PLAN OF OPERATIONS
DEWEY–BURDOCK PROJECT

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Prepared for
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Dewey-Burdock Project
Plan of Operations

POWERTECH (USA) INC.

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Abbreviations and Acronyms

°F	degree Fahrenheit
AADT	annual average daily traffic
AEA	Atomic Energy Act
AEB	aquifer exemption boundary
AEC	Atomic Energy Commission
AMS	air monitoring station
AOR	area of review
ARSD	Administrative Rules of South Dakota
ASTM	American Society for Testing and Materials
BLM	U.S. Bureau of Land Management
CBA	Central Burdock Area
CFR	Code of Federal Regulations
cm/sec	centimeters per second
cpm	counts per minute
CPP	central processing plant
DCGL	Derived Concentrated Guideline Level
DES	Draft Environmental Statement
DENR	Department of Environmental and Natural Resources
DTM	digital terrain model
EC	electrical conductivity
EDE	effective dose equivalent
EFN	Energy Fuels Nuclear
eH	measure of oxidation
EPA	U.S. Environmental Protection Agency
ERG	Environmental restoration group
ESP	exchangeable sodium percentage
ET	evapotranspiration
FAC	facultative
Facility	buildings, grounds, equipment, instruments, furniture, vehicles and scrap
FACU	facultative upland
FACW	facultative wet
ft/day	feet per day
ft^2/day	square feet per day
g	Gram

GIS	Geographic Information System
gpd/ft	gallons per day per foot
gpm	gallons per minute
GPS	Global Positioning System
GWPB	Ground Water Protection Branch
HEC-GeoHMS	Geospacial Hydrologic Modeling Extension
HEC-GeoRAS	Geospatial River Analysis Extension
HEC-RAS	Hydraulic Engineering Center River Analysis System
HPRCC	High Plains Regonal Climate Center
HSA	historical site assessment
HS&E	health, safety and environmental
HTF	heat transfer fluid
IQR	Inter-quantile range
ISL	in situ leach – also referred to as in situ recovery
IX	ion exchange
LLD	lower limits of detection
M	million
Max WHP	maximum well head pressure
MCE	maximum credible earthquake
MCL	Maximum contaminatre
MDC	Minimum detectable concentration
MDL	Minimum detection limits
mgd	million gallons per day
mg/kg	milligram per kilogram
mg/L	milligrams per liter
mi^2	square mile
MIP	maximum injection pressure
MIT	mechanical integrity test
MVS	Mining Visualization System
MW	Monitor Well also referred to as Monitoring Well
NEHAP	National Emissions Standards for Hazardous Air Pollutants
NEPA	National Environmental Policy Act
NFF	National Flood Frequency
NGD	National Hydrography Dataset
NIST	National Institute of Standards and Technology

NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination Systems
NRC	Nuclear Regulatory Commission
NRCS	National Resource Conservation Service
NVLAP	National Voluntary Laboratory Accreditation Program
NWI	National Wetlands Inventory
NWS	National Weather Service
OBL	obligate
OSHA	Occupational Safety and Health Administration
OW	open water
OWUS	open waters of the United States
PA	proposed action
PAA	proposed action area
pCi/L	picocuries per liter
PGA	peak ground acceleration
pH	A measure of the acidity or basicity of a solution
PIC	pressurized ion chamber
PMF	probable maximum flood
PMP	probably maximum precipitation
PNL	Pacific Northwest Laboratory
POO	Plan of Operations
PPE	personal protective equipment
PQL	Practical Quantitation Level
psi	pounds per square inch
psi/ft	pounds per square inch per foot
psig	pounds per square inch gauge
PUB	palustrine unconsolidated bottom
PUSA	palustrine
PV	pore volume
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Contnrol
RCM	recording current meter
RCRA	Resource Conservation and Recovery Act
RG	regulatory guide

RO	reverse osmosis
RSC	residual sodium carbonate
RZEM	Riverine Lower Perennial Emergent
SAR	Sodium absorption rate
SCFM	standard cubic feet per
SDCL	South Dakota Codified Laws
SD DENR	South Dakota Department of Environment and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGF&P	South Dakota Game Fish and Parks
SDSMT	South Dakota School of Mines and Technology
SDSU	South Dakota State University
SDWA	Safe Drinking Water Act
SERP	Safety and Environmental Review Panel
SF	satellite facility
SMA	surface mine area
SMCL	secondary drinking water standards
SOP	standard operating procedure
SRP	standard review plan
SSURGO	Soil Survey Geographic
SWI	Susquehanna Western Inc.
SWMP	Storm Water Management Plan
T&E	threatened and endangered
TDS	total dissolved solids
TENORM	technologically enhanced naturally occurring radioactive material
TLD	thermoluminescent detectors
TRG	Target Restoration Goals
TSS	Total suspended solids
TSX	Toronto Stock Exchange
TVA	Tennessee Valley Authority
UCL	upper control limit
UIC	underground injection control
UPL	upland
USACOE	U.S. Army Corps of Engineers
USDW	Underground source of drinking water
USFS	U.S. Forest Service

USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WDW	waste disposal well
WHP	well head pressure
WoUS	waters of the United States
wt%	weight percent
μC/ml	microcuries per milliliter
μC/g	microcuries per gram
μR/hr	microroentgens per hour

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Glossary of Terms

Aquifer Exemption	The process by which an aquifer, or portion of an aquifer, that meets the criteria for an underground source of drinking water, for which protection under the Safe Drinking Water Act has been exempted under the criteria in 40 CFR 146.4. Injection of fluids through a Class I, II, or III injection well into any aquifer that meets the classification as a USDW requires a demonstration that the aquifer is not currently serving a drinking water system and is not expected to do so in the future.
Bleed	A small flow of water from a process flow stream for the purpose of affecting process pressure.
Brine Solution	A concentrated solution containing dissolved minerals (usually greater than 100,000 mg/l), especially chloride salts.
Central Processing Plant	The main processing facility that typically includes the ion exchange system, elution and precipitation circuits, settling and holding tanks, dewatering equipment, vacuum dryer and effluent control systems.
Confining Bed (layer)	A geologic formation, group of formations, or a part of a formation of low permeability above and below an aquifer that confine groundwater to flow within the aquifer.
Elution	The process of extracting (or eluting) one material from another by washing with a solvent (eluant) to remove adsorbed material (such as uranium) from an adsorbent such as an ion exchange resin.
Excursion	Any unwanted and unauthorized movement of a recovery fluid detected and confirmed at the monitoring well ring.
Facility	Buildings, grounds, equipment, instruments, furniture, vehicles, and scrap.
Ion Exchange	A chemical process used to recover uranium from solution by the exchange of dissolved uranium ions between a lixiviant (leach solution) and a solid, either a mineral surface or, more commonly, a synthetic polymer resin
Injection Well	A well in which fluids are injected rather than produced, the primary objective typically being to maintain reservoir pressure. Two main types of injection are common: gas and liquid. Liquid-injection wells are common offshore in the oil and gas industry, and in solution (in-situ) mining.
In Situ Leach	The in-place recovery of a mineral resource without removing overburden or ore. This method of mining is typically accomplished by installing a well and recovering the resource directly from the natural deposit by exposing it to the injection and recovery of the lixiviant that causes leaching, dissolution and recovery of the mineral. The term in situ leach is synonymous with the term in situ recovery (ISL) for the purpose of this document.
Lixiviant	A leachate solution pumped underground to recover the uranium from the ore

	body.
Monitor Well	A well used to obtain water quality samples or measure groundwater levels; also referred to as Monitoring Well
Ore Horizon	An interface indicative of the uppermost position of an ore body in a stratigraphic sequence.
Picocurie	One one-trillionth (1/1,000,000,000,000) of a Curie: a measure of radioactivity based on the observed decay rate of approximately one gram of radium. The Curie was named in honor of Pierre and Marie Curie, pioneers in the study of radiation.
Pore Volume (PV)	Volume of water required to replace the water in the volume of aquifer that was mined.
Production Well	Also known as 'extraction well' for in situ recovery, usually located in the center of a 5 or 7 spot well pattern; used to pump the metal-laden solution to the surface for further treatment.
Radionuclide	An unstable form of a nuclide that decays or disintegrates spontaneously emitting radiation. Nuclide: a general term applicable to all atomic forms of an element. Nuclides are characterized by the number of protons and neutrons in the nucleus as well as by the amount of energy contained within the atom.
Safe Drinking Water Act (SDWA)	The main federal law that ensures the quality of Americans' drinking water. The SDWA sets the framework for the UIC Program to control the injection of fluids. EPA and states implement the UIC Program, which sets standards for safe injection practices and bans certain types of injection.
Satellite Plant	A remote plant consisting of an ion exchange system, pumps, reverse osmosis unit and transportation vehicles (tanker trucks) to transport loaded resins to the central processing plant.
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
Thermoluminescent Dosimeters (TLD)	Dosimeters made of certain crystalline materials that are capable of both storing a fraction of absorbed ionizing radiation and releasing this energy in the form of visible photons when heated. The amount of light released can be used as a measure of radiation exposure to these crystals.
Underground Source of Drinking Water (USDW)	An aquifer or portion of an aquifer that supplies any public water system or that contains a sufficient quantity of ground water to supply a public water system, and currently supplies drinking water for human consumption, or that contains fewer than 10,000 mg/l total dissolved solids and is not an exempted aquifer.
Yellowcake	A mixture of uranium oxides that can vary in proportion and in color from yellow to orange to dark green (blackish) depending on the temperature at which the material was dried (level of hydration and impurities). Higher drying temperatures produce a darker, less soluble material. Yellowcake is

commonly referred to as U3O8. This fine powder is packaged in drums and sent to a conversion plant that produces uranium hexafluoride (UF6) as the next step in the manufacture of nuclear fuel.

Section 1.0 - Introduction

1.1 Background

Powertech (USA) Inc. (henceforth, Powertech (USA)) submits this Plan of Operations (POO) as applicable to subparts of 43 CFR § 3809 of the federal requirements to develop and operate the Dewey-Burdock Project ("Proposed Action" or "PA") using in situ leach (ISL) methods to recover uranium. The following Plan of Operations describes the Proposed Action and its environmental setting within the proposed action area (PAA) that includes northwestern Fall River County and southwestern Custer County, South Dakota. Powertech (USA) believes this POO provides sufficient information and descriptions for the Bureau of Land Management (BLM) to make a determination that the Proposed Action will not result in unnecessary or undue degradation of public lands. A request for occupancy is provided in Appendix 1.1-A.

The PA will extract and process uranium which is produced as an oxide, with trade names of "Yellowcake and U_3O_8". Uranium is used as fuel to produce electricity in nuclear power plants. In the United States, 20 percent of the electric power supply is produced by nuclear power. There are currently 104 active licensed nuclear power plants in the US and there are more than 30 nuclear power plants planned for construction in the United States. Nuclear power plants produce minimal amounts of greenhouse gases, thereby decreasing the overall carbon footprint of energy production in the United States. In the United States, the operating nuclear power plants currently have annual requirements for about 54 million pounds of uranium in the form of an oxide. The Proposed Action is planned to produce one million (1,000,000) pounds of U_3O_8 annually for seven years with the potential for extending the production life to 20 years with additional resource development in the area. Currently domestic uranium production is 4.5 million pounds of U_3O_8, with the remainder of the necessary uranium being imported from other countries. The Proposed Action's uranium production will contribute significantly to the energy independence of the United States and will contribute significantly to reducing carbon dioxide and nitrogen oxide emissions in the United States.

1.2 Proposed Surface Disturbance

The EPA method used to determine the AOR for injection wells uses a minimum fixed radius of ¼ mile. The fixed radius AOR for this site specific area permit includes the project area (i.e., the well fields) plus a circumscribing area of no less than 1 mile. The following sections summarize the activities planned by Powertech and are described utilizing the 1.2-mile external boundary chosen based upon the larger AOR required by the Nuclear Regulatory Commission (NRC).

Due to the nature of ISL production, minimal and intermittent surface disturbance will be associated with the project, and will be mainly associated with the central processing plant (CPP), ponds, maintenance and office areas. Additional intermittent disturbance occurs in the well fields, which includes well drilling, pipe installations, and road construction; however, well field disturbances and impacts affect a relatively small area and are short-term.

Surface disturbances associated with the construction of the CPP, office and maintenance buildings, and well field header houses will be for the life of the PA. Topsoil will be stripped and stockpiled from these areas prior to construction. Disturbances associated with the well field drilling and pipeline installation are limited and will be reclaimed as soon as possible after these components are completed. Surface disturbance associated with the development of access roads will occur at the project site; topsoil will be stripped from the road areas and stockpiled prior to construction.

While, the PAA encompasses 10,580 acres, the land potentially disturbed by the PA will be approximately 68 acres (facilities, piping, ponds, well fields and roads) the year proceeding operation commencement. The disturbed area during the life of the project (production to restoration) is estimated to increase over time to a maximum of 108 acres depending on disposal method permitted. If the maximum area for land application of treated wastewater is included in the footprint of the PA (Exhibit 1.1-1), then an additional maximum of approximately 355 acres would be affected by the PA for most of the project life. With the use of land application, the maximum potential disturbance at any given time is expected to be 463 acres. The permitting of deep disposal wells as an alternative to land application would decrease the operation's footprint considerably (Exhibit 1.1-2). The total amount of BLM managed land expected to be disturbed by Powertech (USA) over the life of the PA is approximately 13 acres (Figure 1.2-1).

Figure 1.2-1 displays the locations of uranium ore bodies and a proposed main access road and overhead electric line located on BLM managed lands. These are expected locations of major operational infrastructure that will result in surface disturbance during development of the PA. Also included on this figure is a table showing the total expected surface disturbance acreage on BLM lands associated within the PA. The total estimated BLM surface disturbance calculations take into account all surface disturbance activities throughout the life of the project on BLM managed lands.

The total amount of BLM managed land expected to be disturbed by Powertech (USA) over the life of the PA is approximately 13 acres (Figure 1.2-1). The derivation of this estimate of total surface disturbance acreage takes into account several assumptions. These assumptions include:

- The estimate of BLM surface disturbance is based on the construction and development of all uranium ore bodies within BLM managed lands associated with the PA.
- Partial on-going surface reclamation of disturbed areas immediately following construction has not been considered in the total BLM surface disturbance calculation.
- Not all of the BLM surface disturbances are expected to be active at any one time due to phased development.
- Header house surface disturbances are included in minor road calculations.

The total surface disturbance acreage described above is slightly less than the value presented to the BLM in Powertech's original submission of the POO, which was 14.2 acres. The new value is the result of a reconfiguration of the main road and a reinterpretation of the uranium ore bodies and their related surface disturbance.

It should be noted that the surface disturbance calculation presented is an estimate based on information known at this time. Following further geologic and hydrogeologic investigations conducted adjacent to BLM managed lands, the applicant will have a better understanding of the exact configuration of operational infrastructure. As this information becomes available, the total BLM surface disturbance for the PA may vary slightly, in which case the BLM will be notified of such changes.

Facilities planned on BLM-administered lands during the initial year of project development include power lines, a portion of the primary access road leading to the central processing plant, associated culverts and drainage ditches, a light-use road (non-constructed, two-track trail), and four perimeter monitor wells. The locations of these planned facilities are shown on Exhibit 1.1-3. No exploration, delineation or production/injection well drilling activities will be conducted on BLM-administered lands during the initial year of project development. If delineation and well field drilling performed later result in less than five (5) acres of surface disturbance, a Notice pursuant to 43 CFR §3809.21 will be filed with BLM and accepted by BLM as complete prior to conducting these surface disturbing activities on BLM administered lands. The information required by 43 CFR §3809.301 will be provided in the Notice.

In addition to the facilities shown on Exhibit 1.1-3, the approximate locations of potential future facilities planned on BLM-administered lands are shown on Exhibit 1.1-4. These potential future facilities include injection/production wells, monitor wells, buried pipelines, fencing, secondary access roads, and light-use roads.

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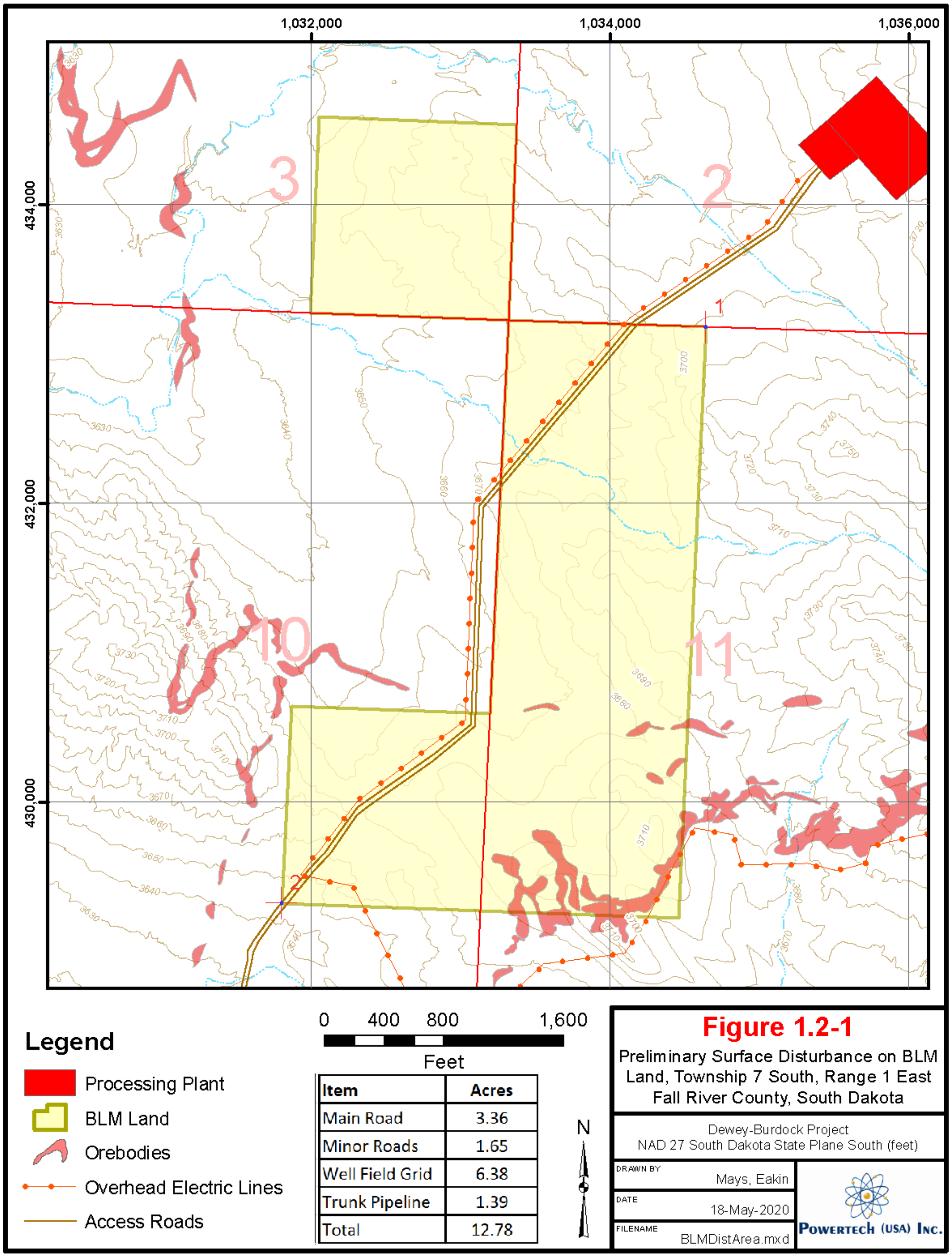

Item	Acres
Main Road	3.36
Minor Roads	1.65
Well Field Grid	6.38
Trunk Pipeline	1.39
Total	12.78

Figure 1.2-1 Surface Disturbance on BLM Lands

Proposed processing facilities and support facilities including a central processing plant, a satellite facility, wastewater storage and treatment impoundments, Madison water supply wells, deep disposal wells, and land application center pivot circles will not be located on BLM-administered lands.

No waste rock (mine overburden) or tailings piles will be generated at any time during Powertech's proposed ISR operations at the Dewey-Burdock Project.

Since the proposed project occurs in an area of known cultural resources, Powertech will complete necessary evaluations and assist in the preparation of treatment and/or mitigation plans as prescribed in the Final Programmatic Agreement, dated April 7, 2014 (NRC ADAMS Accession No. ML14066A344), and as required by License Condition 9.8 in Powertech's NRC source and byproduct materials license (NRC ADAMS Accession No. ML14043A392).

Fencing potentially planned for installation on BLM-administered lands during the life of the project consists of approximately 4,500 to 5,500 linear feet of fencing around well fields.

Based on the selection guidance in BLM's Fencing Handbook H-174-1, a wire fence (bottom strand smooth for antelope passage, others barbed) with the following specifications will be used on BLM-administered lands:

- The distance between posts will be between 16.5 and 30 feet.
- The diameter of wooden posts will be between 3 ½ and 4 inches.
- Wooden posts will be buried approximately 2 feet below ground surface.
- Up to three metal posts will be installed between wooden posts and buried to the "bury line" marked on the post.
- H-braces will be 6 to 7 feet wide and constructed using 6-inch diameter wooden posts.
- The bottom, smooth wire will be at least 15 to 16 inches above ground surface for antelope passage.
- The top wire will be no more than 42 inches high to facilitate passage of deer and elk, and the space between the top two wires will be at least 11 to 12 inches to prevent entanglement.

Signage to be attached to the fence will comply with Powertech's NRC License No. SUA-1600, License Condition 9.11, which specifies that signs reading "CAUTION: ANY AREA WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL" be posted conspicuously at all entrances to the facility. The signs will be posted conspicuously after construction of fencing near the access point for each well field constructed on BLM-administered lands.

Other signage, which may or may not be placed on fencing, includes advisory signs limiting hunting within the vicinity of well fields and processing facilities, and signs at all stockpiled topsoil locations per the requirements of the South Dakota Department of Environment and Natural Resources (SD DENR).

Approximately 3,900 feet of four-wire power line will cross BLM-administered lands as shown on Exhibits 1.1-3 and 1.1-4. It will have a voltage capacity of 14.4/24.9 kV and be constructed of wooden single poles with cross arms. Power poles will be spaced approximately 250 to 275 feet apart. No transformers or switches will be installed on the power lines on BLM-administered lands within the project area.
The power line will be constructed to conform to APLIC recommendations for overhead power line construction by, among other things, providing distances between wires that are adequate to avoid phase-to-phase wingspan contact.

1.3 BLM Claims and Right of Entry

The PAA consists of a combination of private surface, private minerals and federal surface and federal minerals. Surface and mineral acres consisting of 6,120 acres were acquired by landowners through the Homestead Act of May 20, 1862. These lands are controlled by Powertech through active mining leases and purchases. Various landowners acquired 4,220 surface acres through the Stock-Raising Homestead Act of December 29, 1916, whereas the US government retained control all of the minerals under this Act. The 4,220 acres of severed minerals that were retained by the US government under the Stock-Raising Act are controlled by Powertech through unpatented mining claims. In addition, Powertech has located an additional 240 acres (97.1 ha) of unpatented mining claims in accordance with the general Mining Law of 1872 on surface land controlled by the Bureau of Land Management. In conclusion, Powertech controls 10,580 surface and mineral acres either by active mining leases, purchases and unpatented claims. The PAA is located on either side of Dewey Road (previously County Road 6463) and includes portions of Sections 1-5, 10-12, 14 and 15, Township 7 South, Range 1 East and Sections 20, 21, 27, 28, 29 and 30-35, Township 6 South, Range 1 East, Black Hill Meridian. These lands are controlled by Powertech through the staking and acquisition of unpatented Federal Mineral Claims with surface use agreements from the private owners. The 240 acres (97.1 hectares [ha]) of Federal surface are controlled by the BLM and are located in portions of sections 3,10,11 and 12 of Township 7 South Range 1 East. Powertech controls the mineral rights on these lands through unpatented Federal Lode Claims and secures access under the terms of the 1872 mining Law.

The claim serial numbers where disturbance may occur are listed in Table 1.3-1 and are provided in accordance with § 3809.31(2)(d) and § 3809.401 (1). The mineral rights are controlled through unpatented mining claims. Powertech possesses written consent from all the surface owners under active surface use agreements. The surface and minerals under the control of Powertech are illustrated in Exhibit 1.2-1. The proposed permit boundary properties under the control of Powertech (USA) are listed in Table 1.3-2. Land included within the PAA, other than those listed in Table 1.3-1, are private property and are controlled via long-term lease agreements or long-term surface use agreements with the landowners.

Table 1.3-1 Unpatented Mining Claims

BLM Unpatented Mining Claims Held by Powertech (USA) Inc.		
BLM Serial No.	**Claim Name**	**County and State**
SDMMC-218939	NE-0677	Fall River, SD
SDMMC-218940	NE-0678	Fall River, SD
SDMMC-218941	NE-0679	Fall River, SD
SDMMC-218942	NE-0680	Fall River, SD
SDMMC-218943	NE-0681	Fall River, SD
SDMMC-218944	NE-0682	Fall River, SD
SDMMC-218945	NE-0683	Fall River, SD
SDMMC-218946	NE-0684	Fall River, SD
SDMMC-218947	NE-0685	Fall River, SD
SDMMC-218948	NE-0686	Fall River, SD
SDMMC221204	KIM # 50	Fall River, SD
SDMMC221206	KIM # 52	Fall River, SD
SDMMC213188	HECK # 19	Fall River, SD

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Table 1.3-2 Legal Descriptions for the PAA Comprise All Properties Included within the PAA

T6S-R1E, Custer County	T7S-R1E, Fall River County
Section 20: E2NE4, E2SE4, SW4SE4, S2NW4SE4, SE4SW4, S2NE4SW4	Section 1
Section 21: W2,W2W2NE4,W2NW4SE4	Section 2
Section 27: S2	Section 3
Section 28: N2NW4, SW4NW4, SW4	Section 4: W2W2
Section 29	Section 5
Section 30	Section 10
Section 31: E2	Section 11
Section 32	Section 12
Section 33: NW4, SW4, SE4, S2NE4	Section 14: NW4, W2NE4, NE4NE4
Section 34	Section 15: N2
Section 35	

Section 2.0 - Operator Information

Name: Powertech (USA) Inc., a South Dakota corporation, and wholly owned subsidiary of Azarga Uranium Corp., a Canadian corporation.

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Section 3.0 - Description of Operations

3.1 Location Description and Maps of the Project Area

The PAA is located approximately 13 miles north-northwest of Edgemont, South Dakota, and straddles the county line between northern Fall River and southern Custer County. The location of the PAA is described in section 1.2, above. Figure 3.1-1 depicts the proposed project location, i.e. the PAA boundary and Exhibit 3.1-1 depicts the Area of Review (AOR) for all operations considered within this application. The PA will consist of well fields comprised of injection, production, and monitoring wells, satellite ion exchange (IX) production facilities, and a central processing plant (CPP) consisting of an elution (resin stripping) system and precipitation, drying and packaging processes to produce a final uranium product (yellowcake). In addition, the PA will include waste management facilities, office buildings and other structures or facilities to house work areas and equipment. During active ISL operations, Powertech (USA) will construct a series of sequentially developed well fields utilizing ISL technologies and processes to produce uranium from identified ore bodies at the Dewey and Burdock sites (Exhibit 3.1-2). The CPP at the Burdock site will perform all processing of uranium loaded IX resin to produce dried yellowcake product, with disposition of the resulting 11e.(2) byproduct material wastes in a manner consistent with NRC and other applicable regulations and guidance. After depletion of the identified ore bodies in operating well fields, Powertech (USA) plans to restore the groundwater in each completed well field consistent with pre-operational or baseline water quality conditions and in accordance with NRC's implementation of 10 CFR Part 40 Appendix A, Criterion 5B(5). After active uranium recovery operations cease, Powertech (USA) intends to complete site decommissioning and decontamination (D&D), including groundwater restoration, with the ultimate goal of releasing the PA site for unrestricted use

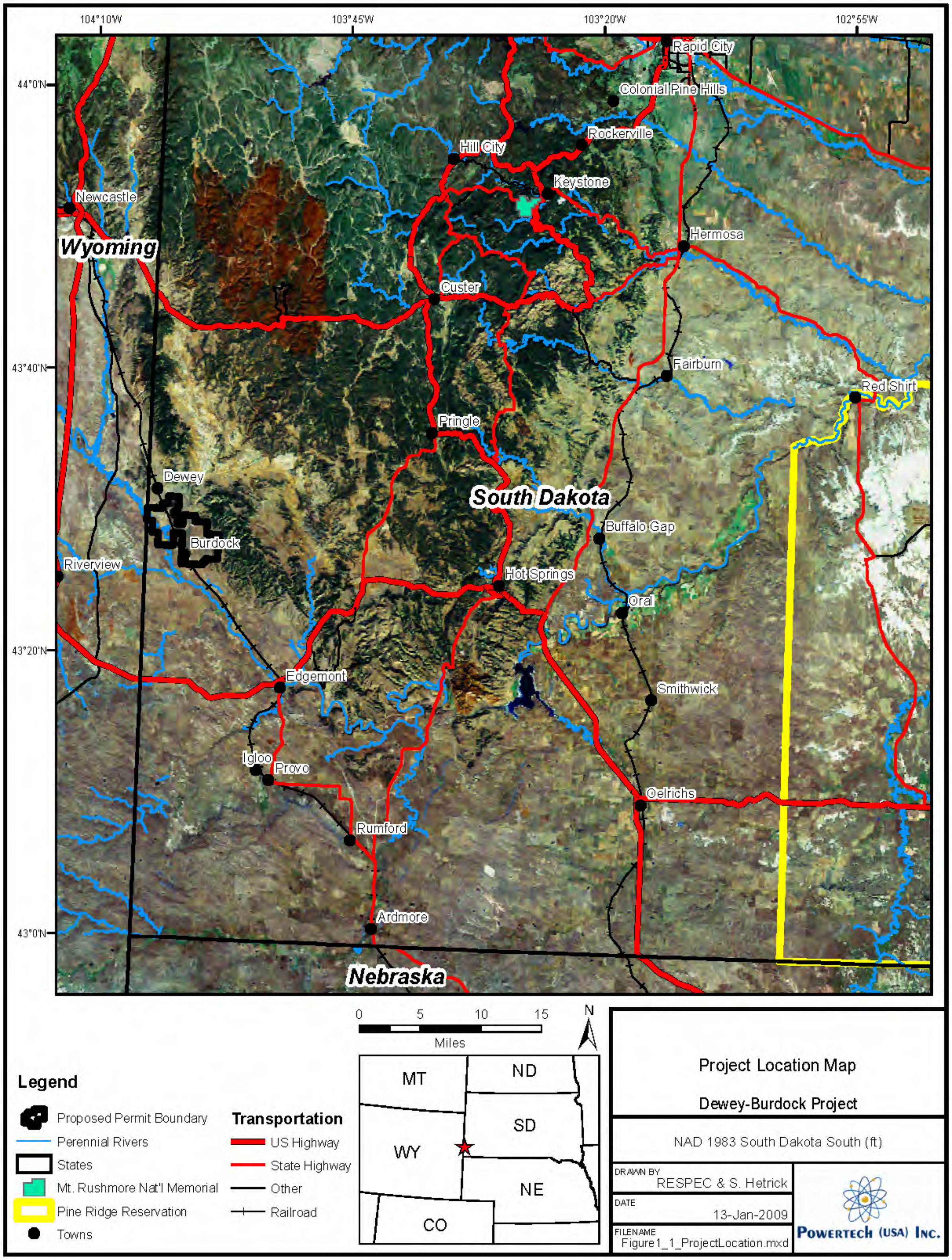

Figure 3.1-1 Proposed Project Location and Site Boundary

3.2 Access Routes

The site can be accessed from the northeast and the west via U.S. Highway 18 to Dewey Road. From the south, the site can be accessed from State Highway 471 to U.S. Highway 18 to Dewey Road. The main access road to the plant facilities and well fields (PAA) is located off Dewey Road in T7S, R1E, and Section 10. This access road joins with several pre-existing roads that traverse through the Burdock Section of the proposed action area (PAA). The Dewey Road also serves as the main access road for the Dewey portions of the PAA. This road joins with several other pre-existing roads. These pre-existing roads within the Burdock and Dewey sections of the PAA will be used to the maximum extent possible in order to minimize surface disturbance. Secondary roads will be built from the existing roads to provide access to other facilities and well fields that are not currently reached from the pre-existing roads.

During the initial year of project development, Powertech plans to construct approximately 3,200 feet of primary access road on BLM-administered lands as shown on Exhibit 1.1-3. The top width of the graveled primary access road will be approximately 28 to 32 feet (two 12-foot lanes and two shoulders). With the drainage ditch dimension included, the total disturbed width of the primary access road will be approximately 45 feet.

Construction of the road will comply with SD DENR requirements as specified in Powertech's large scale mine permit application. Topsoil will be salvaged from the roadbed area prior to construction and placed in designated stockpiles near the primary access road (refer to Section 4 below for additional information on topsoil handling procedures). The road will be surfaced with gravel and include a centerline crown of approximately 2%.

The use of water bars is not planned for cross drainage. Road surfacing, ditching and culverts will be designed to provide adequate drainage and cross drainage. Culverts will be sized and constructed in accordance with SD DENR requirements as specified in Powertech's large scale mine permit application to avoid plugging and collapsing and to minimize erosion at the culvert inlets and outlets. Exhibit 1.1-3 depicts the approximate location of anticipated culverts along the primary access road on BLM-administered lands.

Sediment control for the primary access road will include seeding side slopes and disturbed areas with the seed mixture approved by SD DENR and implementing erosion control measures such as a silt fence and check dams. As a condition of the large scale mine permit, Powertech will be required to submit a final sediment and erosion control plan to SD DENR prior to commencing construction.

In addition to the primary access road, Powertech plans to install approximately 1,300 feet of light-use road on BLM-administered lands during the initial year of project development. The light-use road will be a non-constructed, un-surfaced, two-track trail that is approximately 8 feet wide. Its primary use will be to access the perimeter monitor wells planned on BLM-administered lands using light-duty pickup trucks or other passenger vehicles.

Currently, approximately 8,000 feet of two-track roads exist on BLM-administered lands within the project boundary. To the extent practicable, these existing two-track roads will be used for light-use roads or upgraded to serve as primary access or secondary access roads.

Potential future development on BLM-administered lands may include the addition of approximately 3,000 feet of secondary access roads and 6,800 feet of light-use roads as shown on Exhibit 1.1-4. Secondary access road construction, topsoil handling, drainage, and surfacing will be the same as the primary access road, except that the top width will be narrower (typically 15 to 24 feet) due to the lower traffic demands of the road compared to the primary access road. Secondary access road culverts will be designed in accordance with SD DENR large scale mine permit requirements.

Maintenance of all primary and secondary access roads will be performed routinely and as needed and will include grading, gravel replacement and watering for dust control. Light-use roads will be maintained as necessary and travel on light-use roads will be restricted during adverse weather conditions to minimize erosion.

Powertech plans to apply water to control dust on primary and secondary access roads, including those located on lands administered by BLM. Use of water for dust suppression was incorporated into the project fugitive dust modeling, which was completed in cooperation with BLM, presented to NRC as part of Powertech's source and byproduct materials license application (ADAMS Accession Nos. ML13196A061, ML13196A097 and ML13196A118), and addressed in the Final Supplemental Environmental Impact Statement (FSEIS, ADAMS Accession Nos. ML14024A477 and ML14024A478).

The locations of planned primary and secondary access roads on BLM-administered lands where water may be applied are shown on Exhibits 1.1-3 and 1.1-4.

Powertech does not plan to use other dust abatement agents such as magnesium chloride within the project area.

Any additional routes constructed by Powertech (USA) on BLM managed lands will be planned for only the minimum width needed for operations and shall follow natural contours, where practicable, to minimize cut and fill. If access routes require cuts on the inside edge in excess of 3 feet on public lands, Powertech (USA) will consult with the authorized officer of BLM concerning the methods and location that would create the least amount of degradation (§ 3809.415(6)(b)). Exhibit 3.1-1 displays the potential location of facilities for the proposed project. Also displayed on this figure are the first two mine unit locations, wells within the proposed permit boundary and within one mile surrounding the project area, utilities, residences, and roads.

3.3 Preliminary and Conceptual Designs for Facilities and Cross Sections for Mine Areas/Technology and Practices

The ISL process involves the oxidation and solubilization of uranium from its reduced state using leach fluid (lixiviant). The leach fluid consists of native ground water with an oxidant, such as gaseous oxygen, added to oxidize the uranium to a soluble valence and gaseous carbon dioxide to complex and solubilize the uranium ion causing it to go into solution in the leach fluid flowing through the ore zone. At the well fields, Powertech (USA) will add gaseous oxygen and gaseous carbon dioxide to the recirculated native ground water from the ore zone aquifer. Once solubilized, the uranium bearing ground water will be pumped by submersible pumps via well field production wells to the surface where the uranium is ion exchanged onto ion exchange (IX) resin. After the uranium is removed, the groundwater will be refortified with O_2 and CO_2 and reinjected via well field injection wells. When the IX resin is loaded with uranium, the loaded resin is moved to an IX elution (stripping) column at the CPP where the uranium is eluted (stripped) off the resin by a salt water solution. The resulting barren (stripped) resin is then recycled to recover more uranium. The salt water eluate solution is pumped to a precipitation process where the uranium is precipitated as a yellow solid uranium oxide. The precipitated uranium oxide is then filtered, washed, dried and packaged in sealed containers for shipment to a conversion plant for further processing.

Typically, an ISL well field consists of a set of contiguous geometric shaped patterns of injection and production wells. Powertech (USA) generally will utilize square or rectangular patterns, and sometimes hexagons or triangles to cover the economically recoverable portions of the uranium orebody. This provides for uniform distribution of leach fluid (lixiviant) to efficiently contact the uranium ore. The injection wells will be located at the corners of the geometric patterns and the production wells will be in the center. The lixiviant is pumped into the injection wells and is drawn to the adjacent production well due to the hydraulic gradient formed from the pressure sink created by the pumping well. The production rate is estimated to be between 20-30 gallons per minute (gpm) from each production well. Flow into each of the injection wells is based on the number and configuration of adjacent production wells. The overall injection rate is set to balance flow from the injection wells to the production wells such that slightly more water is produced from each pattern than injected to maintain control of the flow regime. For the entire well field, Powertech (USA) will withdraw 0.5 to 3 percent more ground water than is reinjected to maintain a cone of depression as a pressure sink in the well field. This causes flow of outside baseline quality ground water into the well field and prevents the flow of leach fluid to the monitor well ring surrounding the orebody. The excess produced water (bleed) forces native ground water to continually flow toward the center of the production zone. This bleed also allows Powertech (USA) to control and limit the increase in total dissolved solids (TDS) from the oxidation of reduced chemical species in the ore zone. Over-pumping the production wells prevents the loss of the lixiviant outside of the intended production area and protects ground water outside of the monitor well ring.

Within the SF, the pregnant lixiviant flows through IX columns, where the uranium is transferred to resin. The resin will be trucked or piped to the CPP for further processing into final uranium product (yellowcake).

The barren lixiviant is re-fortified with oxygen and carbon dioxide and re-circulated through the orebody to continue the leaching process. A detailed description of the proposed ISL process is available on (Agency Document Access Management System (ADAMS) http://www.nrc.gov/reading-rm/adams.html in Section 3 of the Technical Report submitted to NRC.

3.3.1 Operating Plans, Design Throughput, and Production

The Proposed Action will utilize uranium ISL production facilities at both the Dewey and Burdock sites with a satellite facility (SF) located at Dewey and a CPP located at the Burdock site see Exhibit 3.1-1. The IX process and well fields are designed for a nominal flow rate of 2000 gpm at each site. Total production from both sites is expected to produce approximately 1,000,000 pounds of U_3O_8 per year.

Refer to Section 7.1 Regional Structure and Stratigraphy and 7.2 Site Structure and Stratigraphy for review of regional and site cross sections.

3.4 Water Management

3.4.1 Operational Water Use

During ISL operations (including both production and restoration) nominal bleed rates of .5-1 percent are expected to be maintained over the life of the project. Instantaneous rates may vary in the range of 0.5 percent to 3 percent for short durations, from a few days to a few months. All effluent systems for treating bleed streams are designed for continuous operation at the maximum bleed rate of 3 percent. However, over the life of the project, a reasonable estimate of .5-1 percent bleed is believed appropriate and sufficient to maintain the cone of depression.

It is anticipated that no more than two well fields, typically one at the Dewey site and one at the Burdock site, will be in production at any given time, with another two in restoration. Restoration will begin as soon as each well field has been depleted of uranium, beginning approximately one to two years after the start of operations. When one well field is depleted, it will be reclaimed at the same time production continues in another well field along the ore trend. This information is repeated in section 5.7.6.9.1 with respect to potential impacts from conducting operations and restoration of groundwater simultaneously.

3.4.1.1 Water Requirements for the Proposed Action Facilities

Additional water requirements for dust control and the CPP processing are estimated to be a maximum of 65 gpm. It is expected that most of this water will be derived from a water supply well to be completed in the Madison formation.

3.4.1.2 Water Usage with Reverse Osmosis and without Reverse Osmosis

Net water use for production operations (as well field bleed) will be in the range 20-120 gpm from the Inyan Kara, with both the Dewey and the Burdock production sites consuming between 10 and 60 gpm as well field bleed. During restoration operations, production of water will be greater from the Inyan Kara. However, water consumed will be replaced with better quality water from the Madison well(s). Therefore, net withdrawal from the Inyan Kara formation will also remain at the range of 0.5 to 3 percent of total restoration flow due to treatment of the water with reverse osmosis (RO) (Table 3.4-1). It is expected that the restoration activities will also be split between the two sites. Net withdrawal during these restoration operations (as well field bleed) is expected to be a total of 2.5 to 15 gpm from the Inyan Kara. At each site, Dewey and Burdock, 1.25 to 7.5 gpm will be the net withdrawal during restoration operations. Net water usage from the Madison using an RO unit to restore groundwater following production, approximately 167 gpm of the 500 gpm (without RO utilization; Table 3.4-2), will need to be made up with Madison aquifer water.

The actual flow rates of water leaving the Inyan Kara formation during restoration operations is expected to be in the range of 150-500 gpm. Nearly all of this water will be “made-up” by injection of water from two sources, the Madison and Inyan Kara Formations.

Madison Formation

The Madison Limestone Formation occurs at approximate depths throughout the project area (2800 – 3200 ft deep). Based on the regional development potential of the aquifer as a source of good quality water, Powertech proposes the installation of a well, or wells, to produce make-up water from the Madison to be used to supplement and replace produced water from the Inyan Kara for both operational bleed and restoration withdrawal. Depending on the final process used, Powertech (USA) may need to produce up to 500 gpm from the Madison aquifer.

In the case of land application disposal of water during restoration, 500 gpm of make-up water will be required from the Madison aquifer. With the RO process used for treating well field bleed streams, permeate will be reinjected and will substantially lower the requirement for makeup water from the Madison; such use of RO typically reduces make-up water requirements to approximately 1/3 (or approximately 167gpm) of the water that would be required without RO (Table 3.4-2).

The actual net difference between fluid produced and fluid injected must be maintained at a rate equivalent to the 0.5-3 percent bleed rates described above. As described above, it is very likely that the Madison aquifer can provide a source of water at the desired rate and quality sufficient for the needs of Powertech (USA) to ensure timely and successful ISL restoration goals.

Inyan Kara Formation

Make-up water is derived from the Inyan Kara formation by withdrawing more bleed thus drawing in more water from the Inyan Kara outside the monitor well ring. Also make up water may be provided by withdrawing from wells that are located far enough from operating well fields so as to not affect the cone of depression within the operating well fields.

Table 3.4-1 Net Water Usage with Reverse Osmosis

	Net Water Usage at nominal bleed rate (with RO in restoration)										Cumulative	Percentage of Recharge	
INYAN KARA											**water Usage**	**350 gpm**	**520 gpm**
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(million gal)**	**recharge**	**recharge**
Production operations													
production flow	4000	4000	4000	4000	4000	4000	4000						
injection flow	3965	3965	3965	3965	3965	3965	3965						
net production withdrawal	35	35	35	35	35	35	35	0	0	0			
bleed rate	0.88%	0.88%	0.88%	0.88%	0.88%	0.88%	0.88%						
Restoration operations													
restoration flow	0	0	500	500	500	500	500	500	500	500			
injection flow			495	495	495	495	495	495	495	495			
Permeate flow			350	350	350	350	350	350	350	350			
Recharge from Madison			145	145	145	145	145	145	145	145			
net restoration withdrawal			5	5	5	5	5	5	5	5			
bleed rate			1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%			
Net Usage from Iyan Kara	35	35	40	40	40	40	40	5	5	5	150	8%	5%
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**			
INYAN KARA	Consumptive Usage - with RO and re-injection of permeate												
Production operations	35	35	35	35	35	35	35	0	0	0	129	7%	5%
Restoration operations*	0	0	150	150	150	150	150	150	150	150	631	34%	23%
Inyan Kara Total	35	35	185	185	185	185	185	150	150	150	759	41%	28%
MADISON	Consumptive Usage - with RO and re-injection of permeate												
Process Water	65	65	65	65	65	65	65	65	65	65	342		
Recharge of Inyan Kara	0	0	145	145	145	145	145	145	145	145	610		
Madison Total		65	210	210	210	210	210	210	210	210	917		
	* assumes all restoration make-up water from outside of INYAN KARA												

Table 3.4-2 Net Water Usage without Reverse Osmosis

	Net Water Usage at nominal bleed rate (without RO in restoration)										Cumulative	Percentage of Recharge	
INYAN KARA											**water Usage**	**350 gpm**	**520 gpm**
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(million gal)**	**recharge**	**recharge**
Production operations													
production flow	4000	4000	4000	4000	4000	4000	4000						
injection flow	3965	3965	3965	3965	3965	3965	3965						
net production withdrawal	35	35	35	35	35	35	35	0	0	0			
bleed rate	0.88%	0.88%	0.88%	0.88%	0.88%	0.88%	0.88%						
Restoration operations													
restoration flow	0	0	500	500	500	500	500	500	500	500			
injection flow			495	495	495	495	495	495	495	495			
Permeate flow			0	0	0	0	0	0	0	0			
Recharge from Madison			495	495	495	495	495	495	495	495			
net restoration withdrawal			5	5	5	5	5	5	5	5			
bleed rate (%)			1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%			
Net Usage from Iyan Kara	35	35	40	40	40	40	40	5	5	5	150	8%	5%
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**			
INYAN KARA	Consumptive Usage - without RO and re-injection of permeate												
Production operations	35	35	35	35	35	35	35	0	0	0	129	7%	5%
Restoration operations*	0	0	500	500	500	500	500	500	500	500	2102	114%	77%
Inyan Kara Total	35	35	535	535	535	535	535	500	500	500	2231	121%	82%
MADISON	Consumptive Usage - without RO and re-injection of permeate												
Process Water	65	65	65	65	65	65	65	65	65	65	342		
Recharge of Inyan Kara	0	0	495	495	495	495	495	495	495	495	2081		
Madison Total	65	65	560	560	560	560	560	560	560	560	2423		
	* assumes all restoration make-up water from outside of INYAN KARA												

3.5 Effluent Control Measures

Surface Water Control

All of the Dewey-Burdock facilities are located outside of the FEMA 100-year flood plain. As part of the wastewater management plan, there may be periodic releases of water from storage ponds for the beneficial use of crop irrigation.

For well fields and non-CPP/SF areas, storm water management will include general grading of roads and building pads to promote positive drainage toward existing water courses. Best management practices (BMPs) for sediment control during construction and operations will be provided until vegetative cover on disturbed ground has been reestablished. Such practices will include, but not be limited to, use of silt fences and hay bales downstream of disturbed areas, and as necessary, long-term erosion protection using stream channel armoring such as rip rap, gabions, and/or geotextiles.

For the CPP/SF areas, and contiguous operational areas, excess runoff above pre-existing conditions will be temporarily detained to assure that peak runoff flow is no greater than peak flow prior to construction. BMPs will include construction of bermed parking lots and routing flow into storm water detention areas with controlled outlet structures. Sediment control during construction will be accomplished using similar BMPs.

Surface water/groundwater interactions and potential impacts to these media from site activities are discussed in Section 7 of this application.

Gaseous and Airborne Particulates

Powertech (USA) will conduct an airborne radiation monitoring program at the Dewey-Burdock facility which is consistent with the recommendations contained in RG 8.30 and will consist of monitoring radon decay products as well as airborne particulate monitoring. Also, Powertech (USA) will conduct an airborne effluent and environmental monitoring program during construction and operations consistent with recommendations in NRC Regulatory Guide 4.14 “Radiological Effluent and Environmental Monitoring at Uranium Mills” (RG 4.14).

This section describes the expected radionuclide airborne emissions from the Dewey-Burdock uranium recovery facilities. Airborne emissions are categorized in two subsections, radon and radionuclide particulates. Potential sources of emissions and a basic description of monitoring for worker protection are based on the design of the process as well as the emissions control systems that will be employed to maintain radionuclide effluents well below regulatory limits and “as low as reasonably achievable” (ALARA).

Radon

According to NRC’s RG 8.30, measurement of radon decay products is the superior method for determining worker dose than radon measurements. Consequently, Powertech (USA) will measure radon decay products in the facility. Working level (WL) measurements for radon decay products will be made on a monthly basis in areas where radon decay product concentrations are likely to exceed 0.03 WL as described in RG 8.30. The time, date, and state of operation of the pertinent equipment in the vicinity of the measurements will be recorded.

The primary radioactive airborne effluent at the Dewey-Burdock ISL facility will be radon-222 gas. Radon-222 is dissolved in the pregnant lixiviant that comes from the well field into the IX facilities for separation of uranium. At the locations where the lixiviant solution is first exposed to atmospheric pressure and ambient temperatures, radon gas will evolve. These are primary release points and include the IX vessels where uranium ion exchange loading occurs and the shaker screens where sediment is separated from ion exchange resin, prior to elution (NMA 2007, Brown 1982, 2007, 2008). The IX vessels normally operate as sealed, pressurized vessels, such that radon releases only occur during resin transfer operations. Dedicated local exhaust at the IX vessels and shaker screens will be directed to a manifold that is vented to the atmosphere outside the building via an induced draft fan. Exhausting radon-222 gas to the atmosphere outside the plant minimizes opportunity for in-growth of radon particulate daughter products (progeny) in occupied work areas and therefore minimizes employee airborne radiological exposure. Small amounts of radon-222 may be released from the well field, solution spills, filter changes, 11e (2) by-product impoundment areas, reverse osmosis (RO) system operation during groundwater restoration, and maintenance activities. These secondary and/or infrequent additional releases would be quite small relative to radon dissolved in the pregnant lixiviant returning from underground. Radon releases associated with these secondary release points have been shown to be minor components of the overall facility radon-222 source term (NMA 2007, Marple and Dziuk 1982, Brown 1980, 2007, 2008). An operational monitoring program will be established to measure radionuclide particulates and radon-222 in the atmosphere outside the buildings and other specified locations within the PAA.

The general heating, ventilating and air conditioning (HVAC) system in the plant will further reduce employee exposure by removing radon from plant air and will be exhausted through a separate ventilation system. This system will be connected via ductwork and manifolds to the eluant and precipitation tanks. Potential release points as well as general air in the plant will be routinely sampled for radon daughters to assure that concentration levels of radon and progeny are maintained ALARA. Sampling and monitoring methods specific for radon progeny will be used (NRC 2002a). Results of monitoring obtained during initial plant operation will be used to adjust monitoring programs (location and frequency), ventilation and/or other effluent control equipment as may be necessary.

Redundant exhaust fans will direct collected gases to discharge piping that will exhaust fumes to the outside atmosphere. Redundancy of fans will minimize employee exposures should any single fan fail. Discharge points will be located away from building ventilation intakes to prevent introducing exhausted radon back into the facility (NRC 2002b). Airflow through any openings in the vessels will be from the process area into the vessel and then into the ventilation systems, maintaining negative flow into the vessel and controlling any releases. (Note that the lixiviant circuit through IX will be a closed system; atmospheric conditions will initially be encountered during resin transfer at the shaker screens.) Tank ventilation of this type has been successfully utilized at other ISL facilities and proven to be an effective method for minimizing employee exposure. (Brown 1982, 2007, 2008)

The general building ventilation system will be designed to maintain air flow from the least likely airborne release locations to the most likely potential release locations prior to external exhaust. Ventilation systems will exhaust outside the buildings and draw in fresh air. During favorable weather conditions, open doorways and convection vents in the roof will provide supplemental work area ventilation.

Radionuclide Particulates

Continuously operating air samplers will be analyzed quarterly for natural uranium, thorium-230, radium-226, and lead-210. Passive track-etch detectors will be deployed at each station for monitoring radon-222 on a quarterly basis. The maximum lower limits of detection (LLDs) for the analyses will be consistent with the recommendations of NRC's RG 4.14. Additionally, effluents from the yellowcake dryer and packaging vent system will be sampled quarterly. The grab samples will be isokinetic in nature and will be analyzed for natural uranium, thorium-230, radium-226, and lead-210. The maximum LLDs for the analyses will be consistent with recommendations of NRC's RG 4.14.

Since there will be no ore grinding at the facility, monitoring of airborne uranium ore dust will not be necessary. However, airborne yellowcake will be monitored at the facility. The facility will be drying yellowcake under low temperatures between 200 and 400°F (93.3-204.4 °C). According to the footnotes of 10 CFR 20 Appendix B, yellowcake dried under low temperature should be considered soluble. Weekly 30 minute grab samples (low volume breathing zone samples) will be taken in airborne radioactivity areas. Breathing zone samples provide a better estimate of airborne particulate concentrations to which workers are exposed, resulting in a more representative estimate of actual intakes. The sensitivity of this method shall be at least 1 x 10-11 µCi / mL. Breathing zone samples will be taken during non-routine operations with potential for a worker to receive exposure to airborne yellowcake above 1 x 10-10 µCi / mL.

Precipitation and Dewatering

Potential radiological air particulate effluents are generated primarily from dried uranium concentrate in the yellowcake drying and processing areas. Following precipitation of uranium from solution, the uranium concentrate is fed to a gravity thickener. The gravity-thickened yellowcake slurry will be pumped into a plate and frame filter press for dewatering. At this point the product contains approximately 60 percent solids content. Dewatered yellowcake drops from the filter press into a live bottom hopper with a screw auger to move the pressed yellowcake slurry to a sump where a progressing-cavity positive displacement pump transfers the yellowcake to the dryers. Although minor spills can occur during the thickening and dewatering process, they would be cleaned up quickly and the area would subsequently be surveyed to minimize any potential airborne source.

Yellowcake Drying and Packaging

Yellowcake drying will be undertaken with a vacuum dryer.

The vacuum drying system is proven technology, which is being used successfully at several ISL facilities (NMA 2007). The off gas treatment system of the vacuum dryers includes a baghouse, condenser, vacuum pump, and packaging hood. The yellowcake will be dried at the standard operating drying range of 200-400 °F (93.3-204.4 °C) in the rotary vacuum drying process. The off gases generated during the drying cycle are filtered through a baghouse, which is located on the top of the dryer, to remove particles down to approximately 1 micron in size. The gases are then cooled and scrubbed in a surface condenser to further remove the smaller size fraction particulates and the water vapor during the drying process. Two rotary vacuum dryers will be located in a separate building attached to the CPP. This attached building will contain the dryers, the bag houses on the dryers, and a condenser scrubber and vacuum pump system for each dryer. The dryers will be heated with a heat transfer fluid (HTF) that circulates through the shell and the rotating central shaft. The heat transfer fluid will be heated by two natural gas or propane-fired HTF heaters, each provided with HTF pumps for circulating the HTF through the shell and central shaft of the dryer. The HTF heaters and pumps will be in a separate structure attached to the back of the dryer building. The water-sealed vacuum pumps will provide the vacuum source while the dryer is being loaded and while the yellowcake is unloaded into drums.

The vacuum dryers are steel vessels heated externally as described above and fitted with rotating plows to stir the yellowcake. The chamber will have a top port for loading the wet yellowcake and a bottom port for unloading the dry powder. A third port will be provided for venting through the baghouse during the drying procedure. The baghouse and vapor filtration unit will be mounted directly above the drying chamber so that any dry solids collected on the bag filter surfaces can be batch discharged back to the drying chamber. The baghouse will be heated to prevent condensation of water vapor during the drying cycle. It will be kept under negative pressure by the vacuum system.

The condenser will be located downstream of the baghouse and will be water cooled. It will be used to remove the water vapor from the non-condensable gases emanating from the drying chamber. The gases are moved through the condenser by the vacuum system. Dust passing through the bag filters is wetted and entrained in the condensing moisture within this unit. The vacuum pump will be rotary water sealed providing negative pressure on the entire system during the drying cycle. It will also be used to provide negative pressure during transfer of the dry powder from the drying chamber to 55-gallon steel drums. The water seal of the rotary vacuum pump captures entrained particulate matter remaining in the gas streams.

The packaging system will be operated on a batch basis. When the yellowcake is dried sufficiently, it will be discharged from the drying chamber through a bottom port into 55-gallon steel drums. A level gauge, a weigh scale, or other suitable device will be used to determine when a drum is full. Particulate capture will be provided by a sealed hood that fits on the top of the drum, which will be vented through a sock filter to the condenser and the vacuum pump system when the powder is being transferred.

Atmospheric Discharges from the Yellowcake Drying and Packaging System
The yellowcake drying and packaging area will be serviced by a dedicated ventilation system. The vacuum pump is the only piece of equipment in the area that discharges to the atmosphere. The vacuum pump is a rotary water sealed unit that provides a negative pressure on the entire system during the drying cycle. It is also used to provide ventilation during transfer of the dry powder from the drying chamber to 55-gallon drums. The water seal of the rotary vacuum pump captures entrained particulate matter remaining in the gas streams, which is recycled back to the process. This point of discharge will be routinely monitored via filter collection and radiochemical analysis for Natural U, Th 230, Ra 226 and Pb 210 to ensure radionuclide effluent releases are maintained ALARA. The water that is collected from the condenser will be recycled to the precipitation circuit, eluant makeup, or disposed with other process water. General plant air will be monitored routinely for airborne radionuclides.

The system will be instrumented sufficiently to operate automatically and to shut itself down for malfunctions such as heating or vacuum system failures. The system will alarm if there is an indication that the emission control system is not performing within operating specifications. If the system is alarmed due to the emission control system, the operator will follow standard operating procedures to recover from the alarm condition, and the dryer will not be unloaded or reloaded until the emission control system is returned to normal service.

To ensure that the emission control system is performing within specified operating conditions, instrumentation will be installed that signal an audible alarm if the air pressure (i.e. vacuum level) rises above specified levels, and the operation of this system is routinely monitored during dryer operations. The operator will perform and document inspections of the differential pressure or vacuum every four (4) hours. Additionally, the air pressure differential gauges for other emission control equipment is observed and documented at least once per shift during dryer operations.

Other Airborne Emissions
Other emissions to the air are possible from limited vehicular traffic (exhaust and dust). There will not be any significant combustion related emissions from the process facility as commercial electrical power is available to the site.

Liquid Effluent Sources
The primary source of liquid waste is the operation of the IX process which generates production bleed. This bleed will either be sent to a deep disposal well or will be treated with barium chloride to precipitate radium and then to a radium settling pond to settle and remove the radium. From there, the water suitable for discharge will be used to irrigate alfalfa or other crops suitable for animal feed within the permit area using center-pivot sprinklers. Other sources of liquid waste from the CPP include laboratory chemicals, laundry water, plant wash down water and the waste brine streams from the elution and precipitation circuits; however, these liquid waste streams make up a much smaller portion of the total liquid waste stream at the Dewey-Burdock facility. These wastes will be collected, treated, and discharged to the deep disposal well.

Well Field Development Effluent
During well development or redevelopment, water will be collected, treated and the waste will be disposed of via a deep disposal well or treatment and land application. Water from injection lixiviant or recovery fluids recovered from areas where a liquid release has occurred from a pipeline or well will be placed into the wastewater disposal system for either deep well disposal or treatment and land application.

Storm Water Runoff
DENR is responsible for administering the stormwater management program that is closely modeled after the federal National Pollution Discharge Elimination System (NPDES) program. Facility drainage will be designed to route storm water runoff either away from or around the plant, ancillary buildings and parking areas, and chemical storage. The design of the project facilities, combined with engineering and

procedural controls contained in a Best Management Practices (BMP) Plan, will ensure that storm water runoff is not a potential source of pollution.

3.6 Quality Assurance Plans

Powertech (USA) will establish a quality assurance program at the facility consistent with the recommendations contained in NRC Regulatory Guide 4.15 “Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) - Effluent Streams and the Environment” (RG 4.15). The purpose of the program is to ensure that all radiological and nonradiological measurements that support the radiological monitoring program are reasonably valid and of a defined quality. These programs are needed (1) to identify deficiencies in the sampling and measurement processes and report them to those responsible for these operations so that licensees may take corrective action and (2) to obtain some measure of confidence in the results of the monitoring programs to assure the regulatory agencies and the public that the results are valid.

The quality assurance program will contain the following RG 4.15 elements:

- The organizational structure, responsibilities, and qualifications of both the management and the operational personnel.
- Specification and qualifications of personnel.
- The SOPs used in the monitoring programs.
- The records of samples, from collection to shipping to analysis.
- The records of quality control of the sample analyses, including results of quality control blanks, duplicates, and cross-checks performed by other laboratories.
- The calibration and operation of equipment used in obtaining samples, measuring radiation, etc.
- Data verification and validation procedures.
- The data and calculations used to determine concentrations of radioactive materials, radiation doses due to occupational exposure, etc.

Quality assurance procedures, as described in RG 4.14 will be defined for the following programs:

- External Monitoring Program
- Airborne Radiation Monitoring Program
- Contamination Control Program
- Airborne Effluent and Environmental Monitoring Program
- Management Control Program

Additionally, quality assurance recommendations contained in RG 4.14 and RG 8.22 will be incorporated in the environmental monitoring and bioassay programs, respectively. In general, the quality control requirements for a specific activity will be incorporated into the SOP for that activity.

The quality assurance program will be audited periodically. The audits will be conducted by individuals qualified in radiochemistry and monitoring techniques. However, the auditors will not have direct responsibilities in the areas being audited. An example of an appropriate auditor is a consultant. The results of the audits will be documented and made available to members of management with authority to enact any changes needed (i.e. RSO, Mine Manager, etc.).

3.7 Spill Contingency Plans

Procedures to address and respond to potential spills will be the responsibility of the radiation safety department; engineers and operations supervisors will assist in development of procedures. The SERP will review the procedure for effectiveness. Procedures developed will implement appropriate protocol to handle potential spills of radioactive materials. Nine responsibilities comprise basic activities:

- Resources and manpower assigned.
- Material and Inventory.
- Identification of potential spill sources.
- Spill reporting and visual inspection program established.
- Review of past spill incidents.
- Coordination among all departments for containment of spills.
- Emergency response protocol established.
- Program implementation, review and updating.
- New construction and changes in process relative to prevention and control of spills will be reviewed.

There are two types of spills that may result from an in situ operation:

<u>Surface Releases</u>
Potential surface releases may be the result of a tank failure, ruptured pipe, or transportation incident.

Failure of a process vessel will be contained within the CPP via berms and directed into a sump (equipped with a level alarm) that will allow the solution to be transported to appropriate tank or disposal system.

Piping system leaks is the most common source of surface releases that occur at an in situ facility. Generally these spills are small due to engineering controls set up to detect changes in pressure within the piping systems. Operators are alerted via an alarm system when pressure changes occur. Well field piping systems are constructed of PVC or high density polyethylene (HDPE) materials with butt welded joints or the equivalent. All pipelines will be pressure tested at operating pressures before put online. No additional stress is placed on the buried pipes so it is improbable a break would occur. The underground portions of the pipes are protected from vehicles and exposed pipes only occur at the wellheads and header houses. Trunkline flows and wellhead pressures will be monitored for process control. Spill response is specifically addressed in the Emergency Response Procedures (Energy Metals Corporation, U.S, 2007).

Spills related to transportation will be addressed in the Emergency Response Action Plan. Specific actions involving response to a radioactive materials shipment will include instructions for appropriate packaging, documentation, driver emergency and accident response procedures and cleanup and recovery protocol. The water contained in the piping and potentially in spills contains only very low concentrations of uranium, generally less than 100 parts per million, consequently radiation dose to a clean-up crew would be minimal. If there is a spill, it will be easily detected and removed to a licensed low-level radioactivity disposal site.

<u>Subsurface Releases</u>
Potential subsurface releases such as a well excursion may result in the migration of process fluids.

Monitoring wells will be set up around the well field for detection of any leach fluids that may potentially migrate away from the production zone due to an imbalance in well field pressure. The monitoring well detection system is a proven method historically among ISL operations. Powertech (USA) proposes to locate a ring of monitoring wells no farther than 400 feet from the well field. These monitoring wells will be screened in the same zone as the production well. There will be additional wells monitoring the aquifers above and potentially below the ore-bearing aquifer. Sampling of monitoring wells will occur on a weekly or bi-weekly basis. Recovery and monitoring work in conjunction, as a coordinated effluent control system, and has proven effective in early detection of recovery fluids for a number of reasons:

- Close proximity of monitoring wells to well field
- Low flow of production wells
- Cone of depression created from production bleed

The overall effect of the system makes non-detection highly unlikely.

Effluent controls for preventing migration of recovery solutions to overlying and underlying aquifers consist of:

- Plugging and Abandonment of all exploration holes.
- Conducting Mechanical Integrity Tests (MITs) on each well before it is put on line.
- Sampling the monitoring wells located within the overlying and underlying aquifers on a frequent schedule.

These controls work together to prevent and detect production fluid migration. Plugging exploration holes prevents connection of the ore-bearing aquifer to overlying and underlying aquifers. The EPA UIC requirement of MITs assures proper well construction and is the first line of defense for maintaining appropriate pressure without leakage. Sampling the monitor wells will enable early detection of any production solutions should an excursion occur.

Sediment or erosion of existing soils has the potential to lead to a release of undesirable elements in addition to the aforementioned spills. The greatest likely hood of this type of release may occur during the construction phase of the project. Two types of Best Management Practices (BMPs) will be employed to minimize the effects of runoff during precipitation events. One type is erosion prevention practices and the second type is sediment control practices.

Erosion Prevention Practices utilize ground covers that prevent different types of erosion from occurring. Ground covers include but are not limited to:

- Vegetation
- Riprap
- Mulch
- Blankets

Sediment control practices prevent soil particles that are being carried in storm water from leaving the site. These types of controls may consist of:

- Silt fence
- Sediment traps
- Sediment basins
- Vegetative cover

Leaving as much of the vegetation in place for as much of the construction period as possible will reduce the potential for a precipitation event to cause significant erosion and soil loss on-site. Utilizing erosion prevention and sediment controls in combination will prevent sediment loss during a major precipitation event. In addition to the above mentioned controls, engineering design and administrative controls will also minimize and control erosion and runoff. Should a pipeline failure coincide with a precipitation event, there is potential for a release. Relative soil saturation beneath the leak area would be a determining factor to what extent the material would be able to be absorbed. In any event with rapid detection and quick spill response a pipeline failure and migration of solutions due to runoff would be minimal.

Wells That May Require Corrective Action

For decades, it has been common practice in the area to allow free-flowing wells to continually discharge, largely to prevent freezing during winter. The attached map shows artesian wells within the AOR that will be monitored to determine if corrective action will be needed (Figure 3.7-1). This determination will be made during well field design phase.

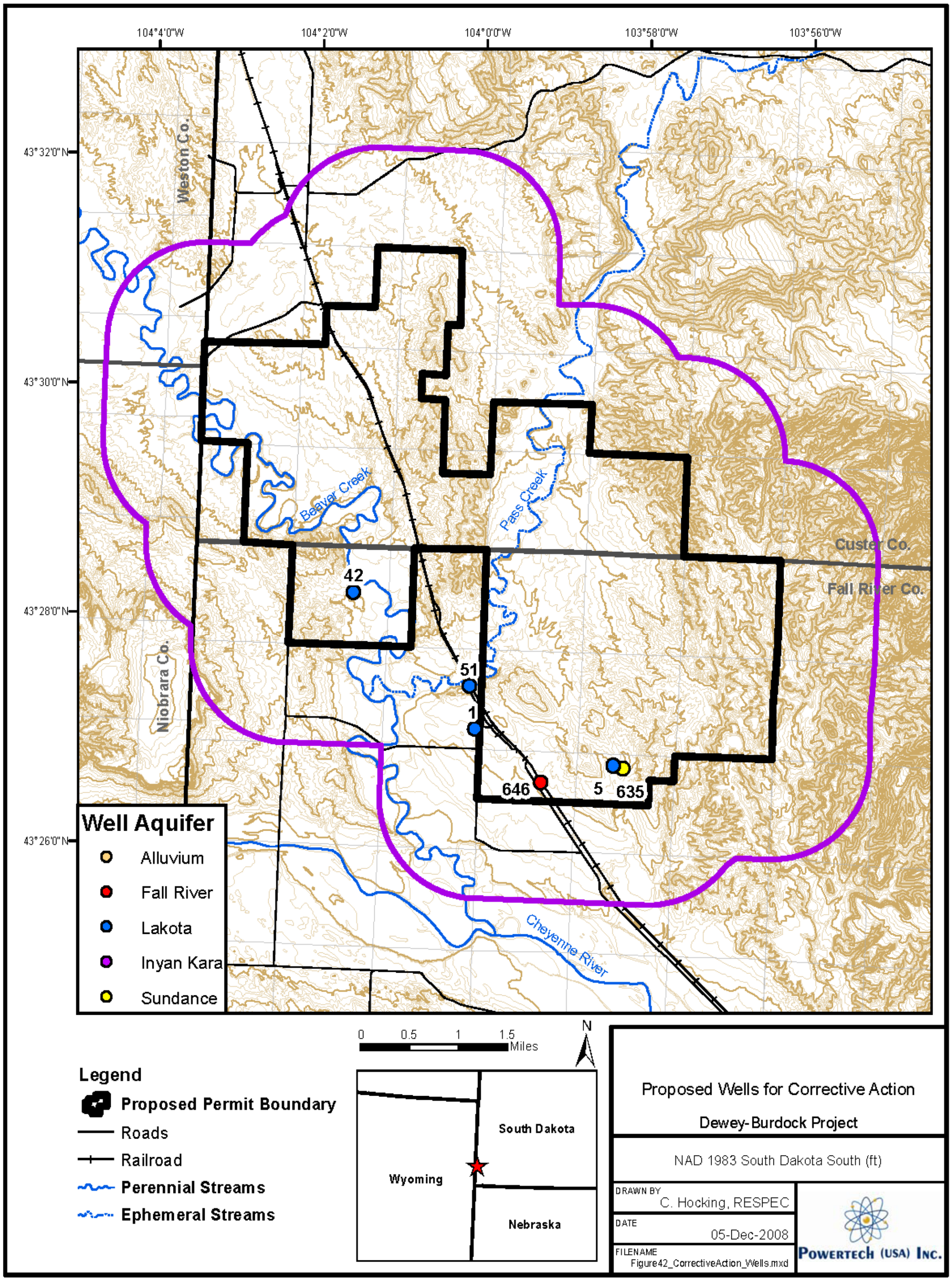

Figure 3.7-1 Proposed Wells for Corrective Action

3.8 Life of Mine Schedule/Sequence of Operations

Following the issuance of an NRC uranium recovery license and other relevant permits it is anticipated that construction of the Burdock Well Field 1, CPP and ancillary facilities including storage ponds and land application pivots will commence. The construction of the Dewey Well Field 1 and ancillary facilities will follow shortly thereafter. Startup of the Dewey and Burdock operations will commence upon completion of construction and will continue for approximately 7 to 20 years or more during which additional well fields will be completed along the roll fronts at both Dewey and Burdock sites. It is planned that groundwater restoration can be accomplished within NRC requirements for timeliness in decommissioning (10 CFR § 40.42); however, in the event restoration cannot be accomplished within this timeframe, Powertech (USA) will seek NRC approval for an alternate schedule. The projected construction, operation, restoration and decommissioning schedule is provided in Figure 3.8-1.

Decommissioning of the well fields including well abandonment, the removal of piping, tanks, ancillary buildings and equipment, cleanup of surface soil to applicable standards and revegetation of disturbed areas will be implemented following the cessation of ISL operations at the Dewey and Burdock sites. It is likely that the CPP at the Burdock site will continue to operate for several years following the decommissioning of the Proposed Action well fields. The CPP may continue to process uranium from other ISL projects such as the nearby Powertech (USA) satellite ISL projects of Aladdin and Dewey Terrace planned in Wyoming, as well as possible tolling arrangements with other operators.

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Figure 3.8-1 Projected Construction, Operation, Restoration and Decommissioning Schedule

3.9 Infrastructure Plans

Approach to Well Field Development

An ISL well field consists of a series of injection and production wells that are completed across the target mineralization zone. Prior to design of the wells, the ore bodies will be delineated with exploration holes drilled on 100-feet centers. As discussed earlier, these holes will be geologically and geophysically logged Using this information, each new injection and production well will be assigned lateral coordinates, a ground surface elevation, depth to base of casing, i.e., top of completion interval, and length of completion interval, before it is drilled.

For all injection and production wells, the base of casing will be established at or below the confining unit overlying the mineralized zone. The screened interval will be completed only across the targeted ore zone.

A typical (100 x 100 ft grid) well field layout is illustrated on Exhibit 3.9-1 This typical layout is based on the lateral distribution and grade of one of the uranium deposits within the PAA.

The well field patterns may differ from well field to well field, but a typical pattern will consist of five wells, with one well in the center and four wells surrounding it oriented in four corners of a square between 50 and 150 feet. Typically, a production well is located in the center of the pattern, and the four corner wells are injection wells. Such a pattern will be modified as needed to fit the characteristics of each orebody.

The pattern dimensions will vary depending on the geometry of the orebody. All wells will be completed so they can be used as either injection or production wells, so that well field flow patterns can be changed as needed to improve uranium production and restore groundwater quality in the most efficient manner. Other well field designs that may be considered include alternating single lines of production and injection wells.

Production and injection wells will be connected to a common header house, as depicted in Exhibit 3.9-2. Well head connection details for injection and production wells are illustrated on Figures 3.9-1 and 3.9-2, respectively.

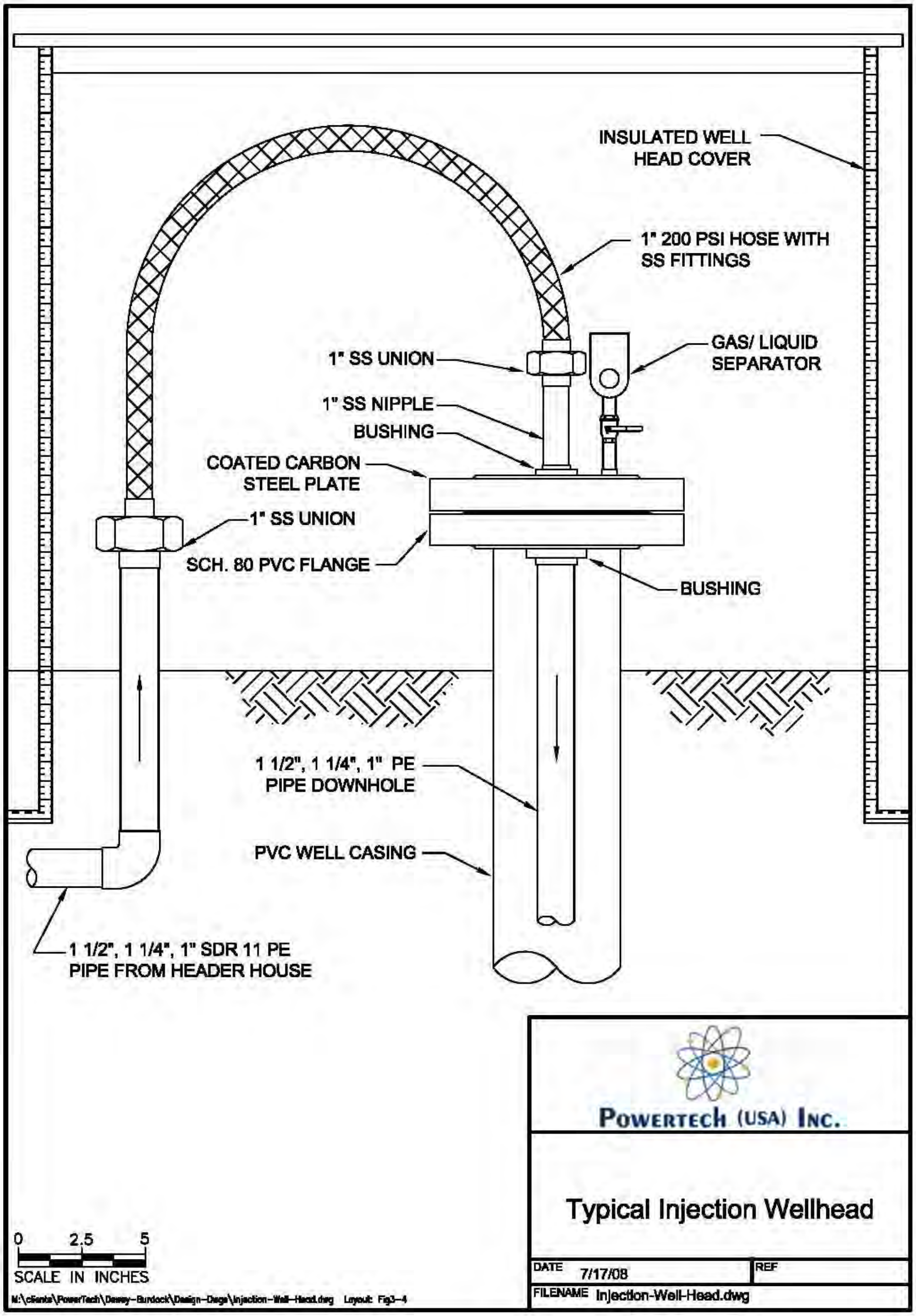

Figure 3.9-1 Typical Injection Wellhead Diagram

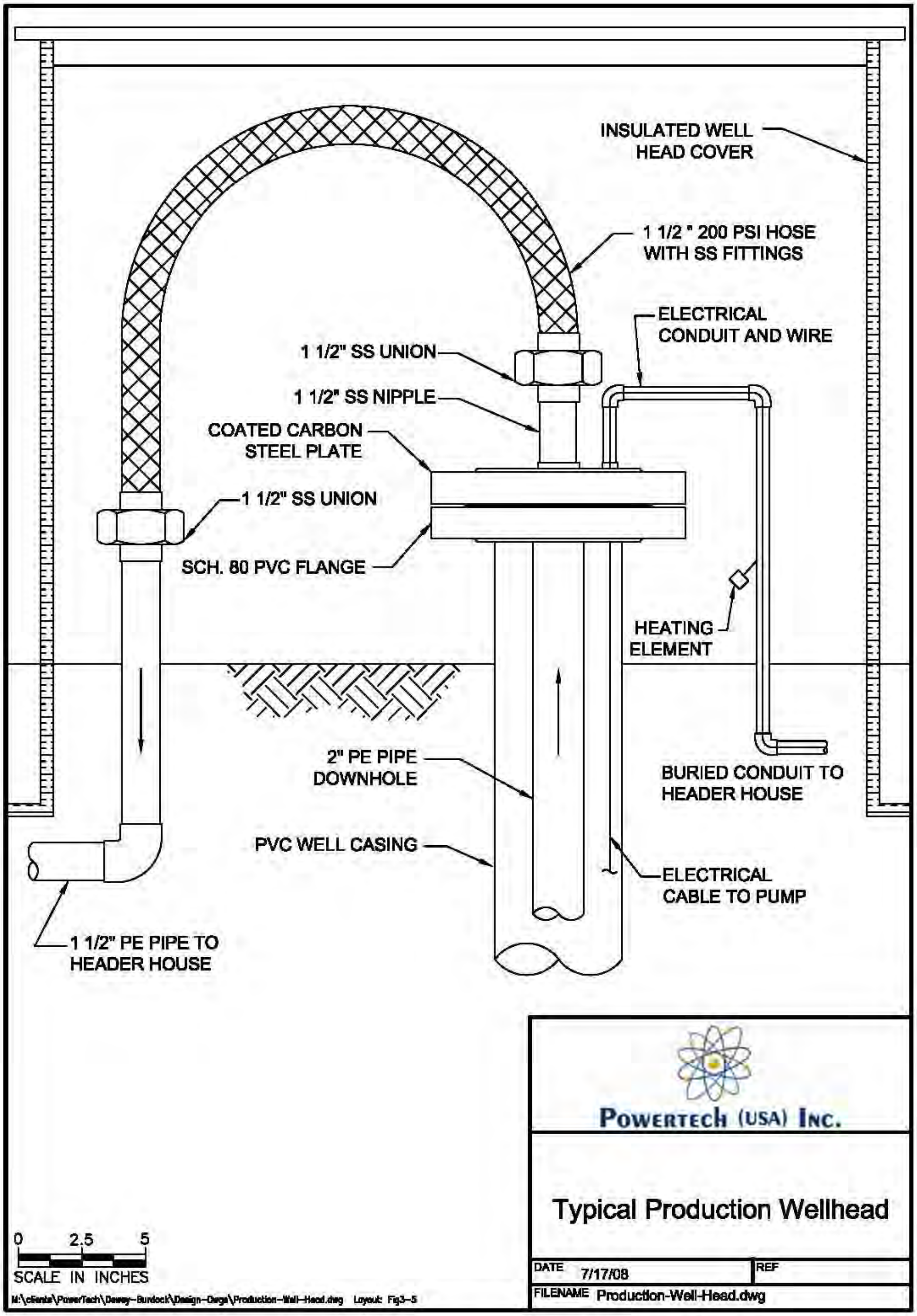

Figure 3.9-2 Typical Production Wellhead Diagram

Well Construction Methods

Typical well installation will begin with drilling a pilot bore hole through the ore zone to obtain a measurement of the uranium grade and the depth. The pilot bore hole will be described using geologic and geophysical logs. After logging, the pilot bore hole will be reamed to the appropriate diameter to the top of the ore zone. A continuous string of PVC casing will be placed into the reamed borehole. Casing centralizers will be installed as appropriate. With the casing in place a cement/bentonite grout will be pumped into the casing. The grout will circulate out the bottom of the casing and back up the casing annulus to the ground surface. The volume of grout necessary to cement the annulus will be calculated from the bore hole diameter of the casing with sufficient additional allowance to achieve grout returning to surface. Grout remaining inside the well casing may be displaced by water or heavy drill mud to minimize the column of the grout plug remaining inside the casing. Care will be taken to assure that at a grout plug remains inside the casing at completion. The casing and grout will then be allowed to set undisturbed for a minimum of 24 hours. When the grout has set, if the annular seal observed from the ground surface has settled below the ground surface, additional grout will be placed into the annular space to bring the grout seal to the ground surface.

After the 24-hour (minimum) setup period, a drill rig will be mobilized to finish well construction by drilling through the grout plug and through the mineralized zone to the specified total well depth. As illustrated in Figure 3.9-3, the open borehole will then be under reamed to a larger diameter.

A well screen assembly will then be lowered through the casing into the open hole. The top of the well screen assembly will be positioned inside the well casing and centralized and sealed inside the casing using “K” packers. With the drill pipe attached to the well screen, a one-inch diameter tremie pipe will be inserted through drill pipe and screen, and through the sand trap check valves at the bottom of well screen assembly. Filter sand, comprised of well rounded silica sand sized to optimize hydraulic communication between the target zone and well screen, will then be placed between the well screen and the formation. The volume of sand introduced will be calculated such that it fills the annular space. The sand will not extend upward beyond the K packers due to packer design. A well completion report will then be prepared for each well. The reports will be kept available on-site for review.

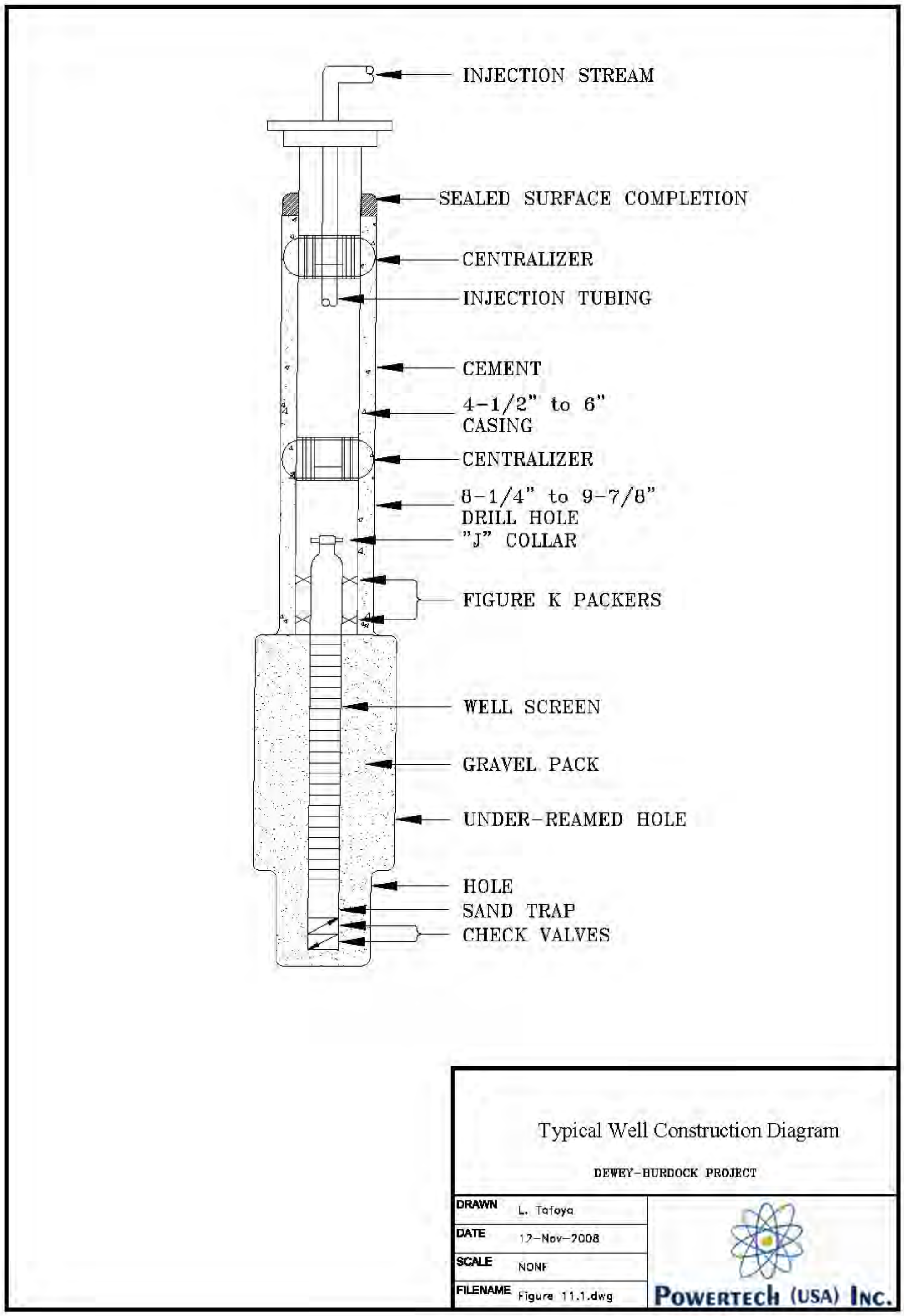

Figure 3.9-3 Typical Well Construction Diagram

The primary goals of well development are to allow formation water to enter the well screen and flush out drilling mud, or cement filtrate water and to develop the well bore to remove the finer clays and silts to reduce the pressure drop between the formation and the well screen. This process is necessary to allow representative samples of groundwater to be collected, if applicable, and to ensure efficient injection and production operations. Wells will be developed immediately after construction using air lifting, swabbing, pumping or other accepted development techniques which will remove water and drilling fluids from the casing and borehole walls along the screened interval. Prior to obtaining baseline samples from monitor or restoration wells, additional well development will be conducted to ensure that representative formation water is sampled. The water will be pumped sufficiently to show stabilization of pH and conductivity values prior to sampling and used to indicate that development activities have been effective.

Well Integrity Testing

Field-testing of all injection, recovery, and monitor wells will be performed to demonstrate the mechanical integrity of the well casing. The mechanical integrity test (MIT) will be performed using pressure-packer tests. The bottom of the casing will be sealed with a plug, downhole packer, or other suitable device. The casing will be filled with water and the top of the casing will be sealed with a threaded cap or mechanical seal. The well casing will then be pressurized with water or air and monitored with a calibrated pressure gauge. Internal casing pressure will be increased to 125 percent of the maximum operating pressure of the well field, 125 percent of the maximum operating pressure rating of the well casing (which is always less that the maximum pressure rating of the pipe), or 90 percent of the formation fracture pressure (which equates to approximately 1 psi per foot of overburden above the bottom of casing), whichever is less. Powertech proposed the method, upon stabilization of pressure, to take readings and record readings at two-minute intervals for ten minutes. A well passes the test if it holds 90 percent of the original pressure for ten minutes. DENR currently requires readings every five minutes for a period of fifteen-minutes after stabilization of pressure. EPA has a different guideline yet. Powertech (USA) is in close communication with the agencies and will comply with the appropriate duration for MIT for Class III wells.

If there are obvious leaks, or the pressure drops by more than 10 percent during the 10 minute period, the seals and fittings on the packer system will be checked and/or reset and another test will be conducted. If the pressure drops less than 10 percent the well casing will have demonstrated acceptable mechanical integrity.

If a well casing does not meet the MIT criteria, the well will be removed from service. The casing may be repaired and the well re-tested, or the well may be plugged and abandoned. Plugging of wells will be in accordance with the EPA regulations located in Title 40 Part 146.10 which comply with the South Dakota Administrative Rules contained in Chapter 74:55:01:59. DENR will be notified of any well that fails the MIT. If a repaired well passes the MIT, it will be employed in its intended service following approval from EPA and/or DENR that the well has demonstrated mechanical integrity. If an acceptable test cannot be demonstrated following repairs, the well will be plugged and abandoned.

In addition to the integrity testing of new wells, a MIT will be conducted on any well following any repair where a downhole drill bit or under-reaming tool is used. Any injection well with evidence of suspected subsurface damage will require a new MIT prior to the well being returned to service. Mechanical integrity tests will also be repeated once every five years for all active wells.

The MIT of a well will be documented to include the well designation, date of test, test duration, beginning and ending pressures, and the signature of the individual responsible for conducting the test. Results of the MITs will be maintained on-site and will be available for inspection by EPA and DENR. Results of MIT shall be reported within quarterly reports in accordance with the EPA UIC regulations in Title 40 Part 146.33 which also meet the DENR requirements in § 74:55:01:49.

3.9.1 Monitoring Well Layout and Design

An extensive groundwater sampling program specific to each well field will be conducted prior to, during, and following ISL operations to identify any potential impacts to water resources of the area. The groundwater monitoring program for individual well fields is designed to (1) establish baseline water quality prior to production, (2) detect excursions of lixiviant either horizontally or vertically outside the of the target mineralization zone, (3) demonstrate compliance with groundwater quality standards, and (4) determine when the mined mineralized zone has been adequately restored following ISL operations. Objectives 1 (partially) and 4 will accomplished using injection and recovery wells. Objectives 1 (partially), 2, and 3 will be accomplished using perimeter and internal non-production zone monitoring wells.

The production wells are laid out in a regular grid to efficiently contact the mineralized deposit (Figure 3.9-4). Generally, the wells are laid out in regular geometric shapes, usually squares, rectangles, triangles, or hexagons. The important features are that the patterns cover the economically mineable portions of the orebody, the production (pumping) well is in the center of each geometric shape, the injection wells are equally spaced from each other and from the production wells in each pattern (geometric shape). This is to ensure efficient contacting of the ore by uniform flow distribution and to facilitate control of the flow to prevent excursion of leachate to the monitor well ring. The injection wells are on the outside to ensure the ore is contacted with leachate and a bleed withdrawing of some 0.5 to 3 per cent of the leachate circulating to maintain a cone of depression ensuring outside groundwater in the ore zone flows in toward the production well field to prevent flow of leachate outwards (NMA, 2007).

The production zone monitor wells are completed in the ore zone around the perimeter of the production well fields spaced 400 feet outside the production well field and evenly spaced around the perimeter of the well field with a minimum spacing either 400 feet or the spacing that will ensure a 70 degree angle between adjacent production zone monitor wells and the nearest injection well (NUREG/CR-6733; NUREG-1910, 2008; NUREG-1569).

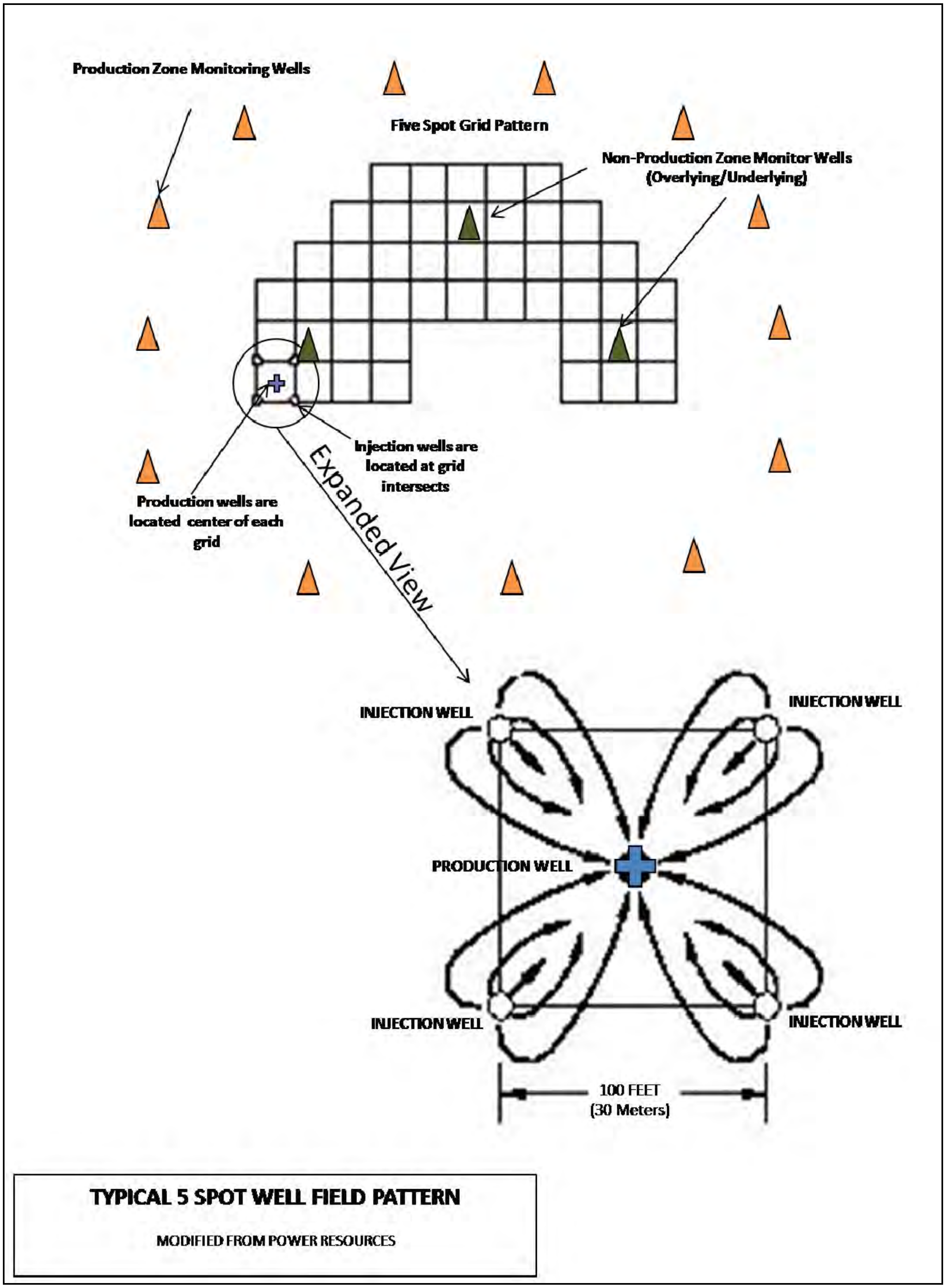

Figure 3.9-4 Typical 5 Spot Well Field Pattern

Non-Production Monitoring Wells
Depending on-site specific conditions, non-production monitoring wells may consist of two types of monitor wells termed "overlying" and "underlying". The screened intervals of overlying wells are located in the sand unit or aquifer immediately above the ore-bearing stratum. The overlying non-production monitoring wells are designed to provide monitoring of any upward movement of leach fluids that may occur from the production zone and to guard against potential leakage from production and injection well casing into any overlying aquifer. The overlying wells are used to obtain baseline water quality data and are used in the development of UCLs for the overlying zones that will be used to determine if vertical migration of leach fluids is occurring. Vertical monitoring is generally set up with a density of wells ranging from one every three or five acres and where confining layers are very thick and permeabilities are negligible, requirements for vertical excursion monitoring can be relaxed or eliminated for underlying aquifers (NUREG/CR-6733, 2001). The screened zone for the overlying wells is determined from electric logs by qualified geologists or hydrogeologists. The first layer of overlying non-production zone monitoring wells will be evenly distributed through the production area with a minimum of one well for every four acres of production area. Should additional aquifers exist above the first monitoring layer; additional overlying monitors will be located in these aquifers with a minimum of one well positioned for every eight acres of production area. The overlying wells will be placed within the geology just above the PAA's upper confining layer the Skull Creek Shale; it has a thickness of approximately 200 feet. Core samples were collected from the lower Skull Creek Shale; analyses of these core samples demonstrate that the Skull Creek Clays have extremely low vertical permeabilities, in the range of 6.8 x 10-9 cm/sec (0.007 millidarcies).

A single layer of underlying monitor wells may be completed in the first sand unit or aquifer underlying the ore-bearing stratum similarly based on the local lithology. The underlying monitor wells are used to obtain baseline water quality data and are used in the development of UCLs for the underlying aquifer that will be used to determine if vertical migration of leach fluids is occurring. The screened zone for the underlying monitor wells is determined from electric logs by qualified geologists or hydrogeologists. Underlying non-production monitoring wells will be evenly distributed through the production area with a minimum of one well for every four acres of production area. Underlying wells will not be installed below the Lakota formation, primarily due to the presence of the approximately 100' thick and relatively impermeable Morrison formation immediately below the Lakota formation.

Non-production zone monitoring wells will be designed and installed for detection of potential excursions of lixiviant, if such an excursion were to occur. Design of the monitor ring and overlying and underlying monitor wells will be performed for each well field according to site specific lithology and processes of the production zone(s) of each well field. Powertech (USA) will present each monitoring well program to EPA and the South Dakota Department of Environmental Natural Resources (DENR) before installation of proposed well placement to ensure administrative approval is obtained. After completion of the required hydrologic test, it may be necessary to revise the location and/or number of wells proposed. South Dakota UIC Class III rules were promulgated in April 2008. ARSD 74:55:01:42 addresses non-production zone monitoring. The rule provides for alternative non-production zone monitoring well location and spacing to be considered if the operator demonstrates that the proposed location or spacing will adequately provide monitoring coverage. Based on industry experience in locating and spacing overlying monitor wells and the low probability of any upward fluid migration going undetected, along with considerations of local lithology, Powertech believes the proposed locations and spacing are sufficient for the monitoring of any potential upward migration of production fluids. The monitoring program will be designed in an effort to satisfy Title 40: Protection of Environment PART 146—Underground Injection Control Program: Criteria and Standards and Chapter 74:55:01 Underground Injection Control -- Class III Wells for the state of South Dakota.

Each well field will be handled on a case-by-case basis in consultation with the EPA and SD DENR. Powertech's Safety and Environmental Review Panel (SERP) to be established under NRC requirements will review hydrologic test results and documentation to demonstrate that the monitoring wells are not hydrologically connected to the injection or production wells. Well field packages will be evaluated based on current knowledge of site lithology and processes of the production area, and industry proven practices, the number and spacing of overlying and underlying monitoring wells to ensure number and spacing meets criteria to protect human health and the environment. Wells completed in overlying and underlying aquifers will be subject to sampling, remedial action, and reporting requirements pertinent to EPA and SD DENR rules.

Groundwater samples will be collected monthly for the first year of operation and quarterly thereafter at the groundwater monitoring well locations as shown in Figure 3.9-5. Quarterly samples will be collected from drinking water and livestock wells, included in the groundwater sampling sites as shown in Figure 3.9-5.

An extensive groundwater sampling program specific to each well field will be conducted prior to, during, and following ISL operations to identify any potential impacts to water resources of the area. The groundwater monitoring program for individual well fields is designed to: (1) establish baseline water quality prior to production, (2) detect excursions of lixiviant either horizontally or vertically outside the of the target mineralization zone, (3) demonstrate compliance with groundwater quality standards, and (4) determine when the mined mineralized zone has been adequately restored following ISL operations. Objectives 1 (partially) and 4 will accomplished using injection and recovery wells. Objectives 1 (partially), 2, and 3 will be accomplished using perimeter and internal non-production zone monitoring wells.

The fact that the upper confining layer is approximately 200-feet-thick and the lower confining layer is approximately 100-feet-thick significantly reduces the concerns of a potential vertical breach for lixiviant migration.

Approximate placement for both well types are illustrated on Figure 3.9-6 and discussed below.

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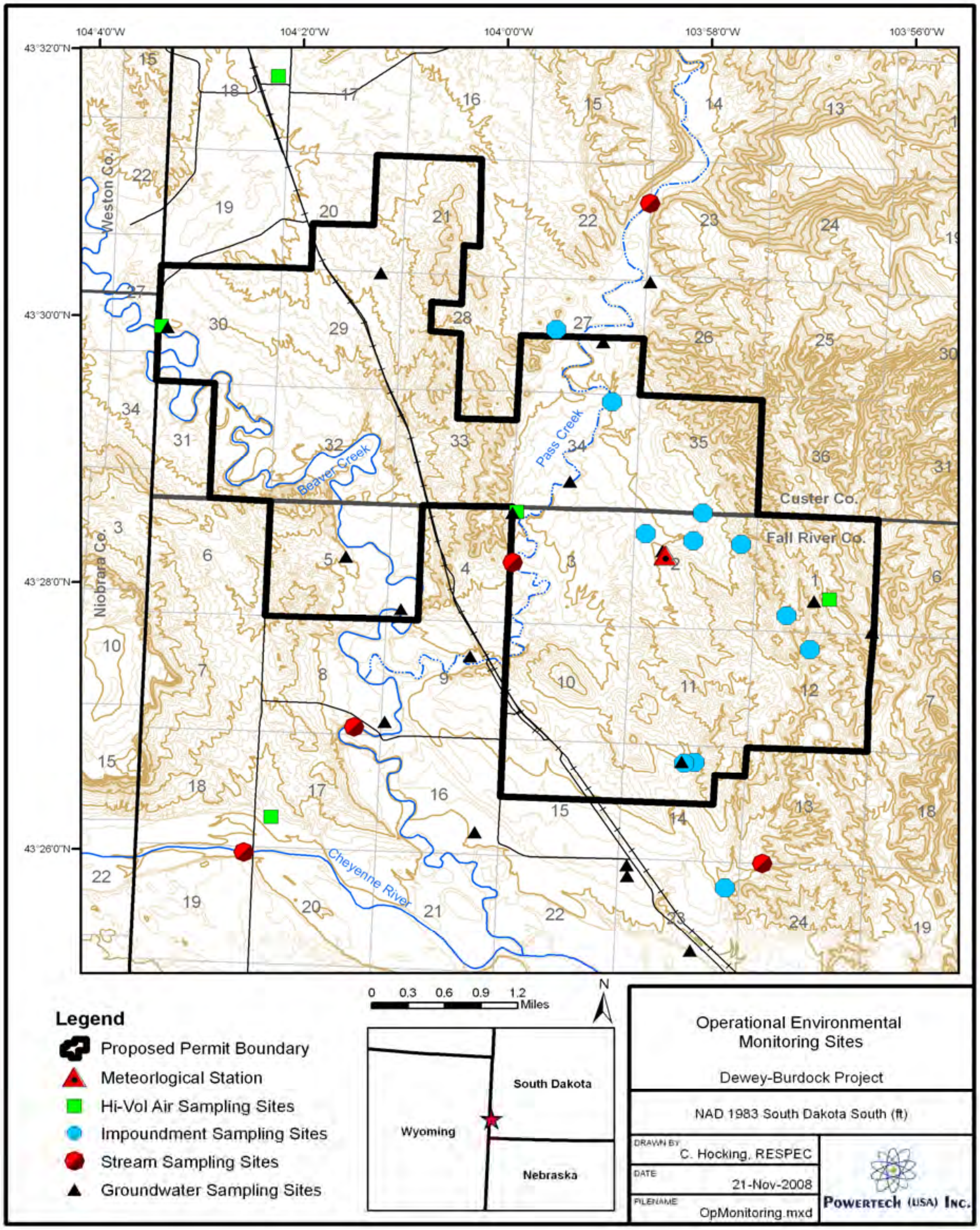

Figure 3.9-5 Operational Environmental Monitoring Sites

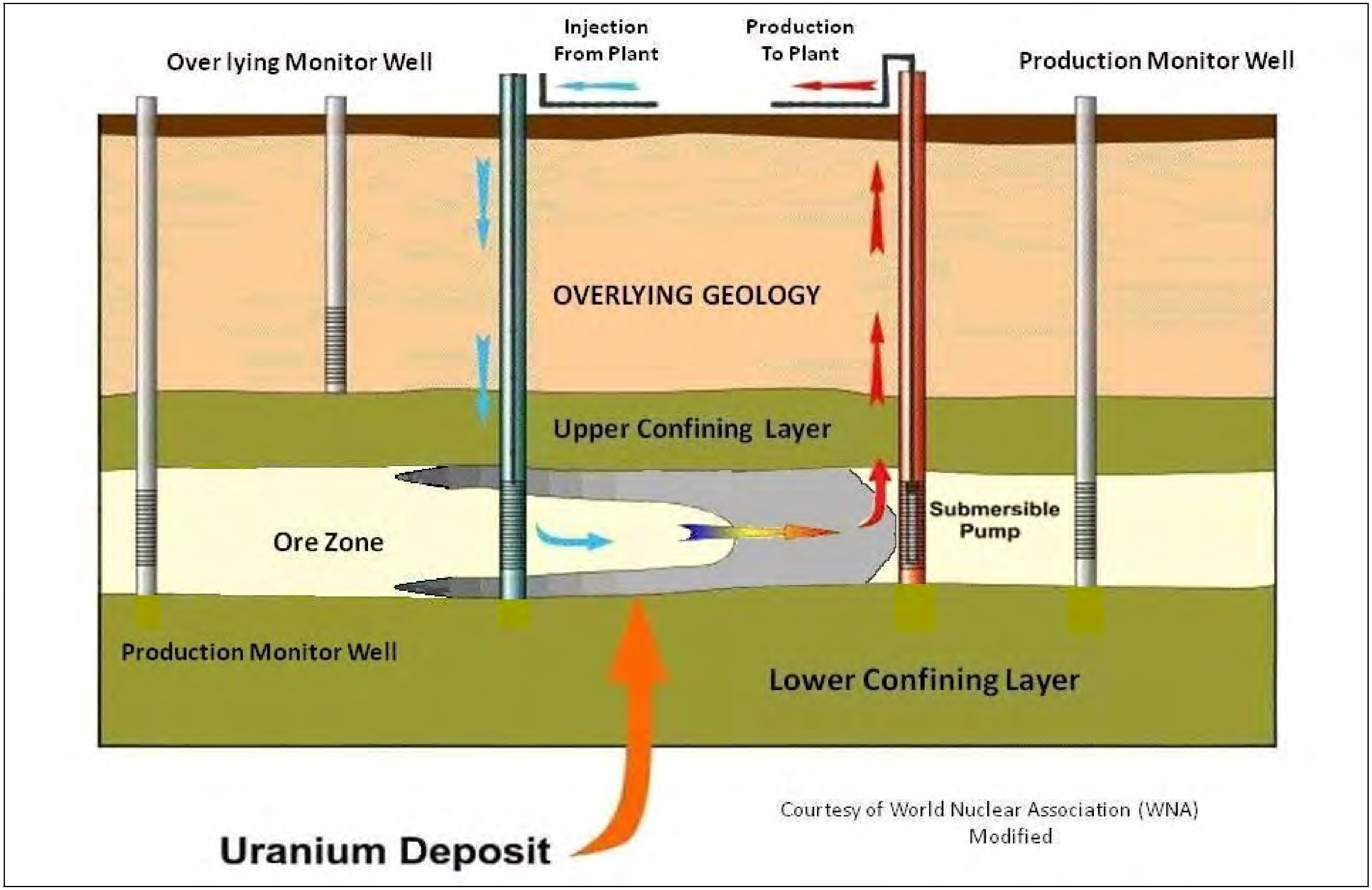

Figure 3.9-6 Cross Section of Typical Well Placement

Production Monitoring Wells

Production zone monitoring wells are installed around the periphery of each production area to monitor for any fluids that might escape the hydraulic controls (Hunkin, G. G., 1977 and Dickinson, K. A., and J. S. Duval, 1977), with a screened interval open to the sand unit containing the production zone. This monitoring “ring” design serves two purposes: (1) to monitor any horizontal migration of fluid within the sand unit or aquifer where production is occurring and, (2) to determine baseline water quality data and characterize the area outside the production pattern area. Upper Control Limits (UCLs) are determined from indicator constituents that are selected due to their nature of mobility to provide early warning with regards to a potential excursion; these constituents are determined from the well field specific groundwater quality baseline data. By establishing UCLs, the operator is allowed the capability of early detection of an excursion at a monitor well and then has the time to apply corrective action before water quality outside the aquifer exemption boundary is adversely affected (NUREG/CR-6733, 2001). Production zone monitor wells will be located no more than 400 feet from the production area, and will be spaced no more than 400 feet between production zone monitoring wells (NUREG/CR-6733; NUREG-1910, 2008; NUREG-1569). If the monitor wells are closer than 400 feet to the well field, the monitor wells will be located via a strategic distance to maintain a minimum angle between Monitor wells and the nearest injection well of 70 degrees. This will ensure that no leach fluids will pass between the adjacent monitor wells undetected as the leach fluids would flow radially outward from the initiation point of an excursion. Production zone monitoring wells are installed before the start of production activities in order that required baseline sampling and hydrologic tests can be conducted. Well design, construction, and development will be identical to those of injection and recovery wells, except well screens will be completed across the entire mineralized sandstone (Figure 3.9-7).

An extensive groundwater sampling program specific to each well field will be conducted prior to, during, and following ISL operations to identify any potential impacts to water resources of the area. The groundwater monitoring program for individual well fields is designed to: (1) establish baseline water quality prior to production, (2) detect excursions of lixiviant either horizontally or vertically outside the target mineralization zone, (3) demonstrate compliance with groundwater quality standards, and (4) determine when the mined mineralized zone has been adequately restored following ISL operations. Objectives 1 (partially) and 4 will be accomplished using injection and recovery wells. Objectives 1 (partially), 2, and 3 will be accomplished using perimeter and internal non-production zone monitoring wells. Monitoring safeguards utilized during operational phase include monitoring the rates, volumes and wellhead pressures of production and injection wells. Monitor well sampling will also be conducted during restoration, including stabilization monitoring at the end of the restoration activities to determine the achievement of acceptable water quality.

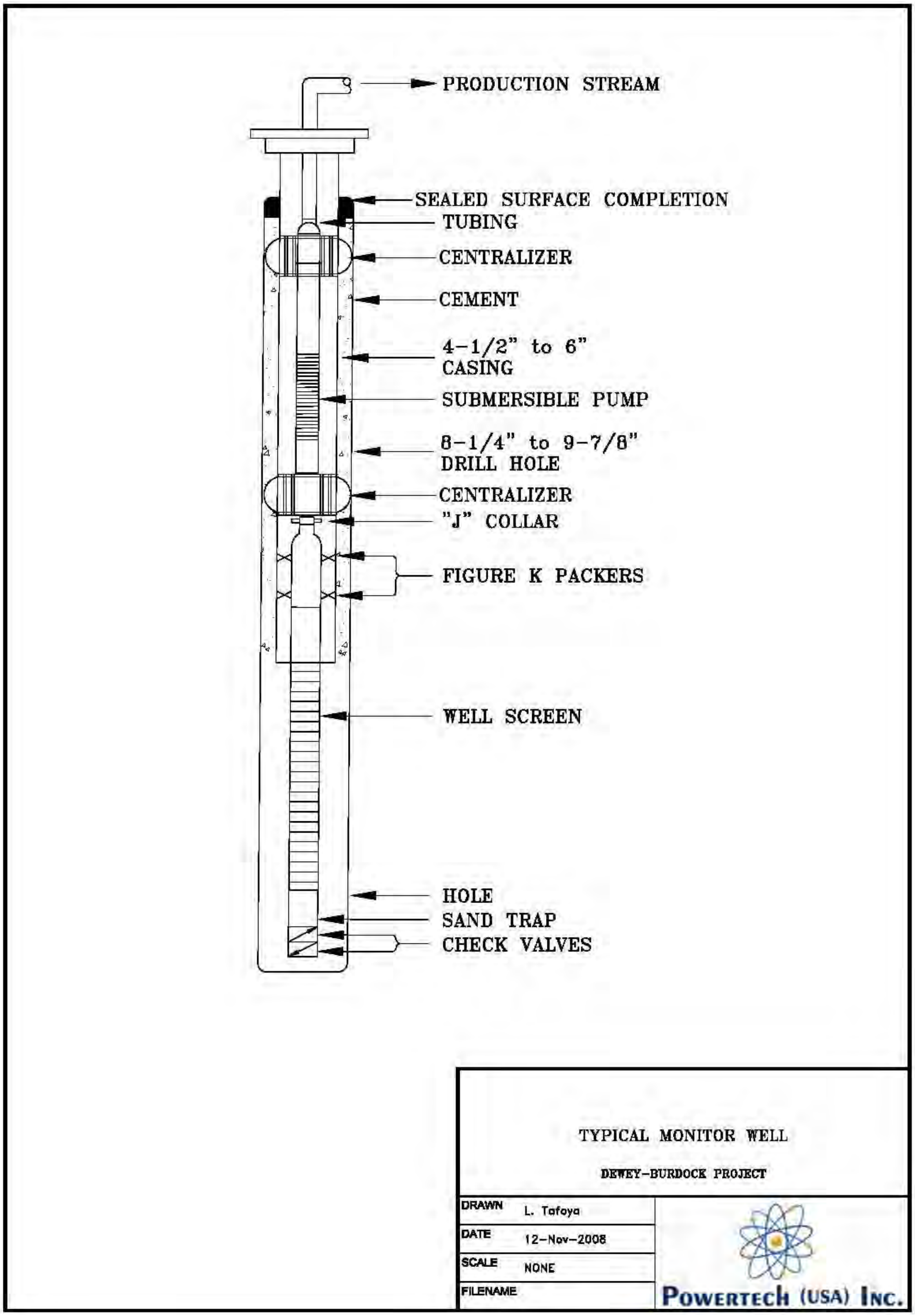

Figure 3.9-7 Typical Monitor Well Construction Diagram

Section 4.0 - Reclamation, Restoration and Facility Decommissioning Plan

Groundwater restoration, reclamation of disturbed land and decommissioning of the well fields, plant and associated facilities will be conducted in a manner that will protect human health, safety and the environment. The methods for achieving this objective are discussed in the following sections.

The reclamation and decommissioning plan presented within this document was prepared in accordance with 43 CFR § 3809, ARSD 74:29:08, SDCL 45-6B-81 and NRC 10 CFR Part 20 Subpart E. The plan has been designed to implement concurrent reclamation, upon affected lands which will not be disturbed again and where it will not adversely affect other mining operation activities, during all phases of mining in order to reclaim disturbed areas at the earliest feasible time, by taking reasonable measures to prevent and/or control on-site and off-site damage of the affected lands (§ 3809.420(3)(i)).

4.1 Surface Reclamation and Decommissioning

The estimated annual surface disturbance for the life of the PA is a maximum of 108 acres. The following are proposed actions to be taken to reclaim surface disturbance.

The Best Management Practices (BMPs) are intended as general guidance to assist individuals responsible for management of activities aimed at reducing, preventing and/or controlling on and off-site damage of the affected lands 74:29:07:02. The BMPs have been selected on the basis of site-specific and industry specific conditions that reflect natural background conditions and will be implemented and applied as a system rather than a single practice. The system employed by Powertech (USA), has been selected and designed to effectively maintain each area in such a manner as to require minimal reclamation rehabilitation effort due to the use of BMPs that implement the front-end of reclamation practices. The BMPs utilized, ensure steps are taken throughout the life of the project that are protective of human health and safety and the environment. The goal of surface reclamation is to release the property for wildlife habitat. This will be accomplished by stabilization with self-sustaining vegetative cover. Due to the over grazed nature of large portions of the properties; the reclamation system is expected to substantially improve the properties upon Powertech's departure. The treatments for revegetation will utilize indigenous species selected for their value as cover and food for both domestic and native fauna. Vegetation will be selected with soil stability and water conservation as considerations. The use of other more specific BMPs as developed by government agencies such as the Soil Conservation Service (SCS), Bureau of Land Management (BLM), EPA and the Army Corp of Engineers may be proposed. However, the BMPs proposed here are expected to be compatible with requirements of governing agencies. The BMPs will be planned and implemented with full consideration for existing resources and site specific conditions. The planning process implemented will consider economics and compatibility with existing operations. The BMPs proposed here will be used to remediate and/or prevent damage that may occur due to construction and resource extraction practices.

A final decommissioning and reclamation plan will be submitted to the NRC and DENR for review and approval at least 12 months prior to the planned decommissioning of a well field or PAA. The reclamation strategy will be developed in accordance with the state requirements for wildlife habitat in 74:29:07:22. Any changes that occur in the approved reference area which may affect the usefulness of reclamation success will be reported to DENR in writing.

4.1.1 BMPs Proposed for Surface Disturbance during Construction and Operation

As stated above, the average maximum estimated land disturbed per year for the life of the operation is 108 acres. The following proposed procedures will be used to minimize the impacts of surface disturbance during construction and operation:

- Disturbance will be limited to only what is necessary for operations.
- Development of Quality Assurance Quality Control (QA/QC) plan to monitor the effectiveness of mitigation methods.
- Restrict normal vehicular traffic to designated roads and keep required traffic in other areas of the well field to a minimum. Road construction and/or upgrades to reads and railroad spurs that provide exclusive service to the Powertech (USA) mining operations will be conducted in compliance with ARSD 74:29:07:12.
- Use Class V deep disposal wells for disposal of liquid wastes to mitigate potential land use impacts. Land application may be utilized separate or in conjunction with a Class V and is dependent upon federal authorization of a Class V permit.
- Disposal of refuse will be disposed of in an approved landfill and/or disposed of on-site if disposal complies with the SD solid waste regulation in article 74:27. Any acid forming or toxin-producing material will handled and disposed of in a manner that controls unsightliness and protective of existing hydrologic systems Hazardous wastes will be handled in accordance with state and federal hazardous waste regulations.
- Conduct site ISL reclamation in interim steps to minimize potential land use environmental impacts. As noted above, sequential well field development results in minimizing land area impacted at any one time.
- Stockpile topsoil from the well sites, evaporation ponds, and facilities. Shape, seed the piles with a cover crop or mulch the stockpiles to control erosion.
- Spoil material on affected lands will be handled in accordance with ARSD 74:29:07:14.
- Grading and backfilling may be necessary to reconstruct topographic features to achieve the functionality and visual compatible contours of pre-mining status. Grading and backfilling performed upon the affected lands will be conducted in accordance with 74:29:07:04.
- Evaporation or water treatment ponds, if used, will be reclaimed and re-vegetated and the land returned to its previous uses, or as otherwise agreed with the regulatory entities and landowners.
- After groundwater restoration is completed, properly decommission each well field and remove or decontaminate in place all well field lines and pipelines. Upon decommissioning, all wells will be sealed and capped. As areas are restored, they will be backfilled, contoured, and smoothed to blend with the natural terrain in accordance with the surface reclamation plan.
- All process facilities will be decontaminated and removed unless they are to be used for other future activities; the Permit Area will regain its pre-operational features.

Upon completion of final site D&D, including surface reclamation, landowners will be contacted and given the option to retain the roads for their private use or have the roads reclaimed by Powertech (USA). If the roads are deemed beneficial to others (i.e., hunters, ranchers and residents) and the landowner agrees, the roads will not be reclaimed. Only roads related to the Proposed Action will be reclaimed.

4.1.2 Topsoil Management

Definition: The salvaging, stockpiling and reapplication of topsoil or other selected materials to be used as growth medium in the reclamation of surface disturbances.

Purpose: To re establish stability and productivity of acreage subject to surface disturbance through proper soils management in accordance with SDAR 74:29:07:07.

Applicability: Although there is very little earthwork associated with ISR activities as compared to open pit mines, proper topsoil management is a priority to ensure successful surface reclamation where surface disturbance does occur.

Topsoil will be salvaged in advance of construction from building sites, permanent storage areas, primary and secondary access roads, chemical storage areas, header house locations, mud pit locations, and pipeline trench construction areas, in accordance with SD DENR requirements as specified in the large scale mine permit application. Earth moving equipment such as rubber-tired scrapers and front-end loaders will be used. Backhoes and excavators may also be used where pipeline trenches and mud pits are dug.

In areas that will be disturbed for prolonged periods during the life of the project (i.e., more than one construction season), topsoil will be salvaged and stored in designated topsoil stockpiles designed in accordance with SD DENR requirements as specified in the large scale mine permit application to minimize erosion. In the case of pipeline trenches, topsoil will be returned following pipeline installation and in the case of mud pits, topsoil will also be returned once use of the mud pit is complete.

The topsoil salvage depth is estimated from the baseline soil survey to range between 0 and 5 feet across the project area and average less than 2 feet. Final salvage depths and cutoff criteria will be determined based on construction level designs and additional soil testing in accordance with SD DENR requirements specified in the large scale mine permit application.

Topsoil salvaged from the primary access roadbed will be placed near the access road, including potentially on BLM-administered lands. Final stockpile locations and volumes will be determined based on construction-level road designs.

All topsoil and spoil stockpiles within the project area will conform to SD DENR requirements, which are described in the large scale mine permit application, to avoid erosion and preserve soil viability.

The topsoil thickness at the time of reclamation will be determined by dividing the area requiring topsoil replacement by the volume of topsoil salvaged from that area.

Planning Criteria: The following items will be considered while managing topsoil.

- The amount of surface disturbance (area), which may require topsoil or growth medium and the required depth of application
- The amount and quality of topsoil and/or growth medium selected
- Methods utilized for topsoil salvage
- Storage location, duration and protection of stockpile to prevent erosion
- Feasibility of direct replacement of the salvaged soils
- Availability and cost of additional growth media as a supplement to topsoil replacement, if necessary

Methods and Materials:

- Conduct a site specific soil survey of the project area as a part of baseline investigations. The soil survey will identify the soils suitable for salvaging, their depth and amount prior to disturbance.

- All suitable topsoil and suitable material to be utilized in reclamation of the surface disturbance should be salvaged wherever feasible and stockpiled for reapplication.
- Topsoil stockpiles will be marked with legible signs containing letters not less than six inches high in sufficient locations to clearly identify stockpiles. Such signs will be in place from the time stockpiling begins.
- If conditions permit, or if project schedules can accommodate, topsoil or growth medium should be applied directly to re contoured disturbance areas.
- Stockpiled soils should be properly stored and re vegetated to protect from erosion and the loss of vital organisms within the soil.
- Soil replacement depths are determined by several factors including: pre-disturbance soil depths, vegetation types and the physical and chemical properties of the material being covered.

Maintenance:
Regarding periodic maintenance, based upon the anticipated length of time the soils will be stockpiled, the piles will be covered with plastic or another substrate to protect from wind, rain and erosion. If storage will be for a long period of time, the stockpiles will be seeded with either annual or perennial grasses. This will stabilize the stockpiles surface. Other mechanisms may be proposed and may include covering stockpiles with plastic or canvas tarps or rock mulches.

Effectiveness:
Proper topsoil management will result in successful revegetation of surface disturbances, reduce soil erosion, and initiate the restoration of the surface disturbance areas stability and productivity.

4.1.3 Erosion Control

In the past, ISL facilities adopt best construction practices to prevent or dramatically decrease erosion (NUREG-1910). Many facilities have been operated to minimize erosion and surface disturbance and then assiduously restored affected soils effectively leaving little impact on soils (NMA, 2007). Surface runoff diversions and erosion control will be performed in accordance with ARSD 74:29:07:09. Diversions of intermittent and perennial streams are unlikely to occur, however, if such a necessity arises, diversion(s) will be conducted in compliance with ARSD 74:29:07:10.

Definition:
Erosion and sediment control structures encompass a host of specific structures that are designed to control a variety of potential surface drainage, erosion effects.

Purpose:
To protect the watershed(s) and the natural resources via a host of BMPs:

- Prevention of the formation of , or the promotion of gullies and rills
- Reduce flow velocity and/or provide structures capable of withstanding intermittent high velocity flows
- Stabilization of the grade and control of head cutting in natural or artificial channels
- Directing water from one elevation to another
- Diverting water away from unstable areas (slopes)
- Filtering and retaining sediment
- Applicability: These practices will be considered where site specific condition may result in:
  - Flow velocity is such that structures are required
  - Excessive grade conditions occur
  - Water needs to be moved from higher to lower elevations

– Sheet erosion results
– Establishment of vegetation cover
– Diversion of water from one area to another more stable area
– To prevent sedimentation or erosion in problem areas

Methods and Materials:

- Use erosion and run-off control features such as proper placement of pipe, grading to direct run-off away from water bodies, and use of riprap (broken rock and/or concrete) at these intersections to make bridges or culverts more effective, if necessary.
- Use sediment trapping devices such as hay or straw bales, fabric fences, and devices to control water flow and discharges to trap sediments moved by run-off
- Maintain natural contours as much as possible, stabilizing slopes and avoiding unnecessary off-road travel with vehicles
- Utilization of water bars or water breaks

Maintenance:
Regular inspection, maintenance and repairs will be performed according to the specific needs of the project site. During runoff and precipitation events the maintenance activities may need to be intensified in order to prevent possible erosion control structures failing and potentially increasing resource degradation.

Effectiveness:
Properly designed, installed and maintained, erosion and sediment control structures will effectively reduce the transport of sediments, minimize erosion and the degradation of water resources and reduce negative impacts to natural resources (i.e. vegetation, wildlife, etc.).

4.1.4 Revegetation:

Revegetation practices will be conducted in accordance with SDAR 74:29:07:06 and the methods outlined in the SD DENR mining permit. In order to help reduce wind and water erosion, topsoil stockpiles and other various disturbances in the well field area will be seeded throughout the PAA. Per SDAR 74:29:07:06, the seed mix will be chosen to be compatible with the post-production land use. The local conservation district, landowners and the SD DENR will be consulted when selecting the seed mix. The licensee will consult with local conservation district to develop and implement a site specific noxious weed control plan (ARSD 74:29:07:15).

Definition:
Seeding practices include a variety of techniques which result in the sowing or planting of seeds. Common practices include:

- Broadcast seeding (hand or mechanical)
- Drill seeding
- Aerial seeding
- Hydroseeding

Purpose:
To provide soil stabilization through vegetative cover; Objectives related to revegetation include but are not limited to:

- Reduction of impact from rain
- Reduction of impact from surface water flow velocity
- Reduction of erosion from wind and water
- Enhancement of the natural environment and aesthetics

Applicability:
Revegetation is applicable to most surface disturbance requiring reclamation. Mechanically stabilized slopes are candidates for re vegetating. Drilling seeding is usually limited to a 3:1 slope or less. Hydroseeding is successful on flat or steep slope situations. Broadcast method is less expensive and requires about twice the seed amount as drilling. Aerial technique is typically utilized over large areas with little or no ground access.

Planning Criteria:
As stated above, seed selection will be based upon site specific land use and qualified professionals will be consulted. Considerations taken when planning the revegetation will consist of:

- Typical economics
- Topography of site
- Application method appropriate for type of vegetation being established
- Slope stabilization (if necessary before re vegetation efforts begin)
- Supplemental techniques and/or material necessary for establishment of seed (mulch, netting, matting, chemicals)
- Water retention methods and planting season
- Prevention of wash out

Methods and Materials:
Qualified vegetation or reclamation specialists will be consulted regarding seed selection, seeding rates, season, and application of mulch to ensure the most successful re vegetation efforts.

Broadcast seeding (hand or mechanical):
Broadcast seeding can be accomplished by hand held seeders or a mechanically driven seeder typically mounted on a tractor or ATV vehicle. The seed mix is placed in a hopper, adjustments are made for the size of the seed and rate of application and the seeder is operated by a hand crank or motor while walking or driving over the areas to be seeded. Broadcast seeding typically requires twice the amount of seed to cover the same given area as a drill seeder due to wind drift, wildlife consumption and lack of good soil to seed contact.

Drill seeding:
Drill seeding requires the use of a Range drill or equivalent depending on the condition of the site. Drill seeders are pulled behind a tractor or bulldozer and actually place the seed to a pre-determined depth. The seed is then covered by the drill mechanism or a chain drag is utilized to cover the seed behind the drill.

Aerial seeding:
Aerial seeding is conducted by helicopter or fixed wing aircraft and can cover large areas of inaccessible terrain. It is the most efficient method for large disturbance areas such as forest or rangeland fires. Germination success is usually low given wind drift, soil conditions, and poor seed to soil contact, but application timing can greatly improve success.

Hydroseeding:
The wood fiber and water mixture are well agitated in a large tank and then blown through a hose and nozzle by compressed air. The apparatus is typically truck or trailer mounted and has sufficient capacity to complete several acres at a time. Mulch application rates and/or seeding rates depend upon the site specifics of the project area and the project goals.

Maintenance:
Regular inspection of re seeded areas and re application if necessary will be carried out to ensure a successful re vegetation project. The treated areas will be protected from foot or vehicular traffic until the vegetation is well established. This may require signs, fencing or some other type of barrier to prevent entrance.

Effectiveness:
With proper selection of appropriate seeding method(s), season, proper seed mixture, application rate and maintenance the revegetation effort(s) will result in the most successful and effective methods of soil stabilization and long term benefits to the designated land use.

Surface reclamation at the PAA will incorporate the following three major activities some of this will occur simultaneously:

- Radiological decommissioning and decontamination of buildings, process vessels and other structures, and/or affected areas
- Removal and reclamation of the CPP and SF, and auxiliary structures
- Reclamation of restored well fields including production and monitor well plugging and abandonment

4.1.5 Facility Decommissioning

Removal or Stabilization of Buildings, Structures and Support Facilities:

Due to the nature of ISL production, minimal and intermittent surface disturbance will be associated with the project, and will be mainly associated with the CPP, maintenance and office areas. All buildings and structures will be decontaminated to regulatory standards and demolished and trucked to an approved disposal facility. The solid materials include metals, building concrete, onsite soils, equipment, furniture, etc., which are present at, and/or used in, the licensed nuclear facility during routine operations. Release will not occur unless materials meet the release criteria outlined in 10 CFR Part 40, Appendix A. Baseline soils, vegetation, and radiological data will be used as a guide in evaluating the final reclamation.

Table 4.1-1 specifies the levels of decontamination that must be obtained for buildings, process vessels, ancillary structures, and affected areas prior to final reclamation to unrestricted release in accordance with NRC requirements, or the contaminated material must be removed to the appropriate disposal facilities. Decontamination may include acid, and water wash down of structures, and concrete. The resulting solvents will be disposed as byproduct material by disposal well, and/or evaporation. Equipment, which cannot be decontaminated, will be dismantled, and disposed of in a licensed disposal facility, or utilized at another licensed uranium facility. All uncontaminated foundations will be removed, or broken, and buried in place. All survey results will be documented and maintained on site or at the headquarters upon termination of license.

Table 4.1-1 NRC Acceptable Surface Contamination Levels[1]

Nuclide[a]	Removable [b,e,f] (dpm/100 cm^2)	Average [b,c,f] (dpm/100 cm^2)	Maximum [b,d,f] (dpm/100 cm^2)
UNat, U-235, U-238, and associated decay products	1000 a	5000 a	15000 a
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, and I-129	20	100	300
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-133, and I-131	200	1000	3000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	1000 bg	5000 bg	15000 bg

a Where surface contamination by both alpha and beta-gamma emitting nuclide exists, the limits established for alpha and beta-gamma emitting nuclide
should apply independently.
b As used in this table, dpm means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
c Measurements of average contaminant should not be averaged over more than 1 m2 . For objects of less surface area, the average should be derived for each such object.
d The maximum contamination level applies to an area of not more than 100 cm2 .
e The amount of removable radioactive material per 100 cm2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency..
When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
f The average and maximum radiation levels associated with surface contamination resulting from beta- gamma emitters should not exceed0.2 millirad per hour (mrad/hr) at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 mg/cm2 total absorber.
The external gamma exposure rate should not exceed 5 microroentgen per hour above background at 1 meter from the surface and for soil 10 microroentgen per hour, above background at 1 meter.
[1] Table obtained from Appendix U (NRC Acceptable Surface Contamination Levels) of U.S. Nuclear Regulatory Commission, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproducts, Source, or Special Nuclear Material, April 1993.

Definition:
To mitigate surface disturbances associated with the construction of the CPP, office and maintenance buildings.

Purpose:
At the completion of the project, all disturbed lands will be returned to their pre-production land use of livestock grazing and wildlife habitat pursuant to ARSD 74:29:07:20 and 74:29:07:22, respectively.

Applicability:
The removal or stabilization of buildings, structures and support facilities are applicable to the achievement of meeting the objective of the surface reclamation effort of returning the disturbed land to equal or better condition than pre-production.

Planning Criteria:
Qualified professionals will be utilized in the planning which will result in the safe removal of structures and support facilities. Some of the criteria that will be evaluated before decommissioning and disposal begin is:

- The Establishment of Surface Contamination Limits
- Preliminary Radiological Surveys and Contamination Controls

- All Decommissioning Procedures in Accordance with the NRC license, Titles 10 and 49 of the CFR, ARSD 74:29:11:28, SDCL 45-6B-38, and other applicable regulatory requirements.

Methods and Materials:
The procedures for removing and disposing of structures and equipment include the establishment of surface contamination limits, preliminary radiological surveys of process building surfaces, equipment and piping systems; strategic cleanup and removal of process building materials and equipment, sorting materials according to contamination levels and salvageability, and preparing materials for transport and offsite (unrestricted) use or disposal. Although not mentioned hereafter, the procedures also apply to tools and other equipment, such as backhoes.

Removal of Process Building and Equipment:
Decommissioning for the CPP and auxiliary structures is dependent upon two key factors, market price and feed material. At which time Powertech has determined it is no longer economically viable to retain the CPP and auxiliary structures these structures will be decommissioned and decontaminated and the area will be released for unrestricted use. Prior to the release for unrestricted use, Powertech will submit verifying information that radionuclide concentrations meet the NRC release standards.

Facility decommissioning may be accomplished in two phases:

Phase I – Equipment that is not utilized in final groundwater restoration (including stability period) may be decontaminated (if surveys indicate decontamination is necessary), surveyed and released for unrestricted use.

Phase II – Plugging of wells and removal of the remaining equipment post final groundwater restoration completion and agency approval.

Powertech (USA) will develop plans for the strategic removal of process building(s) and equipment, based on inventory, the results of the radiological surveys, decontamination options and available methods, reuse/disposal pathways, and information obtained during the effort. To the extent possible, Powertech (USA) intends to decontaminate salvageable equipment for unrestricted release. Decontamination methods may include a combination of washing, high pressure sprays, or steam cleaning. Cleaned surfaces will be air-dried prior to radiological monitoring. The ALARA principle applies to decommissioning activities. As such, surface contamination will be reduced to levels as far below applicable limits as practical.
Powertech (USA) will document the results of radiological surveys for all building materials, systems, and equipment. These items will be sorted as follows:

- Salvageable and contaminated above release limits (not releasable but potentially disposable or transferrable)
- Salvageable and contaminated below release limits (releasable) for unrestricted use
- Not salvageable and contaminated above release limits (offsite disposal at a facility licensed to accept 11e.(2) byproduct material)
- Not salvageable and contaminated below release limits (offsite disposal at a permitted facility)

In the first case, the item may be transferred to another NRC or Agreement State licensee. If it cannot be transferred or decontaminated to be released for unrestricted use, it will be disposed of at a licensed disposal facility. In all cases, Powertech (USA) will strictly maintain an inventory of all process building and equipment and the results of radiological surveys.

4.1.5.1 Building Materials, Equipment and Piping to be Released for Unrestricted Use

Powertech (USA) will develop an approved standard operating procedure for release of items to unrestricted use and thoroughly document all items eligible for release to unrestricted use. To the extent possible, releasable items having a salvageable value will be sold on the industrial market. Releasable items having no net salvageable value will be sent to a municipal landfill.

4.1.5.2 Preparation for Disposal at a Licensed Facility

All materials and plant equipment unsuitable for unrestricted release will be prepared for offsite disposal at a licensed facility. Building materials, tools, and equipment destined for offsite disposal will be prepared for transportation and disposal in accordance with 49 CFR and other applicable requirements.

4.1.5.3 Waste Transportation and Disposal

Waste transportation will be performed in accordance with 49 CFR and all other applicable regulations. Offsite shipments will be properly prepared, in terms of packaging, marking and labeling, dose rate measurements, shipping papers, and emergency contact information. Offsite disposal will be conducted in accordance with disposal facility licensing requirements, including waste characterization and profiling.

Maintenance:
During decommissioning efforts qualified personnel trained in environmental, health, safety and radiation safety will be present on site to assure pre and post surveys are conducted according to procedure and properly documented. Personnel responsible for decommissioning activities will monitor removal of contaminated materials to ensure decommissioning efforts are carried out to the letter of the law and company procedures.

Effectiveness:
Gamma surveys will be performed over the extents of the affected lands post decommissioning. The surveys will be used, in conjunction with soil sampling and analysis to verify cleanup meets the site cleanup criteria.

4.1.5.4 Radiological Survey

Prior to release for unrestricted use radiation surveys will be performed in all areas of well fields, surface impoundments, and process buildings. These areas will also be analyzed for radium content via soil sampling. Final surveys will be performed for confirmation of cleanup standards. All equipment designated for unrestricted release will be surveyed and records of all surveys will be maintained.

4.1.5.5 Quality Assurance Program

Powertech (USA) will prepare a QAPP that establishes the quality assurance and control measures for field measurement, sample collection, and laboratory analysis for all decommissioning activities. The QAPP will also establish performance criteria for field and laboratory data precision, accuracy, completeness, and representativeness. The QAPP will contain recommendations in NRC Regulatory Guide 8.15, Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)-Effluent Streams and the Environment (NRC, 2007).

4.1.5.6 Environmental Monitoring

Monitoring of air quality, water quality vegetation and soils will be conducted throughout the duration of the project activities and upon termination of license in order to comply with all environmental release criteria for termination of the licensed facility. Environmental information will be submitted to the NRC and other appropriate agencies on an annual basis and a termination of licensing meeting will be conducted with regulators in order to comply with federal and state decommissioning requirements before releasing the site for unrestricted use.

Data submitted to agencies will include:

- Soil sample and analysis
- Decommissioning equipment and building smear samples and analysis
- Gamma Survey results and maps
- Environmental monitoring results

4.2 Groundwater Restoration and Schedule

After active uranium recovery operations cease, Powertech (USA) intends to complete site decommissioning and reclamation, including groundwater restoration with the ultimate goal of releasing the Proposed Action site for unrestricted use. The groundwater restoration method proposed for the Dewey-Burdock Project is based on the successful programs implemented by other projects such as the Lamprecht, Cogema Irigaray Restoration Project or Crow Butte Resources, Inc., which have received regulatory approval from NRC for successfully restoring groundwater to previous class of use. The groundwater restoration methods consist of permeate injection using the reverse osmosis process and aquifer recirculation.

In each well field, production activities will proceed until such time as the uranium concentration in the pregnant solution has declined to an uneconomic recovery level. After production ceases, Powertech (USA) will be restoring the groundwater consistent with baseline and in accordance with 10 CFR Part 40 Appendix A, Criterion 5(b) (5) and ARSD 74:29:07:08. Reclamation of surface disturbances will occur after completion of restoration activities in a well field and will continue in the same manner after additional well fields are developed, produced and restored. Therefore, at any time there may be well fields in three different stages of the process: wellfields in production, well fields undergoing groundwater restoration, and well fields undergoing surface reclamation. Additionally, there also may be some small areas indirectly related to these process phases that are held unreclaimed for short periods of time (e.g., storage of top soil). This proposed operational and reclamation plan ensures minimal potential environmental impacts.

4.2.1 General Groundwater Restoration

Definition:
To bring back water quality to a former use or condition.

Purpose:
After production ceases, Powertech (USA) will be restoring the groundwater consistent with baseline and in accordance with 10 CFR Part 40 Appendix A, Criterion 5(b) (5); with the ultimate goal of releasing the Proposed Action site for unrestricted release.

Applicability:
Groundwater restoration is applicable to all ISL operations in order to restore the quality of water found within each mine unit within the exempted aquifer prior to mining. The primary goal of groundwater restoration at the site will be to return groundwater quality within the production zone of a well field consistent with pre-operational baseline water quality conditions or to standards consistent with NRC's application of Criterion 5B(5) of Appendix A to 10 CFR Part 40 and ARSD 74:29:11:06. In the event that Powertech (USA) is unable to restore such groundwater consistent with preoperational baseline water quality conditions, the secondary goal would be to return water quality to its pre-operational livestock watering and agricultural class of use.

Planning Criteria:

Prior to operation, the baseline groundwater quality will be determined through the sampling and analysis of water quality indicator constituents in wells screened in the mineralized zone(s) across each well field. Based on statistical analysis of the data following ASTM Standard D 6312 (ASTM, 2001) to determine the baseline range of statistical variability of an indicator constituent; target restoration goals (TRG) will be established. Powertech (USA) will attempt to meet the TRG established for each constituent during the groundwater restoration process. Table 4.2-1 provided below, lists the baseline water quality parameters and the analytical methods that will be used for establishing groundwater TRG:

Table 4.2-1 Baseline Water Quality Parameters

Test Analyte/Parameter	Units	Method
BULK PROPERTIES		
pH	pH Units	A4500-H B
Total Dissolved Solids (TDS)	mg/L	A1030 E1, A2540 C
Conductivity	µmhos/cm	A2510B
CATIONS/ANIONS		
Chloride	mg/L	E300.0
Sulfate	mg/L	E300.0
Total Alkalinity (as CaCO3)	mg/L	A2320 B
TRACE METALS		
Arsenic, As	mg/L	E200.8
Iron, Fe	mg/L	E200.7
Lead, Pb	mg/L	E200.8
Manganese, Mn	mg/L	E200.8
Strontium	mg/L	E200.8
Uranium, U	mg/L	E200.8
Vanadium	mg/L	E200.7, E200.8
RADIONUCLIDES		
Gross Alpha=Alpha Particles	pCi/L	E900.0
Gross Beta=Beta Particles and Photons	mRem/Year	E900.0
Radium-226	pCi/L	E903.0
Radon-222	pCi/L	D5072-92

Table adapted from USNRC (2008) *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities-Draft Report for Comment*, NUREG-1910, July 2008. Notes: mg/L = milligrams per liter; µmhos/cm = micromhos per centimeter; PCi/L = picocuries per liter. All metals analyses are for dissolved metals.

Powertech (USA) will consult with DENR concerning the specific groundwater suite of constituents prior to well field baseline evaluation. In the event that secondary groundwater restoration standards may need to be considered for specific constituents, Powertech (USA) will provide data and justification for restoring groundwater water quality to pre-operational class of use.

Methods and Materials:
There are several methods available to operators to utilize and often times these methods are combined to assure effectiveness based upon the geochemistry and hydrology of the individual well field undergoing restoration. The main groundwater restoration techniques utilized by the industry include:

- Groundwater Transfer
- Groundwater Sweep
- Reverse Osmosis, Permeate Injection, and Recirculation

Aquifer restoration criteria are determined on a site-specific, well field-by-well field basis. NRC's restoration standards are found in Appendix A to 10 CFR 24 Part 40.

Aquifer restoration programs typically use a combination of methods including: (1) groundwater transfer, (2) groundwater sweep, (3) reverse osmosis with permeate injection, (4) groundwater recirculation, and (5) stabilization monitoring (Energy Information Administration, 1995; Mackin, et al., 2001; Davis and Curtis, 2007).

Groundwater Transfer:
The groundwater transfer method replaces affected groundwater with baseline quality water from a well field coming on line for ISL. This involves transferring groundwater between a mined out wellfield and the next wellfield being brought on line for ISL operations or within a separate area of the same wellfield that may be in an advanced phase of restoration (NRC, 2006). The groundwater resulting from this method is therefore blended until dissolved constituents are similar in concentration. Groundwater transfer does not typically generate liquid effluents.

Groundwater Sweep:
The groundwater sweep method removes affected groundwater from a mined out well field by pumping. The pumping allows unaffected groundwater contained within the aquifer to flow into the mined out portion of the aquifer. The water may be supplemented with makeup water from the Madison formation to increase the restoration rate. The affected groundwater pumped from the well field is routed to the IX recovery in order to remove the uranium. The process water is routed to a radium removal system where the radium is precipitated and settled before disposal via land application in accordance with a groundwater discharge permit from DENR or deep well injection in accordance with a UIC permit.

Reverse Osmosis, Permeate Injection, and Recirculation:
During permeate injection and recirculation, uranium, if in sufficient concentration in the groundwater is removed by passing the water through an uranium scavenging ion exchange circuit, as during operations. After that, other chemical constituents in the groundwater are removed, as necessary, by passing the groundwater through a reverse osmosis system consisting of pressurized, semi-permeable membranes.

The reverse osmosis process yields two fluids: clean water (permeate: about 70 percent) and water with concentrated ions (brine: about 30 percent). The reject (brine solution) can be disposed directly in an evaporation pond or via a deep well injection in accordance with the discharge limits in the UIC permit. If the reject is sent directly to an evaporation pond or a deep disposal well, the net withdrawal from the aquifer could be about 30 percent of the pumping rate (tens of gallons per minute).

Alternatively, a brine concentrator can be used to treat the reject. The brine concentrator heats and evaporates the water, concentrating the brine, which then contains precipitated solids in the form of common salts. The brine concentration process typically results in about one part briny slurry and salts to 300 parts purified water. The purified water can be reintroduced into the aquifer and thus the net withdrawal from the aquifer would be only a small percentage of the recirculation rate. The briny slurry is disposed in an evaporation pond or via deep well injection.

Groundwater Treatment:
The groundwater treatment method of restoration is similar to the injection sweep method in that uncontaminated water is injected in perimeter wells. In this method of restoration, the groundwater removed during restoration is treated by reverse osmosis to divide it into a permeate stream containing most of the water, but about 10 percent of the dissolved solids in the restoration flow, and a reject stream containing a relatively small portion of the volumetric flow, but a large fraction of the dissolved solids. The permeate stream is relatively uncontaminated and is a suitable source for a portion of the uncontaminated water injected at the perimeter of the well field. In addition to this permeate recycle; a make-up stream of fresh water from an outside well will be required, as described in the injection sweep method, but requiring a much smaller amount of this water from an outside source. The reject stream is then disposed of in a suitable deep disposal well, as described in Section 4.3.3.

4.2.2 Deep Disposal Well Option

Powertech has determined that Class I (Hazardous Waste) deep injection wells are prohibited within South Dakota, and in fact, the probability of discovering a horizon that has no possibility of a USDW horizon beneath the injection zone is remote. The nearest Class I disposal well site associated with a licensed facility is at Crowe Butte Resources in Nebraska, approximately 97 miles from the proposed action.

Therefore, Powertech intends to apply for a Class V (Non Hazardous) deep injection permit for disposal of liquid wastes generated from the project through a permitting process with USEPA. The permit would encompass the proposed action permit boundary in an area type permit application. It is proposed that two wells will be installed; one near the Dewey SF site and one near the Burdock CPP site. Ideally these will be located within approximately ¼ mile of each plant site.

The proposed locations of the wells are presented in Exhibit 1.1-1. Regional geology and measurements of water character value within the Minnelusa horizon of Permian Age shows that the horizon has sufficient permeability and sufficiently low water quality that deep well injection would be viable for disposal of process liquid waste with removal of hazardous constituents (Figure 4.2-1 Regional TDS Distribution). Existing water quality data from oil gas exploration and development in the area is presented in Figure 4.2-1. Several analyses indicate TDS concentrations above 10,000 ppm meeting the UIC program criteria for suitability for injection.

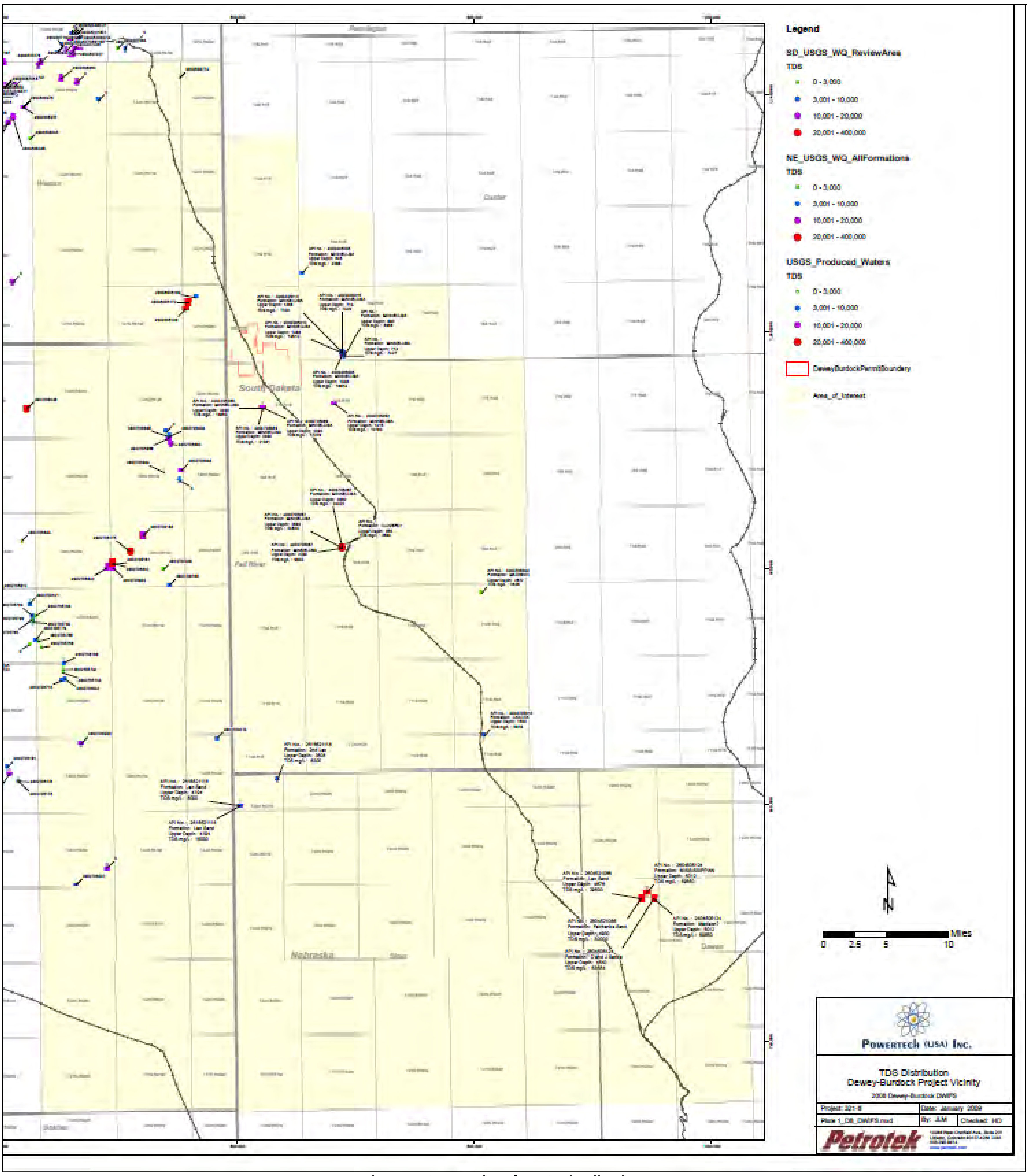

Figure 4.2-1 Regional TDS Distribution

The injection zone for each well is intended to be determined from deep exploratory drilling and collection of fluid sample data from multiple injection target zones. The expected targeted zones consist of the Minnelusa formation or deeper. Formations in consideration are the Minnelusa, Leo Sandstone, Madison, and Deadwood. Regional cross sections in general, can be viewed on the cross section index map, Figure 4.2-2. The regional cross sections, A-A' and B-B' are depicted in Figures 4.2-3 and 4.2-4, which include existing geophysical data which typically ends in the lower portion of the Leo formation and upper Madison formation. Current data does not include the Deadwood formation which is a potential target below the Madison formation. Results of the exploratory sampling prior to installing the wells, will allow proper selection location of the injection activity based upon the determination of water quality throughout all of these formations.

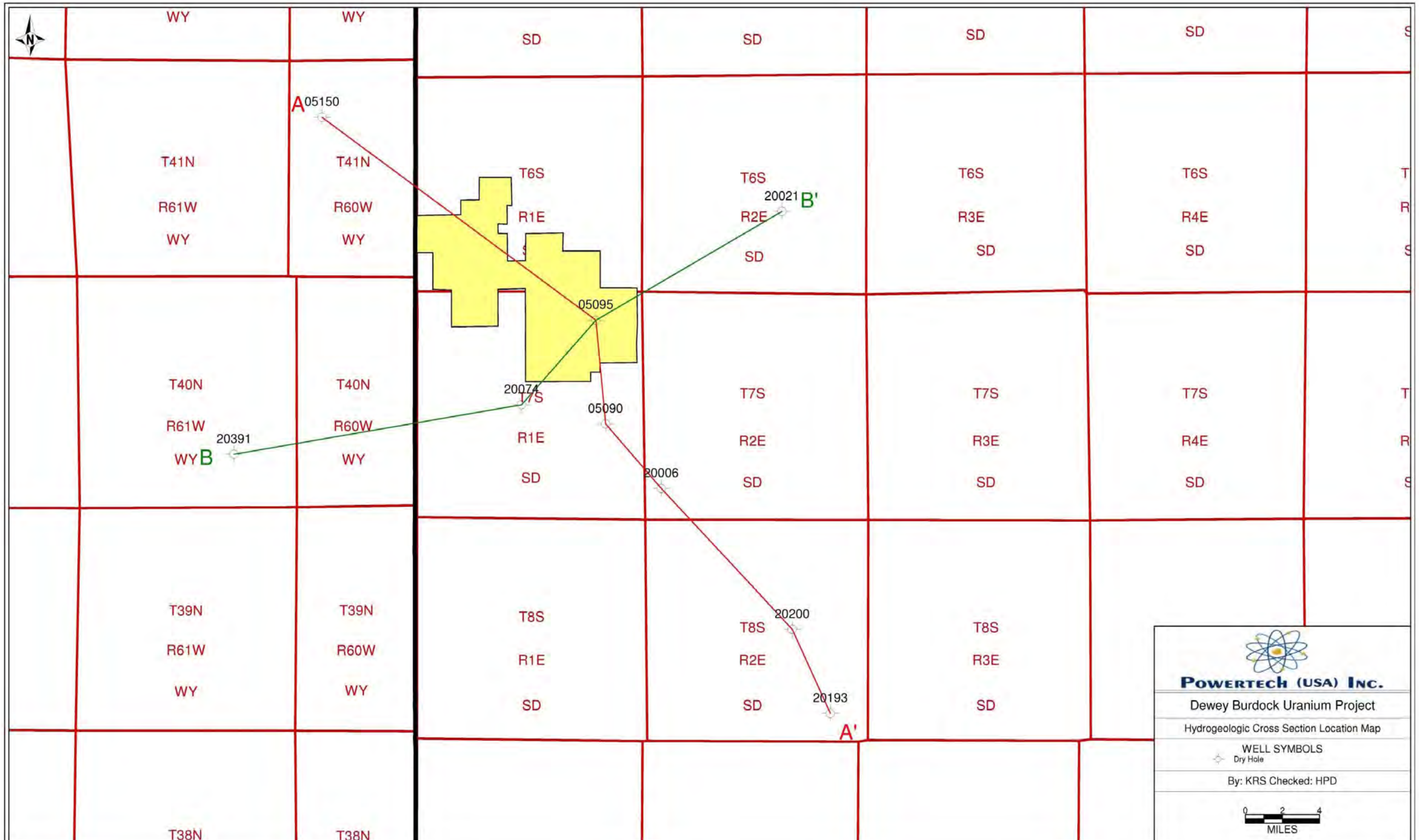

Figure 4.2-2 Cross Section Index

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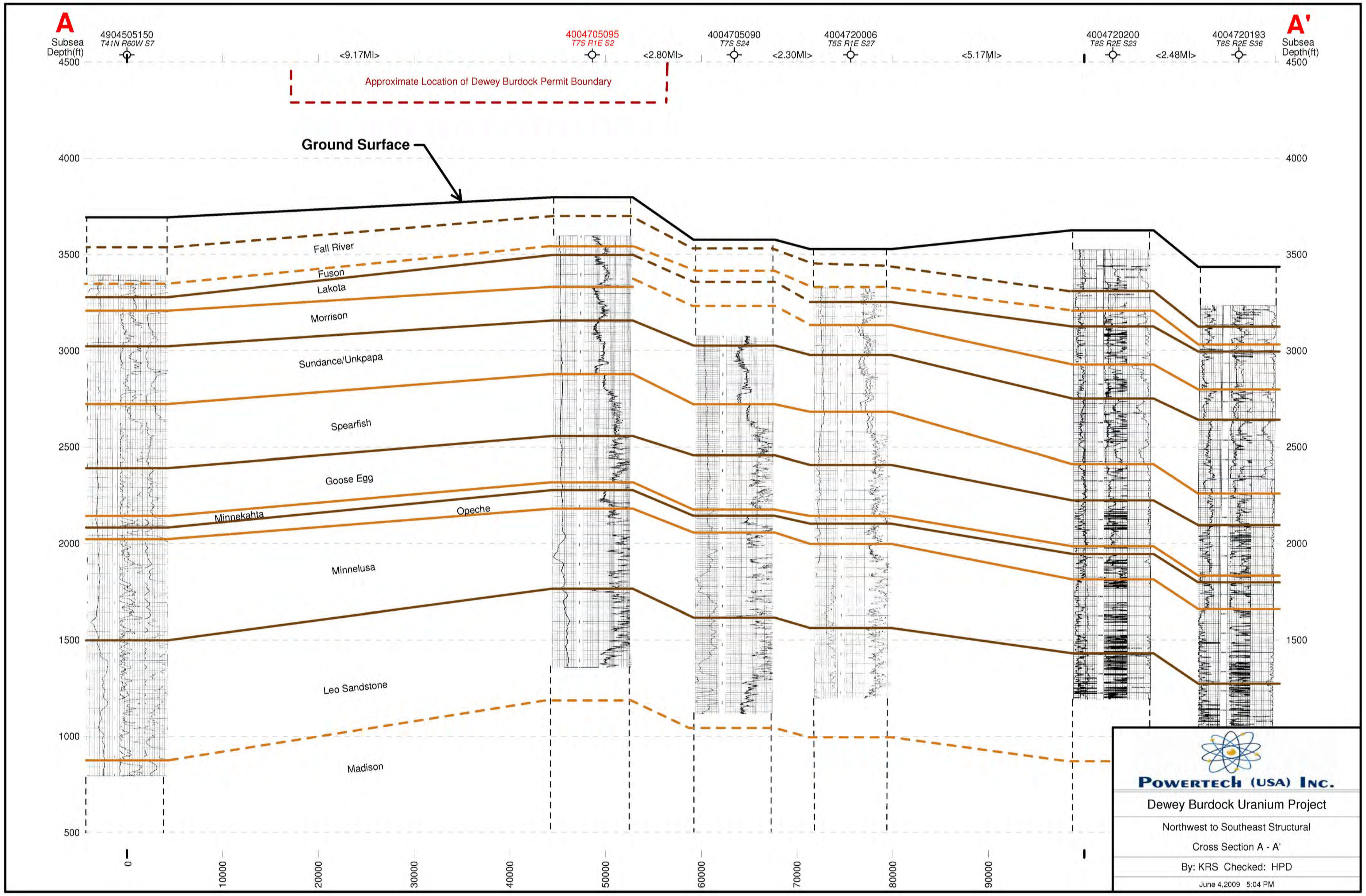

Figure 4.2-3 Regional Cross Section Index A-A'

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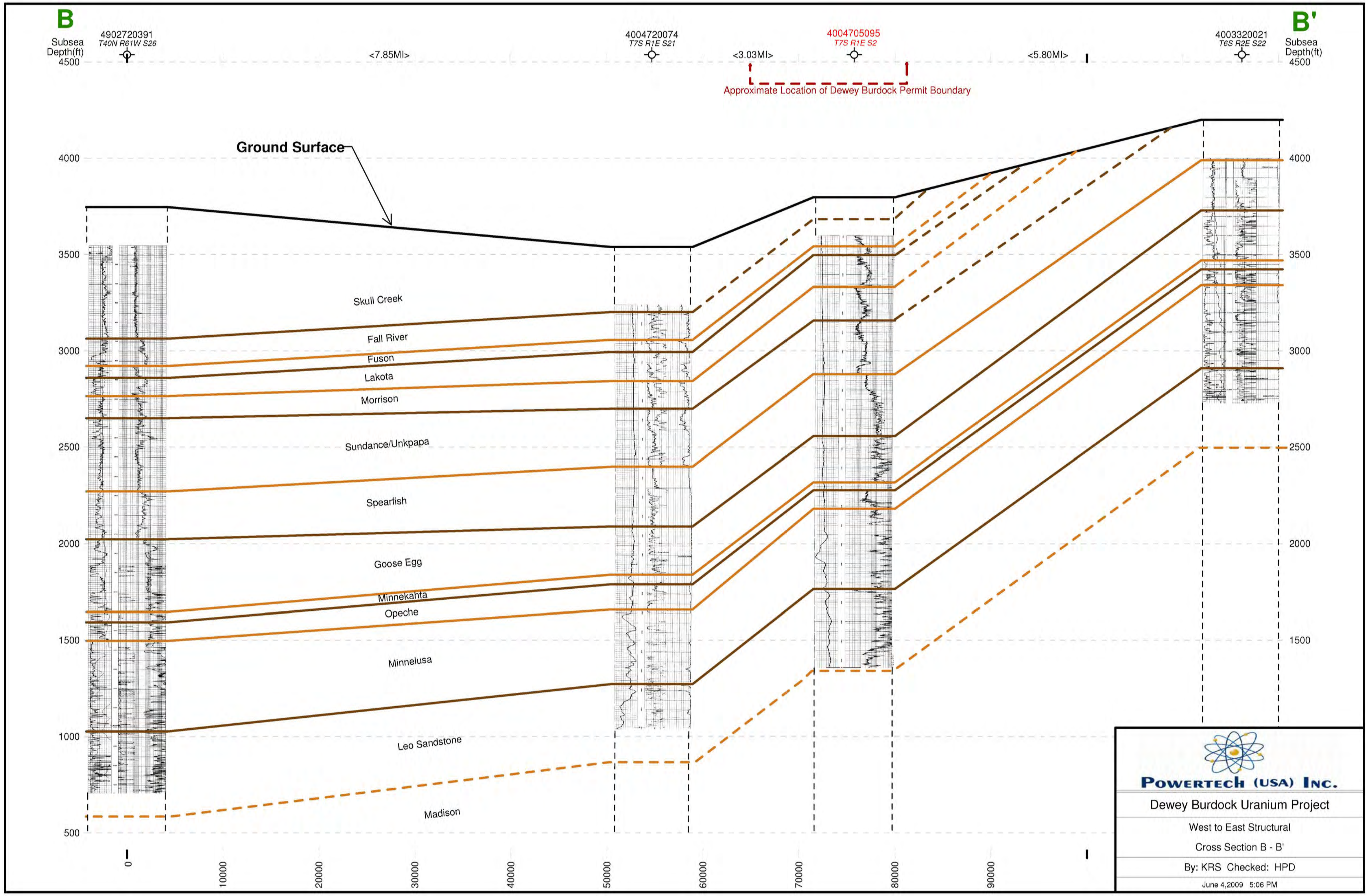

Figure 4.2-4 Regional Cross Section Index B-B'

The proposed ponds for extraction of radium are shown on Exhibits 1.1-1 and 1.1-2 as Radium Settling Ponds. Should water quality standards and the geological subsurface characteristics meet the UIC criteria for disposal of all constituents within the waste water, radium settling ponds would not be utilized.

Waste will consist primarily of the bleed streams from production and restoration operations. Typically these streams will be concentrated by reverse osmosis to minimize waste volume. In addition, these streams will also be combined with lesser amount of fluid generated by the central processing plant and consisting of waste brine from the elution process. The combined waste stream will fall under the classification of non-hazardous, 11e.(2) waste suitable for deep injection well disposal under EPA Class V regulations.

4.2.3 Disposal Well Design

Figures 4.2-3 and 4.2-4 depict the section that will be proposed for permitting. It is clear from these cross sections that the depth and character of the horizon is of sufficient thickness to support the application for a Class V permit.

Well construction will meet EPA requirements; the general construction details are described in Figure 4.2-5. The general description of the design consists of a cemented steel casing from total depth to surface, an internal tubing string, and a packer sealing the casing just above the point of injection. Injection is performed through the tubing and through the packer to the perforations below. The annulus pressure between the tubing and well casing will be continuously monitored to prevent any potential leakage of the injected waste fluid into overlying formations. Operational procedures also include a mechanical integrity testing of the casing to additionally insure against well leakage, with results submitted to all appropriate agencies for approval of injection of non-hazardous waste water with appropriate controls.

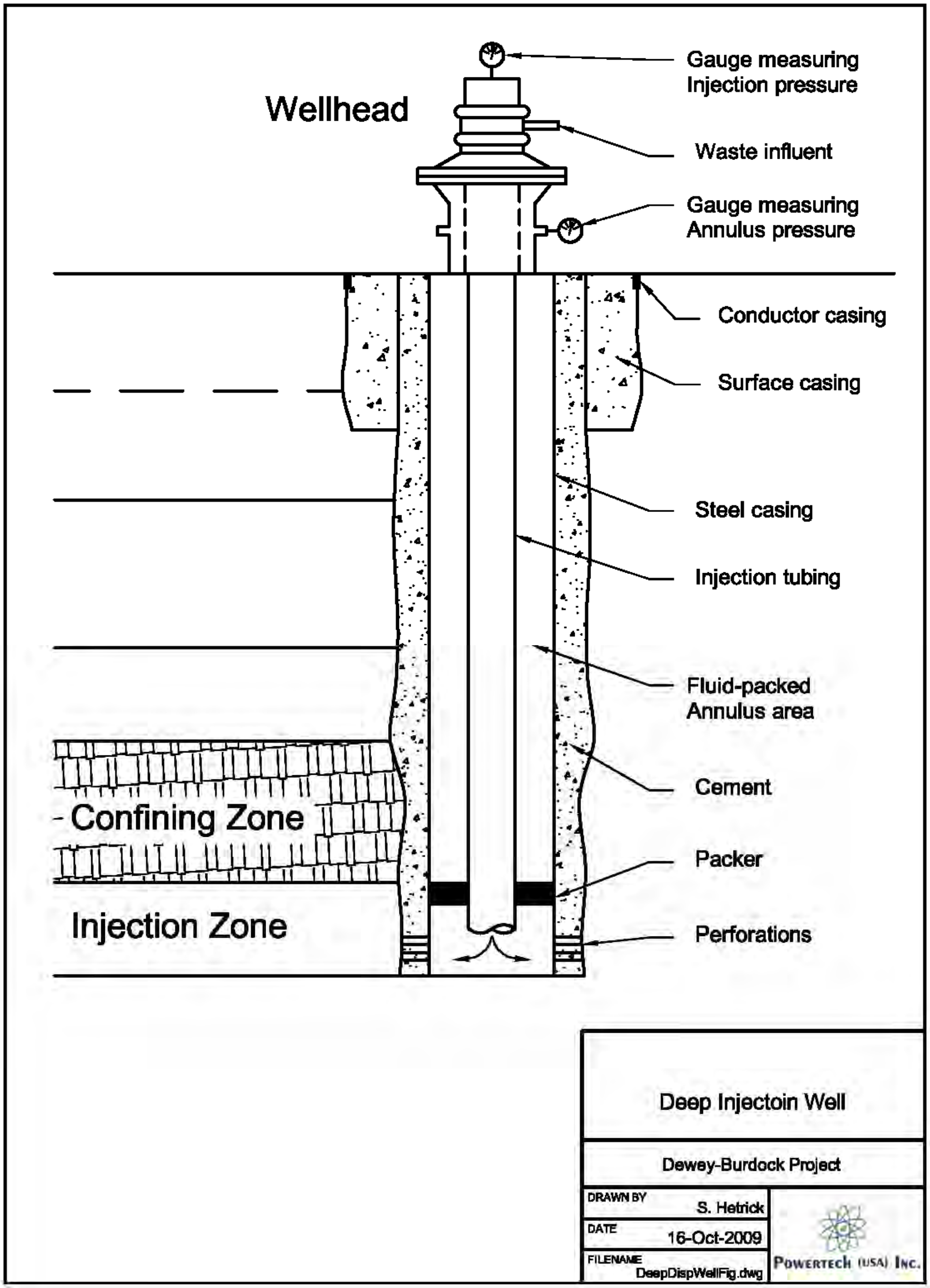

Figure 4.2-5 Deep Injection Well

4.2.4 Land Application Option

Exhibit 1.1-1 describes the proposed location of the Radium Settling Ponds that would be used prior to land application. In addition to the Radium Settling Ponds, wastewater holding ponds would be necessary for land application due to the lower evaporation rate in winter time. Powertech proposes the use of irrigation pivots to apply non hazardous waste water that meets the effluent discharge standards to the surface in order to grow grasses for cattle forage. This method was used regularly at Hobson, Mount Lucas and Highlands with no deleterious effect on the environment.

4.3 Pond Design

It is proposed that depending on the method of disposal ultimately selected, that all final data and design of as-built ponds will be submitted to the NRC and all appropriate agencies. The complete package will include design under the strictest engineering standards and will be designed and signed off by certified professional engineers.

Revised pond and water application designs for the land application option and pond designs for the deep well disposal option are presented in the Pond Design Report provided in Appendix 4.3-A. These designs have been completed following NRC Regulatory Guide 3.11-Rev. 1, NUREG 1569, 10 CFR Part 40, Appendix A, Criterion 5 and State of South Dakota Administrative Rule 74:29:11:23. A summary of the designs for both liquid waste disposal options is provided below.

4.3.1 Land Application Ponds

The land application option includes six categories of ponds:

- Radium settling ponds containing bleed and restoration water and used to settle radium out of solution.
- Outlet ponds used to intercept treated water from the radium settling ponds and to store storm water falling on the radium settling ponds.
- Storage ponds used to store treated water during the non-irrigation season.
- A central plant pond containing brine produced at the Burdock Plant site.
- A spare pond used for emergency containment should the radium settling or central plant ponds fail.
- A spare storage pond used for emergency containment should any of the storage ponds fail or portions of the land application system become temporarily inoperable.

The design of the land application ponds includes the following:

- Two radium settling ponds, one each at the Dewey and Burdock sites, having a storage capacity of 39.4 acre-ft each.
- Two outlet ponds, one each at the Dewey and Burdock sites, having a storage capacity of 4.9 acre-ft each.
- Two sets of storage ponds:
  - A system of four ponds constructed at the Dewey Site each having a storage capacity of 63.8 acre-ft.
  - A system of four ponds constructed at the Burdock Site each having a capacity of 63.8 acre-ft.
- Two spare storage ponds, one each at Dewey and Burdock sites having a storage capacity of 63.8 acre-ft.
- A central plant pond at the Burdock Site having a capacity of 36.2 acre-ft.

- Two spare ponds, one each at Dewey and Burdock sites having a capacity of 39.4 acre-ft.

4.3.2 Deep Disposal Well Ponds

The deep well disposal option includes five categories of ponds:

- Radium settling ponds, containing bleed water and restoration water and used to settle radium out of solution.
- Outlet ponds used to intercept treated water from the radium settling ponds and to store storm water falling on the radium settling ponds.
- A surge pond, containing water that has been treated and which is to be pumped to the disposal wells.
- A spare pond used for emergency containment should a liner on any of the ponds fail.
- A central plant pond containing brine produced at the Burdock Plant Site.

The design of the deep disposal well ponds includes the following:

- Two radium settling ponds, one each at the Dewey and Burdock sites having a storage capacity of 15.9 acre-ft each.
- Two outlet ponds, one each at the Dewey and Burdock sites having a storage capacity of 5.1 acre-ft each.
- Two surge ponds, one each at the Dewey and Burdock sites having a storage capacity of 8.4 acre-ft each.
- A central plant pond at the Burdock site having a capacity of 15.9 acre-ft.
- Two spare ponds, one each at the Dewey and Burdock sites having a capacity of 15.9 acre-ft.

All ponds have been designed to store water reporting to them while maintaining 3 feet of freeboard. The geometry and storage characteristics of the radium settling ponds have also been checked to verify that they will allow the efficient removal of radium from solution.

The radium settling, spare and central plant ponds will be provided with the following lining system:

- An 80-mil-HDPE primary liner
- A 60-mil-HDPE secondary liner
- A 1-ft-thick clay liner below the secondary liner
- A geonet drainage layer sandwiched between the primary and secondary HDPE liners
- A leak detection sump and access port system

All other ponds will contain treated water that is either to be used for land application or deep well disposal. These ponds will include a single 40-mil-HDPE liner underlain by a 1-ft-thick clay liner.

The results of the stability analyses calculated for the embankments using three different methods of analysis: (1) Bishop Method, (2) Janbu Method, and (3) Morgenstern-Price Method, indicate that the slopes are stable under both static and MCE seismic loading conditions.

The wastewater systems, deep well disposal and land application descriptions are discussed in further detail in Appendix 4.3-A (Pond Design Report, Land Application++ Report).

4.3.3 How Groundwater Restoration Methods are Dependent upon Disposal Methods

For ISL operations, a common commercial groundwater restoration program consists of a restoration stage and a monitoring stage. During restoration, groundwater will continue to be pumped from the well field, using a subset of wells that, during the production phase, functioned as either injection or production wells. The groundwater produced by these restoration wells will contain uranium and other constituents released during uranium production as well as residual lixiviant. Initial concentrations of these substances will be similar to those seen during production, but will decline gradually throughout the groundwater treatment process and further via the natural restoration process (NUREG/CR-3136, 1983). Water that is removed is first passed through an IX system to remove any available uranium.

Following IX, the groundwater will be treated by reverse osmosis to concentrate contaminants into a reject brine stream that is then injected into a Class V disposal wells. An alternate disposal method of treatment to remove contaminants, followed by storage and land application to produce an agricultural crop is also presented.

The specific method of groundwater restoration selected for the Dewey-Burdock project will depend on which option; deep well injection or treatment and land application, or combination thereof, as described in Section 4.2, is utilized for disposition of the wastewater from the restoration well fields.

The stability monitoring stage includes a period in which the indicator parameters identified in Table 4.1-1 are monitored in order to establish successful restoration consistent with NRC requirements.

Effectiveness:
With proper water quality evaluations of each individual well field, a thorough understanding of the hydrological characteristics and geochemistry of each well field and the use of qualified personnel that understand the processes utilized for groundwater restoration, the ultimate goal of releasing the exempted aquifer for unrestricted prior use will be accomplished.

The groundwater restoration methods described in this application have been successfully applied at other uranium ISL facilities in the US, including Irigaray/Christensen Ranch in Wyoming and Crow Butte in Nebraska.

Powertech (USA) will consult with DENR concerning the specific groundwater suite of constituents prior to well field baseline evaluation. In the event that secondary groundwater restoration standards may need to be considered for specific constituents, Powertech (USA) will provide data and justification for restoring groundwater water quality to pre-operational class of use.

4.3.4 Estimate of Post-Production Groundwater Quality

In order to estimate post-production water quality from ISL operations at the site, Powertech (USA) has reviewed operational restoration water quality data from six ISL operations in the western United States. These sites include:

- Irigaray/Christensen Ranch (Wyoming)
- Crownpoint (New Mexico)
- Crow Butte (Nebraska)
- Bison Basin (Wyoming)
- Smith Ranch/Highland (Wyoming)
- Ruth (Wyoming)

Based on this review, the Crow Butte site was selected for the estimate because of the proximity and similar geologic conditions to the project site, available water quality data, reasonable pore volume estimates to achieve restoration and overall restoration success. The water quality data for the Crow Butte site is extensive with baseline, post-production, post-restoration, and stabilization period data. Baseline water quality, post-production water quality, post-restoration average water quality and stabilization period average water quality data are provided in Table 4.3-1 for the Crow Butte Mine Unit No.1. Powertech (USA) may expect similar baseline and post-production water quality results at the project site.

Table 4.3-1 Crow Butte Post Mining Water Quality Data Summary

Parameter	Baseline Water Quality	Post-Mining Water Quality	Post-Restoration Average Water Quality	Stabilization Period Average Water Quality
BULK PROPERTIES				
Specific Cond.	1947	5752	1620	1787
pH	8.5	7.35	7.95	8.18
TDS	1170.2	3728	967	1094
CATIONS/ANIONS				
Alkalinity	293	875	321	347
Chloride	204	583	124	139
Sulfate	356.2	1128	287	331
TRACE METALS				
Manganese	0.11	0.075	0.01	0.02
Arsenic	0.002	0.021	0.024	0.017
Iron	0.044	0.078	<0.05	0.09
Lead	0.031	<0.05	<0.05	<0.01
Uranium	0.092	12.2	0.963	1.73
Vanadium	0.066	0.96	0.26	0.11
RADIONUCLIDES				
Radium-226	229.7	786	246.7	303

4.3.5 Restoration Stability Monitoring to Ensure Effectiveness:

A minimum six month groundwater stability monitoring period will be implemented to show that the restoration goal has been adequately maintained. During the stability period, the following restoration stability monitoring program will be utilized:

- Monitoring ring wells will be sampled once every two months and analyzed for the indicator parameters, which include chloride, total alkalinity (or bicarbonate), and conductivity.
- At the beginning, middle, and end of the stability period, the production wells will be sampled and analyzed for the indicator parameters listed in Table 4.2-1 (Baseline Water Quality Parameters).

The NRC and DENR will be contacted if any of the wells cannot be monitored within 65 days of the last sampling event due to unforeseen conditions such as snowstorms, flooding, and equipment malfunctions.

4.3.6 Restoration Schedule

The proposed project restoration schedule, Figure 4.3-1, shows the estimated schedule for restoration. This is a preliminary schedule based on current knowledge of the area, and is based on completion of the production activities for both the Dewey and Burdock sites. As the project is developed, the restoration schedule will be further refined.

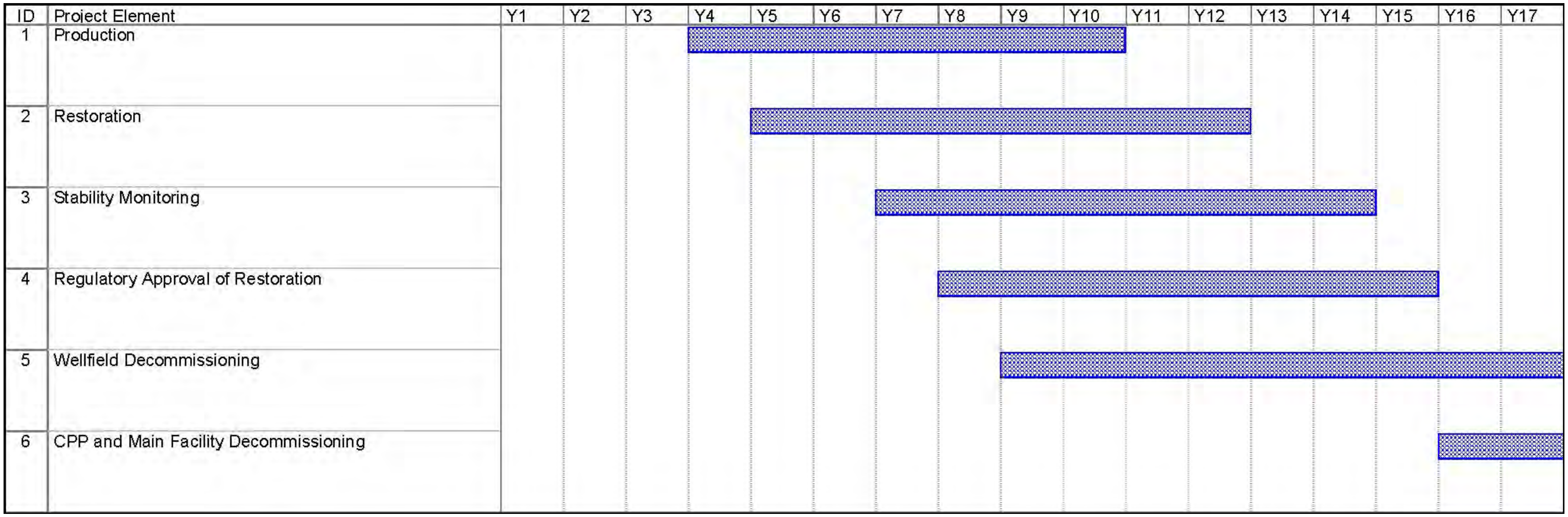

Figure 4.3-1 Proposed Project Operations and Restoration Schedule

4.3.7 Plugging and Abandonment of Wells

Prior to plugging, each well will undergo mechanical integrity testing (MIT) to demonstrate the integrity of casing and cement that will be left in the ground after closure. Alternatively, cementing records or other evidence will be used to show that an adequate quantity of cement is present to prevent upward fluid movement within the borehole outside of the casing. If it cannot be verified that a well casing is grouted properly, an effort will be made to plug the annulus from the bottom of the annulus to the ground surface, using the same materials required for plugging the inside of the casing as described below.

Wells will be opened and debris and downhole equipment such as the tubing, pumps and screens will be removed to prevent obstacles from interfering with plugging operations. The wellhead and casing will be removed to 3 feet below ground surface. A tremie pipe will be used to add grout to wells that are more than 40 feet deep.

Injection, extraction and monitoring wells that are completed into a confined aquifer or multiple aquifers will be plugged with bentonite grout provided the weight of the bentonite grout column will be sufficient to overcome the bottom hole pressure. If bentonite grout will not be sufficient, cement grout will be placed from the bottom of the well to within 8 feet of the ground surface. Cement grout will be placed from 8 feet below ground surface to within 3 feet of the ground surface. The top 3 feet of the well will be backfilled with native material and reclaimed. If a tremie pipe cannot be lowered inside the well-casing for grout placement a tight connection will be made to the top of the casing in order to pump a sufficient volume of cement grout down to fill the well, under pressure. Bentonite grout will not be used if the tight connection method is used.

Figure 4.3-2 shows a generalized schematic of a plugged and abandoned well completed into a confined aquifer or multiple aquifers.

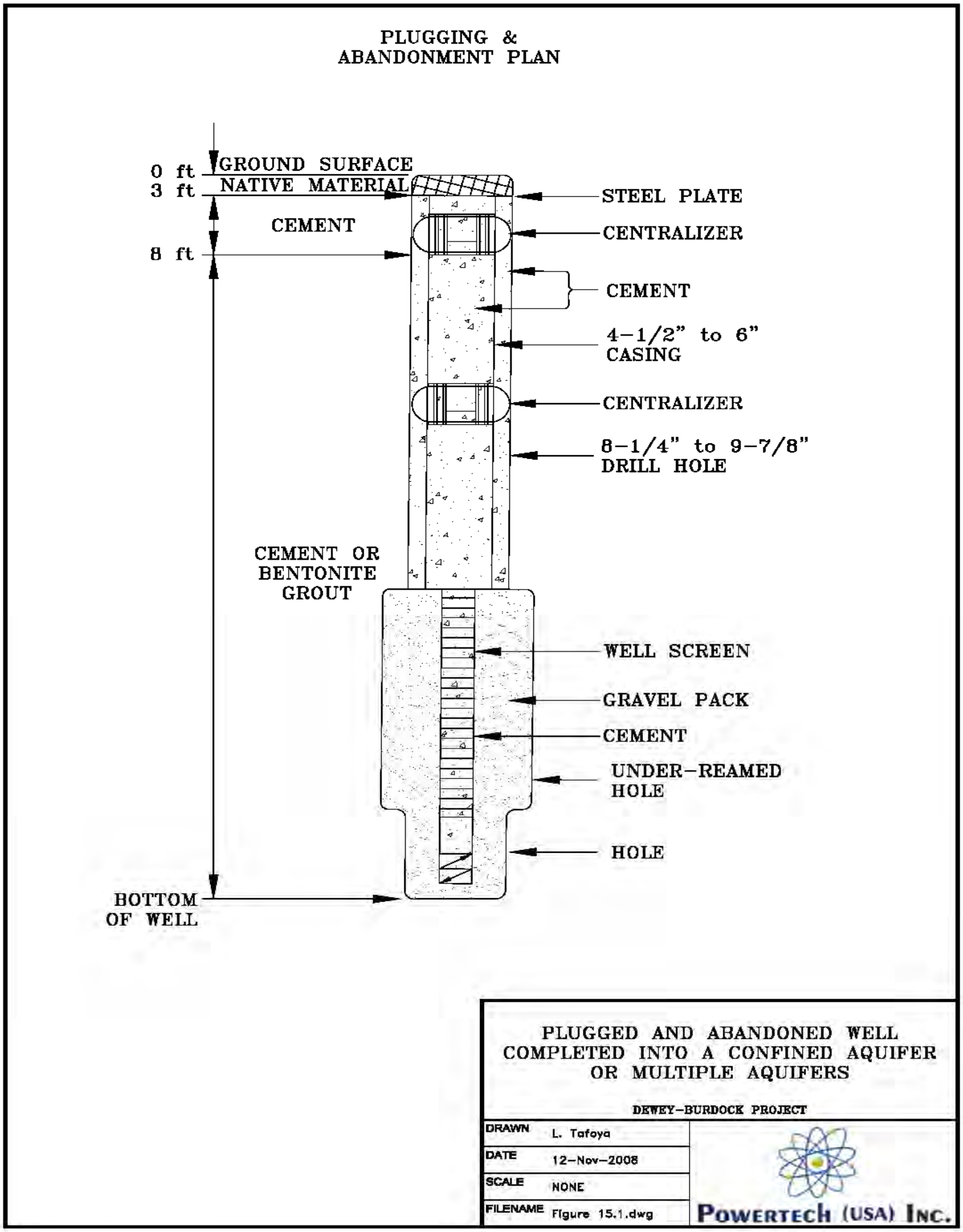

Figure 4.3-2 Plugged and Abandoned Well Completed into a Confined Aquifer or Multiple Aquifers

4.4 Reclamation Cost Estimate

Reclamation cost data is broken down into the following categories according to Estimated Costs in Appendix 4.4-A previously submitted to NRC. See Table 4.4-1 for costs associated with BLM surface disturbance. Costs associated with reclaiming BLM managed lands include total acreage of well fields (9.21 acres) and pipelines and roads (5.04 acres) for a total of 14.2 acres of disturbance. .

Total estimate categories include, but are not limited to;

1. Access Road
2. Plugging and Abandonment of wells
3. Trenches and Pits
4. Solution ponds, settling ponds and other non-tailings impoundments
5. Foundations, facilities and other equipment
6. Revegetation
7. Maintenance and Monitoring
8. Restoration Treatment Chemicals
9. By-product Disposal during Restoration
10. Site Demolition

Table 4.4-1 Estimated Reclamation Cost Associated with BLM Surface Disturbance

Unit cost per well (assume average depth of 650 feet)		
Materials	**Quantity**	**Unit**
5" diameter casing	0.136	Cubic ft/ft
Average well depth	650	ft
Cubic ft per well	88.4	CF
Cement grout cost	9.00	$/cubic ft
Cement grout cost/well	795.60	$/well
Equipment and Labor		
Contractor crew and equipment - at $125/hour		
Mob/DeMob ($11,000 over 377 wells)	30.00	
Well plugging	375.00	$/well
Demolition of well heads and backfill	95.00	
Revegetation	2754	$/15 wells
Equipment and Labor cost/well	500.00	$/well
Total abandonment cost/well	1,300.00	$/well
1st Well field		
Monitoring wells #wells = 15	19,500.00	$
Production and Injection wells #wells = 0	000,000.00	$
Total Estimated Well Abandonment	**22,254**	**$**

Considerations when preparing the cost estimation for reclamation include, but are not limited to:

- Salvageable building and equipment

  - Decontamination, refurbishment, removal of equipment and repairs cost data supplied if applicable:
- Nonsalvageable building and equipment
  - Disposal cost data with tons of material and building volume in cubic meters from each nonsalvageable structure, foundation concrete in cubic feet, process equipment in tons, piping and insulation data provided in lump sum, and electrical and instrumentation cost data provided in lump sum.
- Disposal of chemical solutions within the licensed facility
- Restoration of contaminated area (process area, affected groundwater, surface impoundment residues)
  - According to Criterion 2 of 10 CFR Part 40, Appendix A, 11e.(2) byproduct material must be transported and disposed of at a licensed disposal site. The quantity of removed material, the distance to the disposal site and fees associated with receiving facility will be considered within the final estimated cost of disposal.
- Project Management Costs and Miscellaneous
  - Cost estimations associated with project management, engineering design, review, and change will be submitted within the closure cost estimation along with items such as mobilization; power usage during restoration and reclamation; quality control costs, radiological safety; and any miscellaneous costs not covered under other categories.
- Labor and Equipment Overhead, Contractor Profit
  - Overhead costs for labor and equipment and contractor profit may be calculated one of two ways; as separate items or loaded into hourly rates. If hourly rates are used the unit costs will be identified as a percentage and applied for each area.
- Contingency
  - A minimum of a 15 percent contingency will be applied to the total cost estimate for the final closure of the licensed area.
- Adjustments to Surety Amounts
  - As a requirement outlined in 10 CFR Part 40, Appendix A, Criterion 9, Powertech will adjust the cost estimates annually. This adjustment will account for inflation and changes in reclamation plans; this adjustment will be in the form of a request for amendment to the license.

Changes in reclamation plans include:

- Changes in the process such as size or method of operation
- Licensee initiated changes in reclamation plans or reclamation/decommissioning activities performed
- Adjustments to reclamation plans required by NRC
- Proposed revisions to reclamation plans with cost estimates and the basis for cost estimates detailed for NRC review and approval (see Tables 4.4-2 and 4.4-3 below for cost summaries for land application and disposal well options).

Powertech will provide sufficient information for the NRC to verify that the amount of coverage provided by the financial assurance will permit the completion of all decontamination, decommissioning, and reclamation of licensed area, structures, and equipment used in conjunction with facility operations.

To avoid unnecessary duplication and expense, NRC shall take into consideration surety arrangements required by other federal, state and other local governing bodies per NUREG 1569 Appendix C, 2003.

Table 4.4-2 Cost Summary – Land Application Only

Task No.	Description	Cost
1	Water Treatment Equipment (provided with initial project construction)	-
2	Groundwater Restoration Cost	2,387,000
3	Well Closure	490,000
4	Decommissioning Labor	706,000
5	Mobilization and Site Preparation	25,000
6	Demolition and Disposal of 11e(2)	1,489,000
7	Plant Equipment Transferred	239,000
8	Demolition with Disposal in Landfill	2,520,000
9	Other Reclamation	1,989,000
10	Contingency at 15%	1,477,000
	Total Restoration and Reclamation Cost	11,322,000

Table 4.4-3 Cost Summary – Disposal Well Only

Task No.	Description	Cost
1	Water Treatment Equipment	-
2	Groundwater Restoration Cost	1,877,000
3	Well Closure	490,000
4	Decommissioning Labor	706,000
5	Mobilization and Site Preparation	25,000
6	Demolition and Disposal of 11e(2)	702,000
7	Plant Equipment Transferred	239,000
8	Demolition with Disposal in Landfill	1,228,000
9	Other Reclamation	915,000
10	Contingency at 15%	927,000
	Total Restoration and Reclamation Cost	7,109,000

4.5 Land Use Plans

The information in this section provides data relevant to describe the major land uses within and near the Proposed Action Area (PAA) (Exhibit 4.5-1).

The PAA straddles the western county border between Custer and Fall River, South Dakota. Land within the PAA is predominantly privately owned (97.5 percent) and the remaining 2.5 percent is managed by the Bureau of Land Management (BLM). Exhibit 1.2-1 depicts surface and mineral control in the vicinity of the PAA.

Land use within the proposed project boundary primarily consists of agriculture related to grazing, as well as hunting and historical mining. A 2.0-kilometer review area is not available for the PAA because the four counties in the study area do not utilize zoning or land use plans outside of urban areas. There is no commercial crop production within the permit area, although approximately 388.79 acres of land are irrigated in Sec. 32, T 6S, R. 1E along Beaver Creek. The majority of agricultural production is related to grazing. Most land serves as grazing land for cattle that are sold as food, as well as a small number of horses.

According to the United States Department of Agriculture's (USDA) 2002 census, Custer County generated $11,536,000 and Fall River County generated $49,003,000 from the sale of livestock, poultry and their products. The results from the 2007 Census will not be available until February 4, 2009. According to the National Agriculture Statistics Service, in 2008 (USDA, 2008) the two counties had a combined total 78,000 head of cattle (No data was available for poultry, pig, or sheep inventories). Table 4.5-1 shows the 2008 livestock inventory for Custer and Fall River Counties.

Table 4.5-1 2008 Livestock Inventory for Custer and Fall River Counties

Type of Livestock	Number Custer County	Number Fall River County	Percent of Total (Custer and Fall River combined)
Beef Cows	17,000	45,000	22/58%
All Cattle and Calves – excluding Beef Cows	1,000	15,000	1/19%
Sheep and Lamb	N/A	N/A	N/A
Hogs and Pigs	N/A	N/A	N/A
Total Animals	18,000	60,000	100%

Source: USDA 2008.

Recreation lands are present in Custer, Fall River and Pennington counties within a 50-mile radius of the PAA (Table 4.5-2). Major attractions include Mount Rushmore National Memorial and Wind Cave National Park which are set in the backdrop of the Black Hill National Forest. Within the PAA or within the surrounding 2.0 kilometers there are no recreation lands present because most of the land is private with a small portion (240 acres) belonging to the BLM.

Recreational use within the PAA is limited primarily to large game hunting. Within the PAA, hunting is currently open to the public on approximately 5,689 acres. Approximately 240 acres are owned by the BLM; the South Dakota Game Fish and Parks (SDGFP) lease around 3,069 acres annually of privately owned land and currently designate this acreage as walk-in hunting areas.

Table 4.5-2 Recreational Areas within 50 Miles of the PAA

Name of Recreational Facility	Managing Agency	Distance From PAA (miles)
Mount Rushmore National Memorial	U.S. Department of the Interior	44.0
Jewel Cave National Monument	U.S. Department of the Interior	23.0
Buffalo Gap National Grassland	U.S. Forest Service	3.0
Custer State Park	South Dakota Department of Game, Fish and Parks	35.0
Wind Cave National Park	U.S. Department of the Interior	29.0
Black Hills National Forest	U.S. Forest Service	0.25
Angostura State Recreation Area	South Dakota Department of Game, Fish and Parks	29.0
George S. Mickelson Trail	South Dakota Department of Game, Fish and Parks	17.0

Source: Google Earth (20 June, 2008)

Table 4.5-3 lists the distance to the nearest resident from the PAA according to 22.5-degree sectors centered on the 16 cardinal compass points. The nearest resident is 0.9 miles to the west south-west of the PAA.

Table 4.5-3 Distance to Nearest Resident from the Center of the Proposed Project

Sector	Distance from Project Center	
	Miles	Km
N	7.2	11.6
NNE	8.3	13.3
NE	6.7	10.8
ENE	13.1	21.1
E	6.8	11.0
ESE	10.7	17.3
SE	7.5	12.1
SSE	5.9	9.4
S	0.9	1.4
SSW	3.4	5.5
SW	21.0	33.7
WSW	1.7	2.7
W	20.3	32.6
WNW	6.2	10.0
NW	3.5	5.6
NNW	4.2	6.7

Data from US Census Bureau, 2000 Census

Aesthetics

The PAA is located within the Great Plains physiographic province on the edge of the Black Hills Uplift. The vegetation is a mix of short grasses and shrubs typical of semi-arid steppe land along with Ponderosa Pine forest toward the Black Hills. The color of the landscape varies from light brown and green to dark green with wildflowers in the springtime to light brown to golden during the later drier months. The human influence on the area is minor with most of the area being used for grazing activities and associated facilities (e.g., fences and stock wells). The area's infrastructure includes the Burlington Northern Rail Road (BNRR) that runs north through Edgemont towards Newcastle, Country Road 6463 that parallels the BNRR to the town of Dewey and overhead electricity lines and several gravel access roads.

Transportation and Utilities

The PAA generally will be accessed north from Edgemont along County Road 9. To the east U.S. Highway 18 connects Edgemont with Hot Springs and to the north State Highway 89 connects Edgemont with Custer City. Annual Average Daily Traffic (AADT) counts on U.S. Highway 18 between Edgemont and the junction with State Highway 89 is 2,000 vehicles (South Dakota Department of Transportation [SDDOT] 2007). The AADT count on State Highway 89 between Custer City and the junction with U.S Highway 18 is 515 vehicles (SDDOT 2007).

Fuel Cycle Facilities

The NRC provides a list of all of the source material facilities operating in the United States which include uranium mills and fuel cycle facilities. According to the NRC website there are no fuel cycle facilities within 50 miles of the PAA. The closest fuel cycle facility is the AREVA NP, Inc. uranium fuel fabrication in Richland, Washington. Also in Eunice, New Mexico the Louisiana Energy Services fuel cycle facility is currently under construction (NRC, 2008).

There are no Resource Material Licenses for in situ uranium projects within 50 miles of the PAA. The nearest operational in situ facility is the Crow Butte ISL facility, SUA-1534, in Darrow County, near Crawford, Nebraska (NRC, 2008).

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Section 5.0 - Environmental Protection and Monitoring Plan

The Environmental Protection and Monitoring Plan is designed and submitted in an effort to demonstrate the measures that will be taken to prevent unnecessary or undue degradation during operations (§3809.301.(b)(2)(i) and 3809.311.(c)). Presented within this plan are the baseline environmental data that was collected within the proposed permit boundary and outside the permit boundary within a two kilometer radius. An evaluation was conducted to determine potential impacts for each action taken during each phase of the proposed mining operation; environmental controls and mitigation initiatives are also discussed in this plan.

5.1 Radiological

For radiological characterization of the PAA three primary guides were utilized, NUREG-1569 "Standard Review Plan (SRP) for In Situ Leach Uranium Extraction License Applications" (NRC 2003), "NRC Regulatory Guide (RG) 4.14" (Revision 1), "Radiological Effluent and Environmental Monitoring at Uranium Mills" (NRC 1980) to provide an acceptable basis for pre-operational radiological baseline evaluations, NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), 2000 was also considered where relevant.

Sample placement prescribed by RG 4.14 was modified in order to ensure the effort put forth in characterization of the PAA is adequate and assures an appropriate baseline determination of background radiation. Modification of the sampling program described in RG 4.14 is appropriate as RG 4.14 was developed to be used in design of an environmental monitoring program for conventional uranium mill and tailings sites and was not specifically intended to address ISL operations. The modified sampling program adequately characterized radiological aspects of the environment at the PAA and assists the applicant in the proper placement of operational monitoring sites to ensure standards for protection against radiation will be met during licensed operations. The sampling protocol was designed to achieve the goal of adequately protecting the public and the environment from unacceptable levels of radiation or radioactive materials that exceed background levels. See Section 5.1.3 for additional details.

Responsible operators achieve this goal, in part, by consulting NRC guidance documents such as NUREG-1575. By conducting a detailed environmental site survey, sampling and analysis program; the operator is able to establish baseline background levels and assess possible derived concentration guideline levels (DCGLs) via both historical site assessments (HSA) and the most recent site characterization. Historical and current data will be assessed prior to commencement of the Proposed Action's D&D (Decontamination and Decommissioning) program. By utilizing the immense experience of the industry, consultation with the appropriate regulators and utilization of applicable guidance, the licensee will be able to clean up any contamination that may result from ISL operations and release the site for unrestricted use.

5.1.1 Baseline Radiological Data

This section provides baseline radiological data for surface soils (0-5 and 0-15 cm), subsurface soils to a depth of 1 m, vegetation, cattle, direct gamma radiation, and radon-222 flux rates radon-222 in air representative of the project property. The work was performed by Environmental Restoration Group (ERG) between August 2007 and July 2008.

Field investigations, sample collection, and other quality-related work performed were conducted in accordance with applicable ERG Standard Operation Procedures (SOPs), listed below:

- SOP .010 Radon Flux Canister Deployment
- SOP 1.05 Calibration of Scaler, Rate meters

- SOP 1.22 Determining the Concentration of Airborne Radioactive Particles
- SOP 1.51 Correlation between Gamma-Ray Count Rate and Exposure Rate
- SOP 2.02 General Equipment Decontamination
- SOP 2.07 Function Check of Equipment
- SOP 2.09 Correlation between Gamma-Ray Measurements and Radium-226 in Soil
- SOP 3.02 Sample Control and Documentation
- SOP 5.01 Setup and Operation of Trimble Pro XRS GPS Receiver with Trimble TSCe Datalogger
- SOP 5.02 Download, Correction, and Export of GPS Survey Data
- SOP 5.06 Creating, Uploading, and Navigating to Waypoints
- SOP 7.08 Surface and Shallow Subsurface Soil Sampling
- SOP 7.09 Vegetation Sampling

The baseline radiological field investigation consisted of the following activities:

- A GPS-based gamma survey conducted at 100 to 500 meter (m) transects spanning the PAA
- A second GPS-based gamma survey of two, collective land application areas conducted at 100 m transects
- Collecting surface soil (0-15 centimeter [cm]) samples at 75 randomly selected and at five biased locations spanning the PAA
- Collecting subsurface soil samples at nine randomly selected locations taken at depth intervals of 15-30 cm and 30-100 cm
- Collecting surface (0-15 cm) and subsurface samples at the same depth intervals at 17 randomly selected locations in the land application areas
- Collecting shallow (0-5 cm) surface soil samples at the eight AMS
- Vegetation sampling at each AMS during the summer, fall and spring
- Air monitoring at one background and seven additional locations
- Radon monitoring in air
- Radon flux measurements at locations coinciding with the subsurface samples
- Exposure rate monitoring, using a PIC and thermoluminescent detectors (TLDs)
- Collecting three samples of locally grazed livestock

Table 5.1-1 summarizes the scope of the field investigation and Exhibit 7.9-1 shows the sampling location and type of sampling performed in the PAA. All samples were shipped under chain-of-custody to a National Environmental Accreditation Conference-certified laboratory, Energy Laboratories, in Rapid City, South Dakota.

The units reported in the body, tables, and figures related to this section vary. NRC RG 4.14, *Radiological Effluent and Environmental Monitoring at Uranium Mills*, has specific requirements for unit reporting in tables. For example, it recommends that radionuclide soil concentrations be reported in units of microcuries per gram (µCi/g). Where applicable, the tables adopt this unit. The main body of Section 5.1, however, adopts the unit pCi/g for this parameter, as this unit is used more generally and consistently by the uranium industry and public.

Table 5.1-1 Summary of Baseline Radiological Investigation Scope

Task Method/Endpoint	Baseline Investigation Scope	Parameters Evaluated
A.GPS-Based Gamma Surveys	GPS-based unshielded gamma-ray readings along 100 or 500 meter transects at $\leq$1.5 meters per second. A second survey covered land application areas along 100 meter transects.	Serve as basis to estimate pre-operational gamma emissions from land areas and exposure rates, surface soil radium-226 concentrations, and identify areas for biased soil sampling.
B. Biased Soil Sampling	Biased samples at five locations, all collected from 0 to 15 cm	Radium-226 for all samples Thorium-230, natural uranium, lead-210 for 2 locations
C. Random Soil Sampling	Random samples at 75 locations Nine of the 75 locations were sampled at depth (15-30 cm and 30-100 cm) Ten duplicates at 0 to 15 cm. One duplicate each at 15 to 30 cm and 30 to 100 cm.	Radium-226 for all samples Thorium-230, natural uranium, lead-210 (8 from 0 to 15 cm and one each at 15 to 30 cm and 30 to 100 cm
D. Soil sampling in land application areas	Random samples at 17 locations, all but one of which were sampled at 0 to 15, 15 to 30 and 30 to 100 cm. Refusal was encountered at 45 cm in the exceptional location. One duplicate each at 0 to 5, 15 to 30, and 30 to 100 cm.	Radium-226, thorium-230, natural uranium, and lead-210 for all samples
E. Exposure Rate Monitoring	Exposure rate determinations based on TLD and PIC measurements. TLD measurements collected for four quarters.	Exposure rates
F. Soil and Vegetation Sampling at Air Monitoring Stations	Eight locations: seven on-site (AMS-01 through AMS-07) and one located approximately 1.9 miles west of the southwest corner of the PAA (AMS-BKG). Vegetation samples collected for four quarters.	Vegetation: radium-226, thorium-230, natural uranium, lead-210 and polonium-210 Soil: All of the above except polonium-210
G. Air Particulate Sampling	Eight locations: seven on-site (AMS-01 through AMS-07) and one located approximately 1.9 miles west of the southwest corner of the PAA (AMS-BKG). Air particulate samples collected for four quarters.	Air filters: radium-226, thorium-230, natural uranium, lead-210 and polonium-210
H. Radon in air	16 locations: eight AMS and eight additional locations. Radon in air measurements taken for four quarters.	Radon-222
I. Radon Flux Measurements	Radon flux measurements at nine locations (collected at the biased subsurface soil sample locations in Task C) in summer, fall, and spring.	Radon-222
I. Locally Grazed Livestock Sampling	Three samples collected from one locally grazing cow.	Radium-226, thorium-230, natural uranium, lead-210 and polonium-210

5.1.2 Gamma Survey

5.1.2.1 Baseline GPS-Based Gamma Survey

GPS-based gamma surveys were conducted within the PAA and the historical surface mine areas of the project from September 13-27, 2007 and completed on July 14, 2008. Unshielded Ludlum Model 44-10 2”x 2” sodium iodide (NaI) detectors were coupled to Ludlum Model 2221 ratemeter/scalers (set in ratemeter mode) and a Trimble Pro XRS GPS Receiver with Trimble TSCe Datalogger. Survey transects were spaced at approximately 500-m intervals in the PAA and 100 m in the surface mine area. The transect spacing was reduced in the surface mine area in anticipation of finding a greater variation in gamma-ray emissions, due to historical mining in the area. The survey speed was maintained between 2 and 5 feet per second with x- and y-coordinates and gamma-ray count rates recorded every second. The detector height was held relatively constant at approximately 18 inches above ground surface. Depending on the terrain, field personnel surveyed using ATVs or by walking with the equipment in backpacks. See example of utilization of best technology available in regards to conducting the roving gamma survey at the PAA in Figure 5.1-1.

A second GPS-based gamma survey was conducted over the land application areas from July 17-19, 2008, using the Ludlum gamma-ray detection system described above with the same response characteristics as used in the initial survey. The scanning speed and detection height were unchanged from the initial survey and the transect spacing was 100 m.

The areas subject to GPS-based gamma surveys are shown on Figure 5.1-2.

Figure 5.1-1 Example of Best Technology Available Utilized for the Roving Gamma Survey at the Dewey-Burdock Project by ERG

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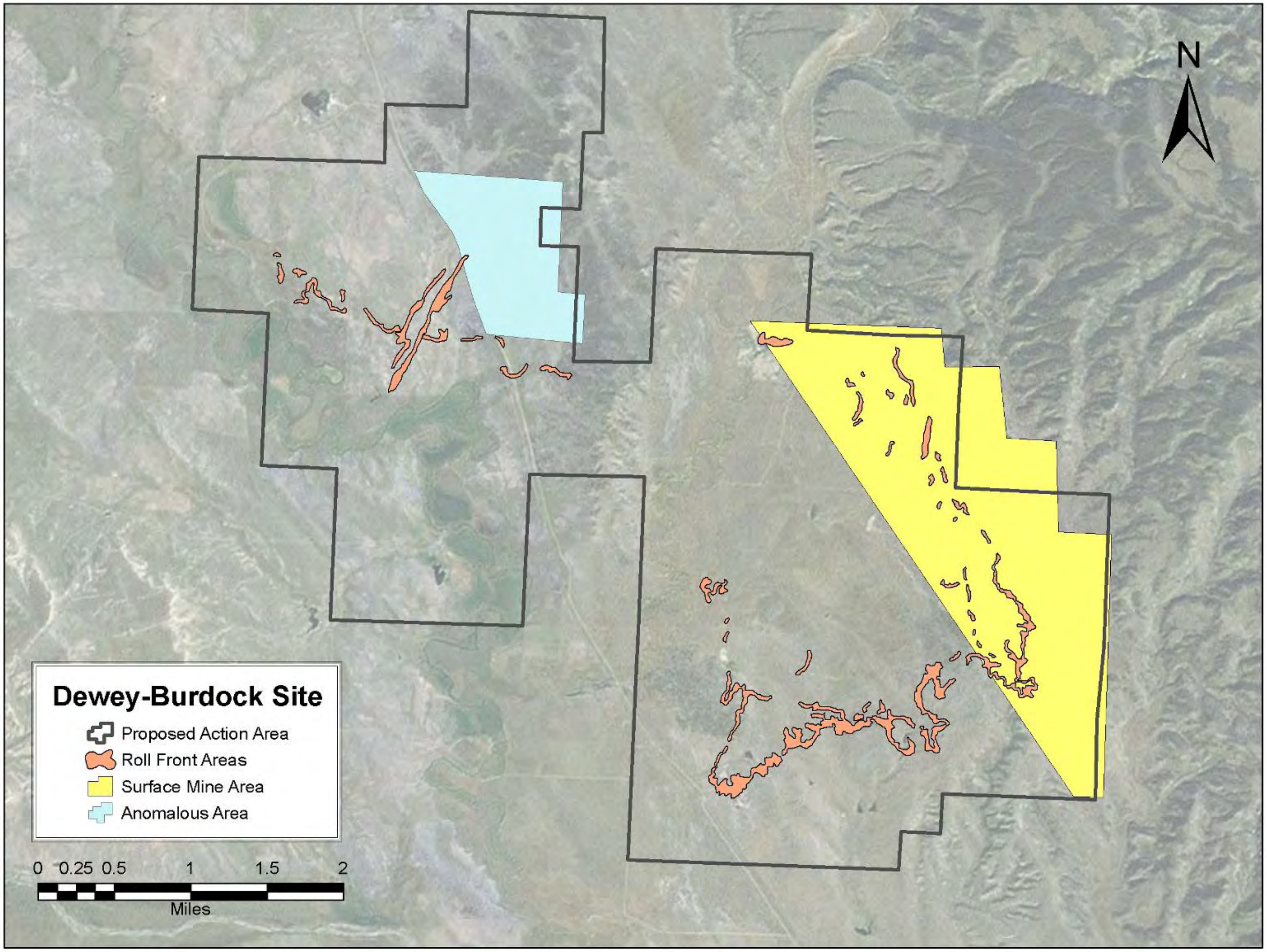

Figure 5.1-2 Areas Subject to GPS-Based Gamma Surveys

5.1.2.1.1 Cross-Calibration of Sodium Iodide Detectors and a High-Pressure Ionization Chamber

Both the sodium iodide detector and PIC measure gamma radiation. The sodium iodide detection system measures the rate that the gamma rays interact with the detector in counts per minute (cpm), has a lower sensitivity than the PIC and is energy dependent. The PIC is a highly accurate ionization chamber for measuring exposure rate in microroentgens per hour (μR/hr) but requires a longer count time. The PIC was used because it measures exposure rates directly and is considered a primary standard by NIST, when calibrated. The PIC measures gamma, X-rays, and cosmic radiation without discrimination. It is highly stable, relatively energy independent, and serves as an excellent tool to calibrate other survey equipment to measure exposure rates. Because of its portability and shorter measurement times, the sodium iodide detector is more efficient than the PIC for use in large area surveys. By performing the large area gamma surveys with sodium iodide detectors, then developing a correlation between the two instruments, exposure rates derived from the sodium iodide measurements can represent site wide gamma emissions from surface soils.

Powertech collected 12 co-located static gamma counts and exposure rate measurements to develop the correlation between gamma counts and exposure rates. The locations were biased towards areas where gamma shine was not relatively high; that is, where gamma count rates remained relatively constant at 18 inches, 1 m, and 2 m above ground surface. In addition, locations were chosen to encompass most of the range of sodium iodide detector readings observed in the GPS-based gamma surveys. The sodium iodide measurements were taken using one of the 2-inch by 2-inch sodium iodide detectors that were used in the baseline gamma survey. A 1-minute integrated count was taken at each of the 12 locations with the detector suspended at 18 inches above the ground surface. Exposure rate measurements were then collected at a 1-m height at each location, directly above the location where the sodium iodide detector was held. Exposure rates were determined after 20-minute integrated counts. The PIC and gross gamma measurements were performed on July 14 to 16, 2008 at the locations shown on Figure 5.1-3.

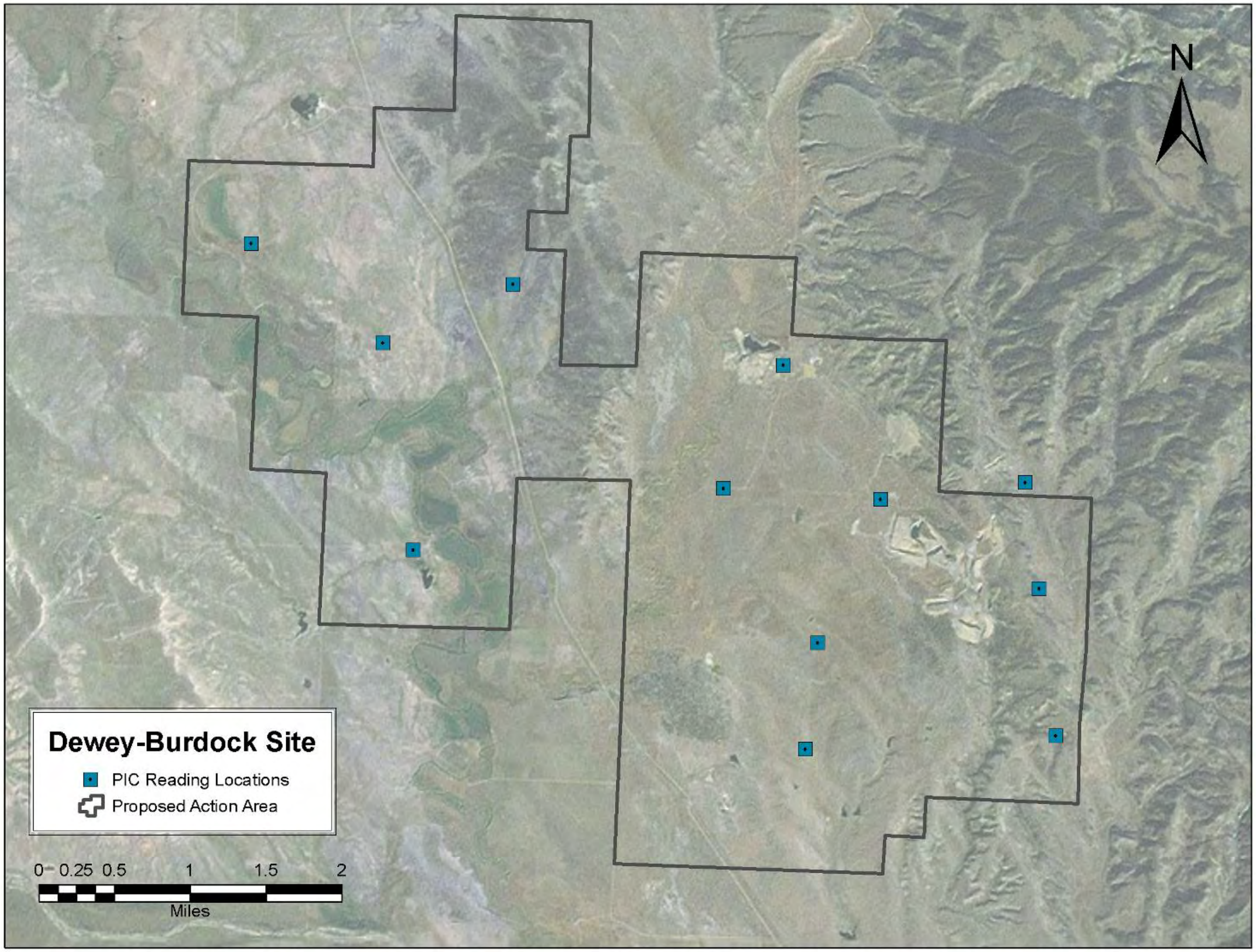

Figure 5.1-3 Locations of High Pressure Ion Chamber and Sodium Iodide Detector Measurements

5.1.2.1.2 Gamma/Radium-226 Correlation Grids

To estimate site-wide radium-226 concentrations at each of the GPS-based gamma survey points, a correlation was established by performing a regression between the surface soil analytical results for radium-226 in the 80 surface (0-15 cm) soil samples and one-minute integrated direct radiation measurements collected at each of these locations prior to sample collection. The measurements were collected with the same Ludlum 44-10/2221 2-in by 2-in sodium iodide gamma detection systems used in the GPS-based gamma survey.

The correlation was used to translate each of the gamma-ray count rates obtained in the GPS-based survey to predicted radium-226 concentrations. Arc GIS then was used to generate average predicted radium-226 concentrations in 700 by 700 foot grid blocks covering the site.

5.1.2.1.3 Data Quality Assurance/Quality Control

All survey instruments were calibrated. The function of survey instruments was checked at the beginning and end of each work day using a National Institute of Standards and Technology-traceable cesium-137 source. Calibration sheets and function check data have been retained.

5.1.2.2 Gamma Survey Results

The gamma-ray count rate data obtained in the initial survey were first evaluated as an entire set and then subdivided into the main permit (the entire data set less the surface mine area) and surface mine areas.

The observed gamma-ray count rates are presented as colors representing ranges of counts in Figure 5.1-4. Three areas are shown on the figure: the main permit and surface mine areas, and an area of anomalous gamma-ray count rates located in the northern portion of the PAA.

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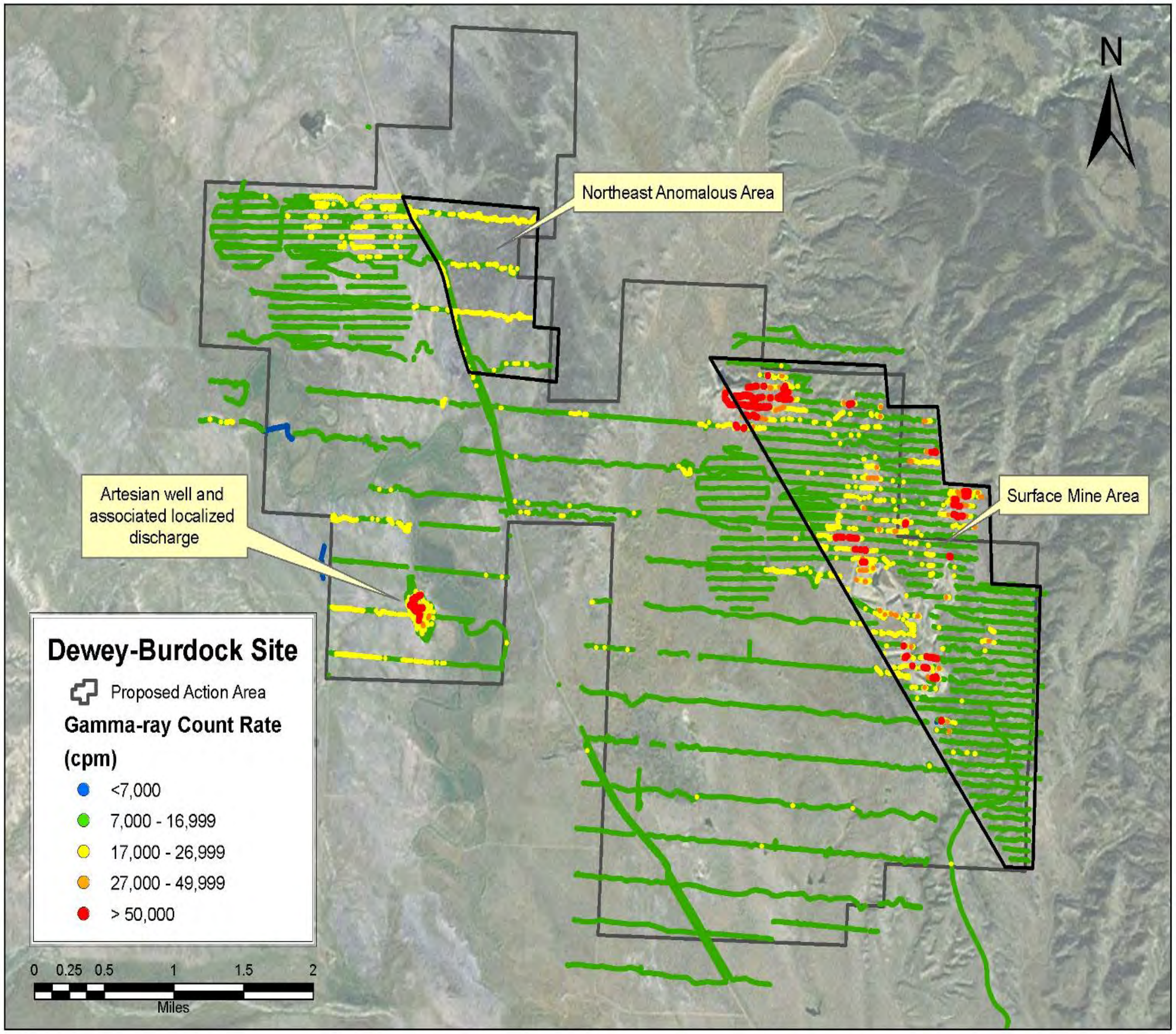

Figure 5.1-4 Gamma-Ray Count Rates Obtained During Initial GPS-Based Gamma Survey

None of the data sets: including the entire PAA and gamma data obtained in the main permit and surface mine areas are normal, lognormal, or exponentially distributed. Furthermore, normalizing data transformations were conducted and the transformed data did not follow standard distributions. For these reasons, data analysis and summaries were performed using non-parametric statistical methods, which are less sensitive to extreme observations typical of skewed data distributions.

The median and inter-quartile ranges (IQR) are non-parametric measures of central tendency and variability, respectively. The IQR is the difference between the first (Q1) and third (Q3) quartiles, i.e., 25 and 75 percent of the data area less than Q1 and Q3, respectively. Any datum that is outside the range of 1.5 times the IQR lower than Q1 and 1.5 times the IQR higher than Q3 is considered an outlier. Extreme outliers, or extremes, are those exceeding three times the IQR to the left and right from the first and third quartiles respectively (Ott and Longnecker, 2001).

The summary statistics of the GPS-based gamma-ray survey are listed in Table 5.1-2. The median of the gamma-ray count rates for the overall data set was 12,687 cpm. Field personnel collected 157,075 readings ranging from 5,550 to 460,485 cpm.

Table 5.1-2 Statistical Summary of Gamma-Ray Count Rates in Entire Data Set, Main Permit and Surface Mine Areas

	Gamma-Ray Count Rate (cpm)		
Estimator/Endpoint	Entire Data Set	Main	Surface Mine Area
Mean	15,025	13,073	16,823
Standard Deviation	17,095	2,995	23,377
Median	12,687	12,664	12,717
Mode	12,487 (n=53)	12,585 (n=35)	12,138 (n=31)
Minimum	5,550	5,883	5,550
Maximum	460,485	171,243	460,485
Q1	11,395	11,598	11,125
Q3	14,437	14,137	14,783
IQR	3,042	2,539	3,658
No. of Counts	157,075	75,345	81,757

Notes:
Entire data set does not include gamma-ray counts obtained along the eastern haul road. In addition, the sum of the counts in the main permit and surface mine areas is 27 counts greater than the counts in the entire data set, due to an overlap in counts within the two shapes placed as a layer in ArcView GIS to select the data sets .

Proposed Action Area

As shown in Table 5.1-3, the median gamma-ray count rate for the PAA data set was 12,664 cpm for 71,148 observations. The count rates ranged from 5,883 to 171,243 cpm. Low outliers in the PAA data set, count rates below 7,790 cpm, appear to be limited to two clusters. High outliers in the data set, count rates exceeding 17,946 cpm, appear to be limited to an approximately 600-acre located at the north end of the PAA, the area identified as an anomalous area on Figure 5.1-4.

Approximately 0.1 and 2 percent of the gamma-ray count rates observed in the PAA are comprised of low and high outliers, respectively.

The majority of high outliers are located in the north section of the PAA. The distribution of these anomalous gamma-ray count rate data is unknown. The count rates ranged from 8,863 to 22,130 cpm and the median was 15,503 cpm.

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Surface Mine Area
In the surface mine area, the gamma-ray count rates ranged from 5,550 to 460,485 cpm and the median was 12,717 cpm. In general, clusters of higher readings are associated with un-reclaimed open pit uranium mines, waste rock, rocky outcrops, and drainages in the surface mine area. Approximately 0.004 and 9 percent of the gamma-ray count rates observed in the surface mine area are low and high outliers, respectively.

Discussion
There is sufficient evidence for the variances in the main permit and surface mine area gamma-ray count rates being distinct and thus represent distinct data populations. The variances in the main permit anomalous area are also distinct.

It is clear that the surface mine area in the eastern quarter of the site exhibits radiological impacts from historic and/or current anthropogenic activities within the area. In addition, gamma-ray count rates in the anomalous north area also are clearly distinct from those in the wider main PAA. The precise sources of the differences are not relevant in the context of this investigation since they are part of the baseline or background radiological characteristics of the site.

Land Application Areas
The summary statistics of the GPS-based gamma-ray survey of the proposed land application areas are listed in Table 5.1-3. The gamma-ray count rates obtained in the main PAA are listed in the table to facilitate comparison between the proposed land application areas and area in which they occur. The data are shown as ranges of count rates on Figure 5.1-5.

Gamma-ray count rates in the proposed land application areas are similar to those obtained in the larger main PAA. In the Dewey land application area, the median of the gamma-ray count rates was 12,523 cpm. Field personnel collected 23,480 readings ranging from 6,798 to 20,422 cpm. In the smaller, Burdock land application area, the median of the gamma-ray count rates was 12,232 cpm. Field personnel collected 13,647 readings ranging from 8,498 to 24,248 cpm.

Table 5.1-3 Statistical Summary of Gamma-Ray Count Rates in Proposed Land Application Areas

	Gamma-Ray Count Rate (cpm)		
		Land Application Area	
Estimator/Endpoint	**Main**	**Dewey**	**Burdock**
Mean	13,073	12,815	12,308
Standard Deviation	2,995	1,940	1,318
Median	12,664	12,523	12,232
Mode	12,585 (n=35)	11,778 (n=15)	12,266 (n=16)
Minimum	5,883	6,798	8,498
Maximum	171,243	20,422	24,248
Q1	11,598	11,437	11,504
Q3	14,137	13,993	12,958
IQR	2,539	2,556	1,454
No. of Counts	75,345	23,480	13,647

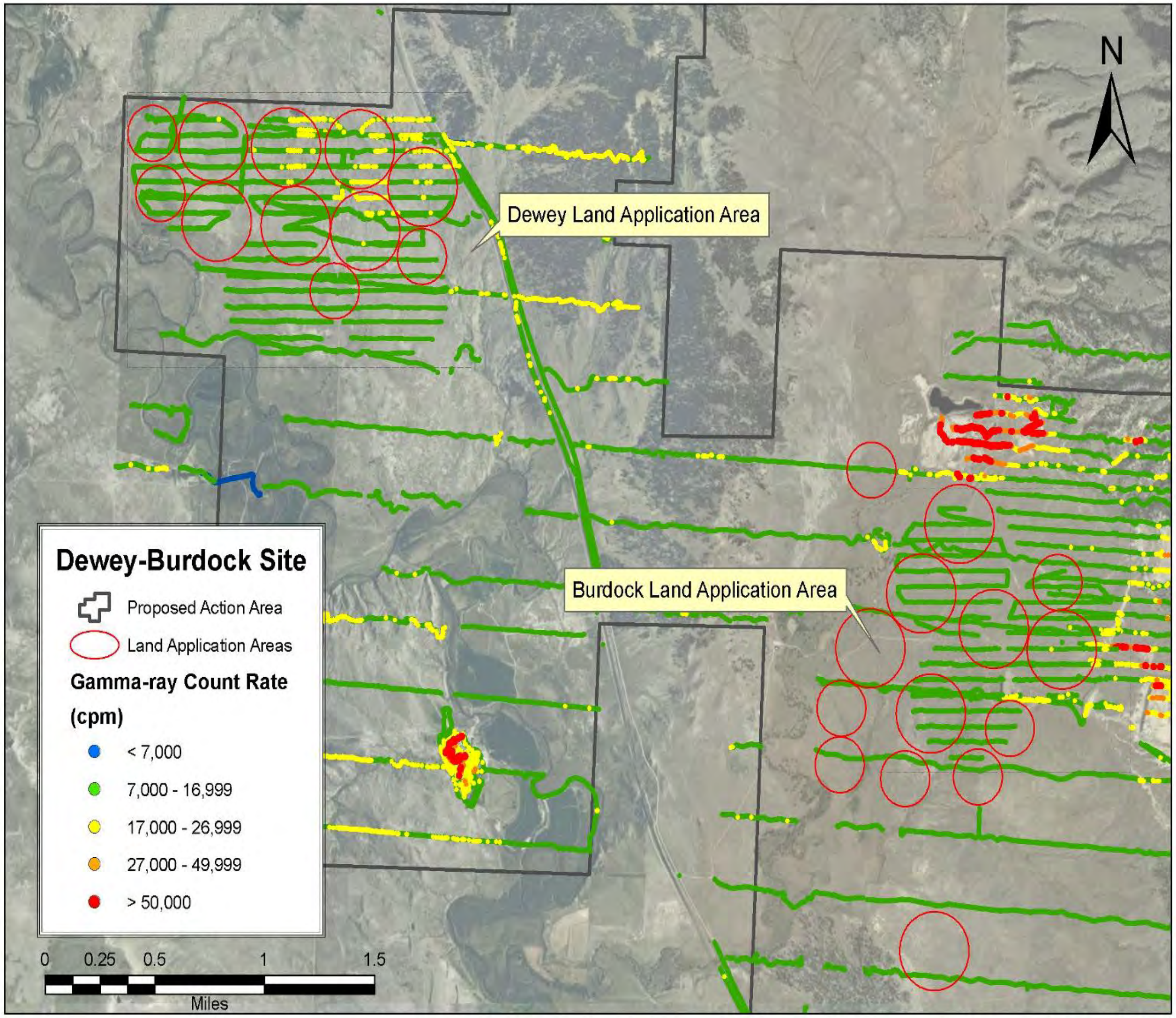

Figure 5.1-5 GPS-Based Gamma-Ray Count Rates in the Land Application Areas

5.1.2.2.1 Cross-Calibration of Sodium Iodine Detectors and a High-Pressure Ionization Chamber

The linear equation representing the correlation between exposure rates and gamma-ray count rates, determined using the PIC and average of the two sodium iodide detectors is:

$$Exposure\ Rate = 0.0007\ x\ Gamma\ Count\ Rate + 2.02$$

where the exposure rate is in gross µR/hr and the gamma count rate is in gross cpm.

The linear regression model for the average is a good fit, with an R2 of 0.96. Nearly all of the data align along the slope of the line, as shown in Figure 5.1-6. The correlations are similar for the individual sodium iodide detectors and not discussed further.

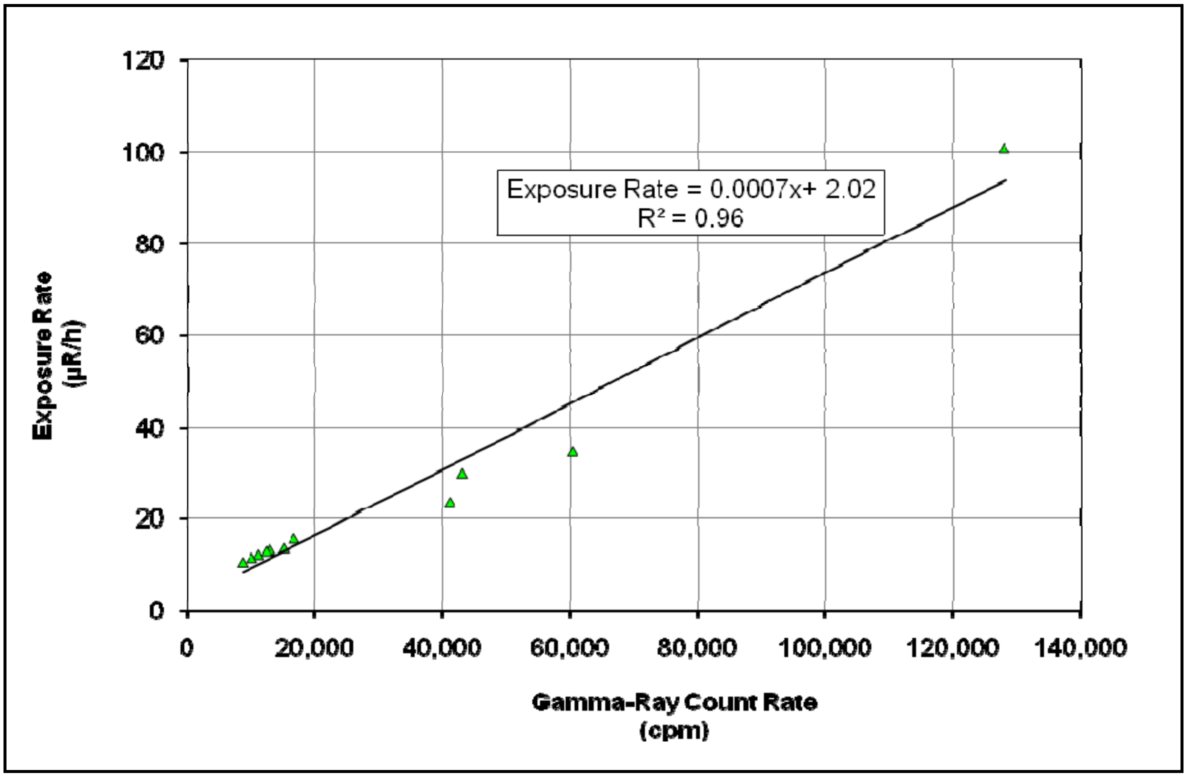

Figure 5.1-6 Linear Regression Model: Exposure Rates Correlated to Gamma-Ray Count Rates

The linear regression model predicts an average exposure rate of 10.9 µR/hr for the site. The range of predicted exposure rates is 5.9 to 324 µR/hr, based on the observed gamma-ray count rates at the site. The predicted site-wide exposure rates are shown as ranges of colors in 700 by 700 foot grid block averages on Figure 5.1-7.

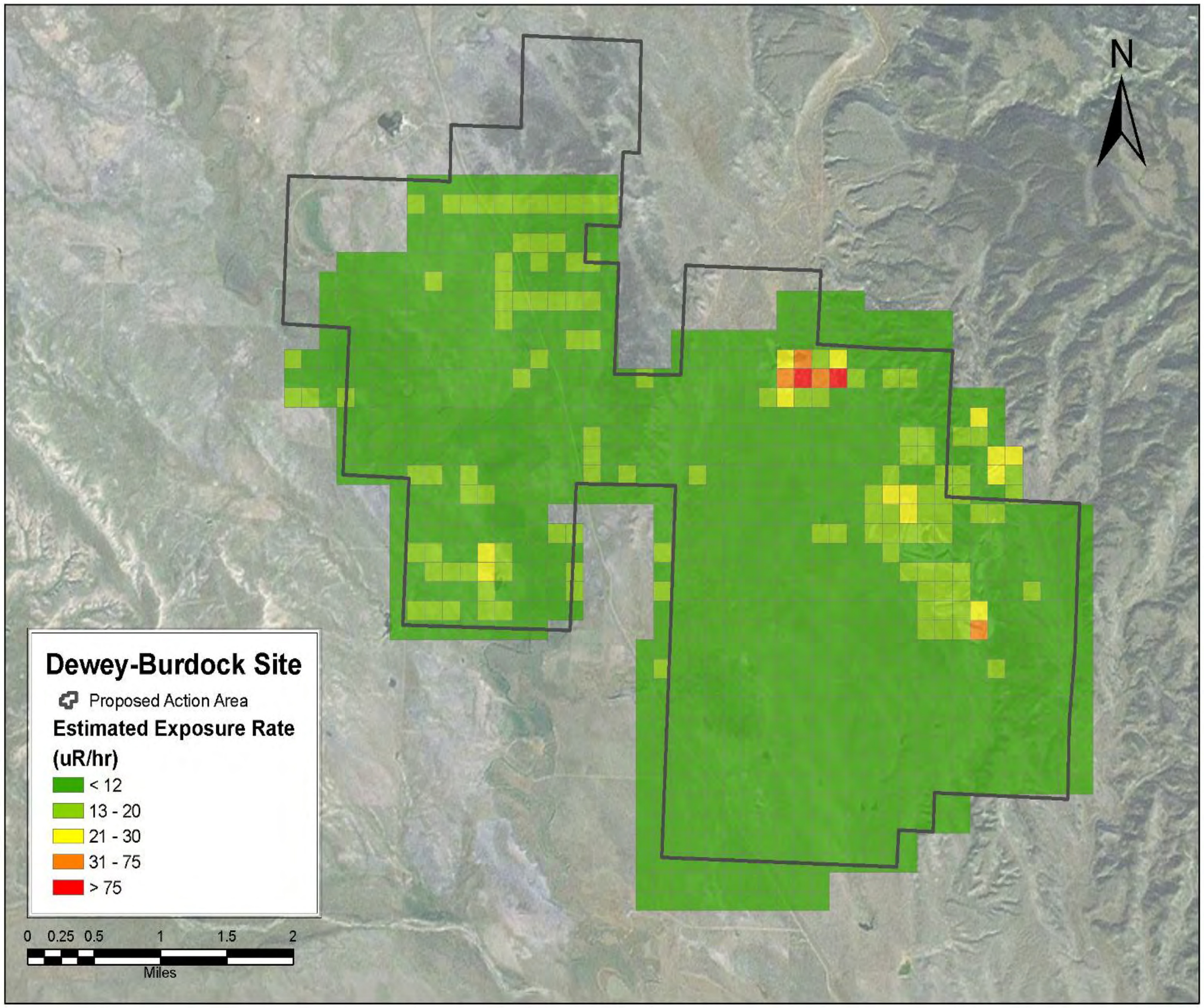

Figure 5.1-7 Predicted Site-Wide Exposure Rates, Grid Block Averages

5.1.2.2.2 Gamma-Ray Count Rate-Soil Ra-226 Concentration Correlation Grid Results

The relationship between gamma-ray count rates and radium-226 concentrations was determined to be appropriate after five outliers were removed from the set of 80 data points. The equation of the linear fit is:

$$Radium\text{-}226 = 1.9*10^{-4} \times Gamma\text{-}Ray\ Count\ Rate\ -1.04$$

where the radium-226 concentration is in pCi/g and the gamma-ray count rate is in gross cpm.

This model has an R2 of 0.43, with 0.43 accounting for 43 percent of the variance in the data set. Table 5.1-4 lists summary data for the predicted radium-226 concentrations in each of the major areas.

Of the 1,015 grid blocks covering the entire PAA, the majority (approximately 78 percent) of the interpolated surface radium-226 concentrations is less than 1.5 pCi/g. In the overall data set, the median predicted radium-226 concentration is 1.1 pCi/g and the range is 0.0 to 24.9 pCi/g. In the main PAA (excluding the anomalous area), the median predicted radium-226 concentration is 0.0 pCi/g and the range is 0.0 to 9.0 pCi/g. In the surface mine area, the median predicted radium-226 concentration is 1.5 pCi/g and the range is 0.0 to 24.9 pCi/g. In the anomalous portion of the main PAA, the median predicted radium-226 concentration is 1.4 pCi/g and the range is 0 to 2.3 pCi/g.

Table 5.1-4 Summary of Predicted Radium-226 Concentrations in Grid Blocks

		Predicted Radium-226 Concentration Based on Average of Counts Within Grid Block (pCi/g)					
Data Set	**No. of Grid Blocks**	**Median**	**Minimum**	**Maximum**	**Q1**	**Q3**	**IQR**
All Data	1,015	1.1	0	24.9	0	1.4	1.4
Surface Mine Area	171	1.5	0	24.9	1.1	1.8	0.7
Main without Anomalous Area	791	1.0	0	9.0	0	1.3	1.3
Anomalous Area	53	1.4	0	2.3	0	1.8	1.8

5.1.2.2.3 Final Gamma Exposure Rate Mapping

The linear regression model correlating sodium iodide detector readings to PIC measurements predicts a site-wide average exposure rate of 10.9 µR/hr. The range of predicted exposure rates is 5.9 to 324 µR/hr, based on the observed gamma-ray count rates at the site. As indicated on Figure 5.1-7, predicted exposure rates ranging from 21 to greater than 75 µR/hr occur in the open pit mine areas, near the artesian well in Section 5 and its localized discharge areas, and in rocky outcrop areas in the northwest corner of the surface mine area. Predicted exposure rates in the anomalous area in the northern portion of the main PAA range from less than 12 to 30 µR/hr.

5.1.2.2.4 Soil Ra-226 Concentration Mapping

Predicted radium-226 concentrations in soil are shown as grid block averages on Figure 5.1-8. It is important to acknowledge that discrepancies between measured soil radium-226 concentrations reported by the laboratory and corresponding radium-226 concentrations estimated by gamma surveys are inevitable in a characterization survey of this nature and magnitude, given the heterogeneity of the site (at least in some areas) and differing detector-source geometry at various sample/survey locations.

At the same time, Figure 5.1-8 shows that without a gamma survey, reliance on a random soil sampling program alone would not have identified elevated areas of radioactivity at the site.

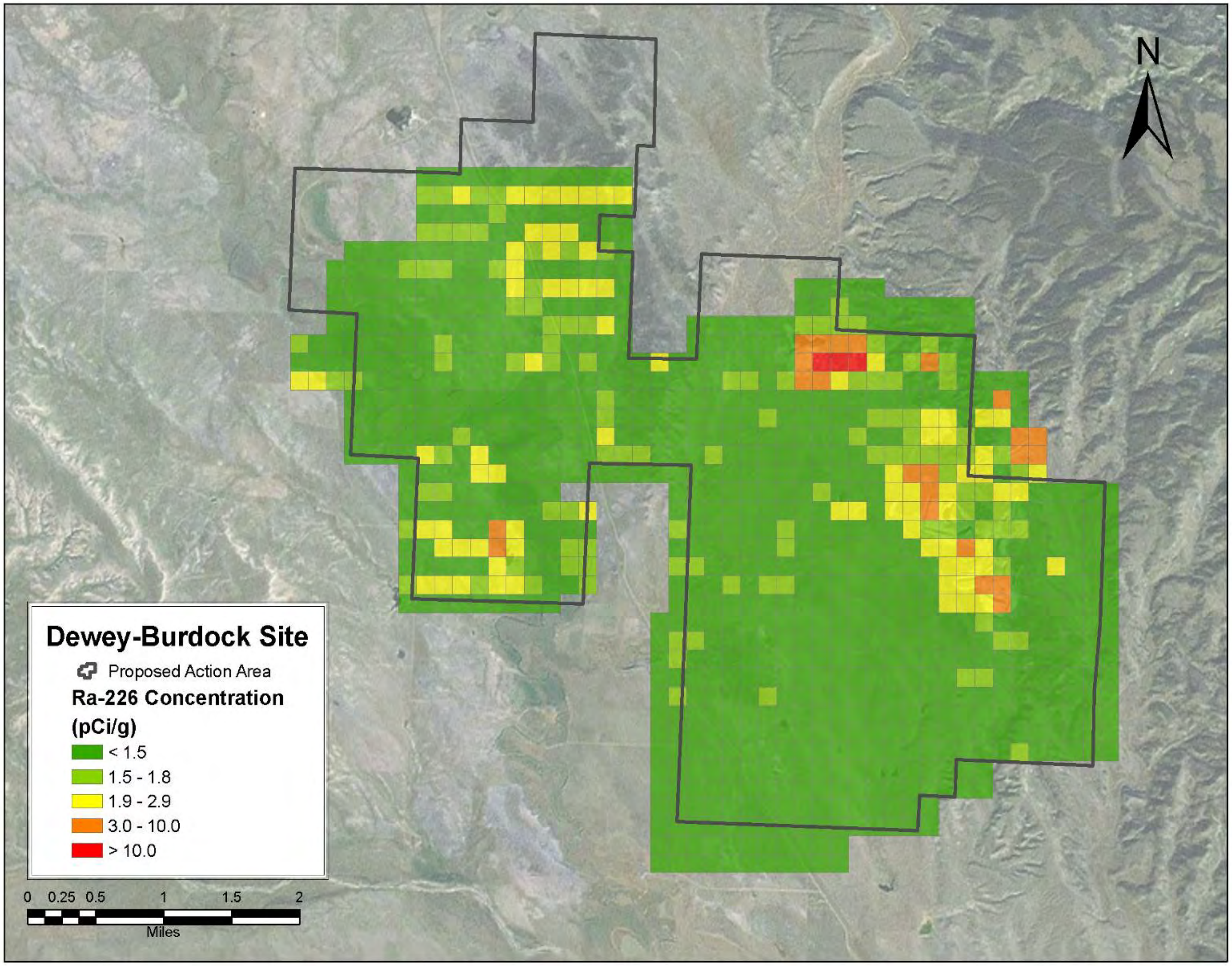

Figure 5.1-8 Predicted Site-Wide Radium-226 Concentrations, Grid Block Averages

5.1.3 Soil Sampling

5.1.3.1 Surface Soil Sampling

In the case of surface soil radiological characterization, sample placement prescribed by RG 4.14 was modified. RG 4.14 states that soil sampling locations start at a point halfway between proposed tailings and process areas, and 0-5 cm samples are collected every 300 m out to 1500 m in eight compass directions (40 samples) and one at each air monitoring station. This prescribed spacing largely ignores potentially varying site features such as soil types, drainages, outcrops, and the affects of historical activities. In addition, the soil sampling depth of 0-5 cm does not coincide with applicable cleanup standards. The NUREG-1569 requirements include collecting 0-15 cm samples to be consistent with the radium-226 cleanup standard of 5 pCi/g above background for the 0-15 cm soil horizon (10 CFR 40, Appendix A, Criterion 6(6)).

RG 4.14 suggests the collection of 40 samples from 0-5 cm and NUREG-1569 suggests the collection of samples at 0-15 cm. To avoid any ambiguity in the interpretation of these guidance documents, Powertech chose to collect 80 samples at 0-15 cm and supplementing the sampling effort with Global Positioning System (GPS)-based gamma radiation surveys. This sample size was determined to be adequate based on criteria in NUREG-1575. The GPS-based surveys allow orders of magnitude more data to be obtained with a similar effort. Owners of uranium recovery sites that have or are undergoing decommissioning are finding that extensive baseline data are invaluable. In conjunction with soil sampling and analysis and cross-reference to PIC measurements, the GPS-based gamma surveys can be used to predict site-wide concentrations of gamma-emitting radionuclides and/or exposure rates. Spatial trends in gamma emissions (and radionuclide concentrations as surrogates) are also far more apparent through the use of GPS-based gamma surveys than soil sampling alone. As will be shown below, reliance on a random soil sampling program alone would not have identified elevated areas of radioactivity at the site.

Main Permit and Surface Mine Areas

The soil sampling strategy for the main permit and surface mine areas of the project site consisted of biased and random sampling at the eight AMS locations shown in Figure 5.1-9 (this figure also shows the locations of the radon flux and track etch detector measurements, discussed below) and 80 additional locations shown in Figure 5.1-10. Biased samples were collected at five of the 80 locations; the remainder was placed randomly, using Visual Sampling Plan (VSP), Version 5.0. The biased samples were obtained in the surface mine area and selected to bound the upper range of radionuclide concentrations. The five biased samples are not sufficient to characterize radium-226 concentrations in impacted areas.

The additional 80 surface soil samples were collected from 0-15 cm below ground surface. Seventy-one of these samples were collected using a hand shovel. A hand auger was used to collect samples at 0-15, 15-30, and 30-100 cm at nine of the 80 locations. All of the soil samples were analyzed for radium-226. Ten of the 80 samples were also analyzed for natural uranium, lead-210, and thorium-230. Thirteen duplicate samples were collected: 11 with the surface set and 2 with the subsurface set. All duplicate samples were analyzed for radium-226 while two were also analyzed for natural uranium, thorium-230, and lead-210. The analytes and corresponding analytical methods were:

Radium-226 via gamma spectroscopy or radon emanation: EPA Methods 901.1 and 903.1, respectively. Prescribed Procedures for Measurement of Radioactivity in Drinking Water (EPA/600/4-80-032), August 1980. The majority of radium-226 analyses were performed using EPA Method 901.1.

Thorium-230: EPA 907.0 Prescribed Procedures for Measurement of Radioactivity in Drinking Water (EPA/600/4-80-032), August 1980.

Natural Uranium: EPA 6020 ICP-MS, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), June 2007

Lead-210: EPA 909.0M Prescribed Procedures for Measurement of Radioactivity in Drinking Water (EPA/600/4-80-032), 1980.

Land Application Areas

To characterize baseline radionuclide concentrations in soils in the land application areas, samples were collected at 17 locations, 10 in the northern and 7 in the southern area, from three intervals: 0-15, 15-30, and 30-100 cm. Refusal was encountered at 10 inches below ground surface (bgs) in LAN-008 and the lower interval was not collected. The sample locations, selected randomly using VSP Version 5.0, are shown on Figure 5.1-11. The samples were analyzed for radium-226, natural uranium, thorium-230, and lead-210.

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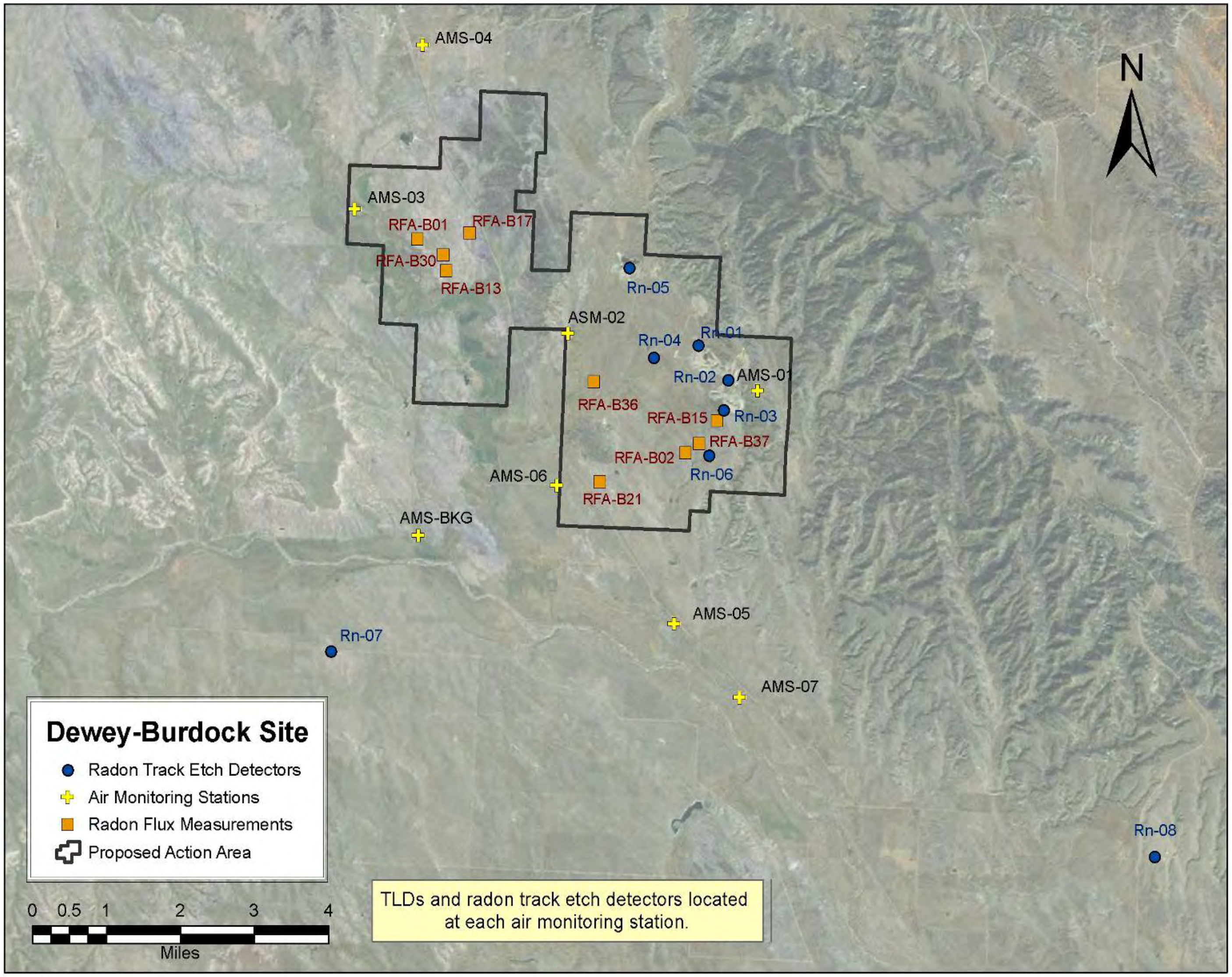

Figure 5.1-9 Air Monitoring Station, Ambient Radon, and Radon Flux Measurement Locations

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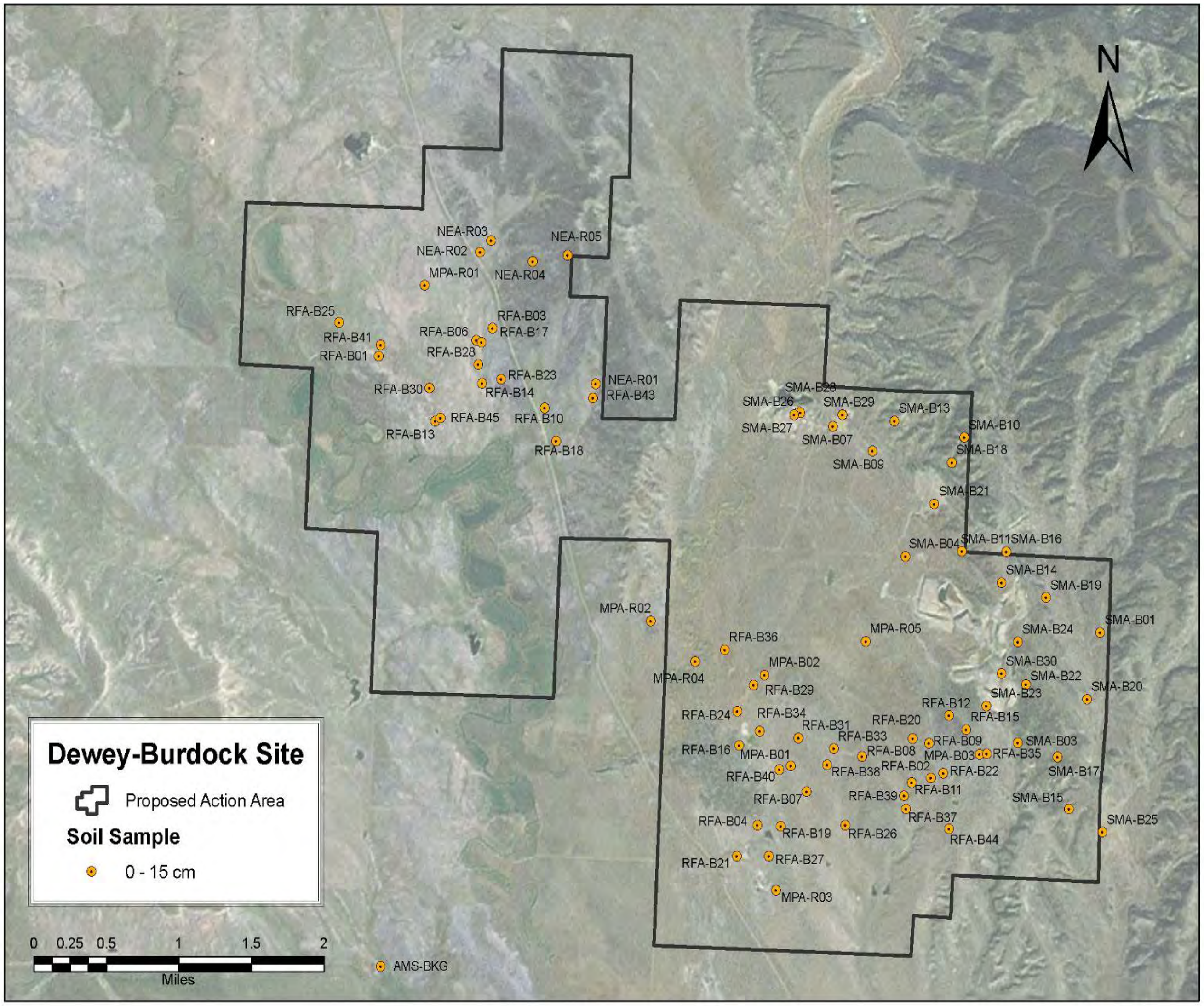

Figure 5.1-10 Surface Soil Sample Locations (80 Locations)

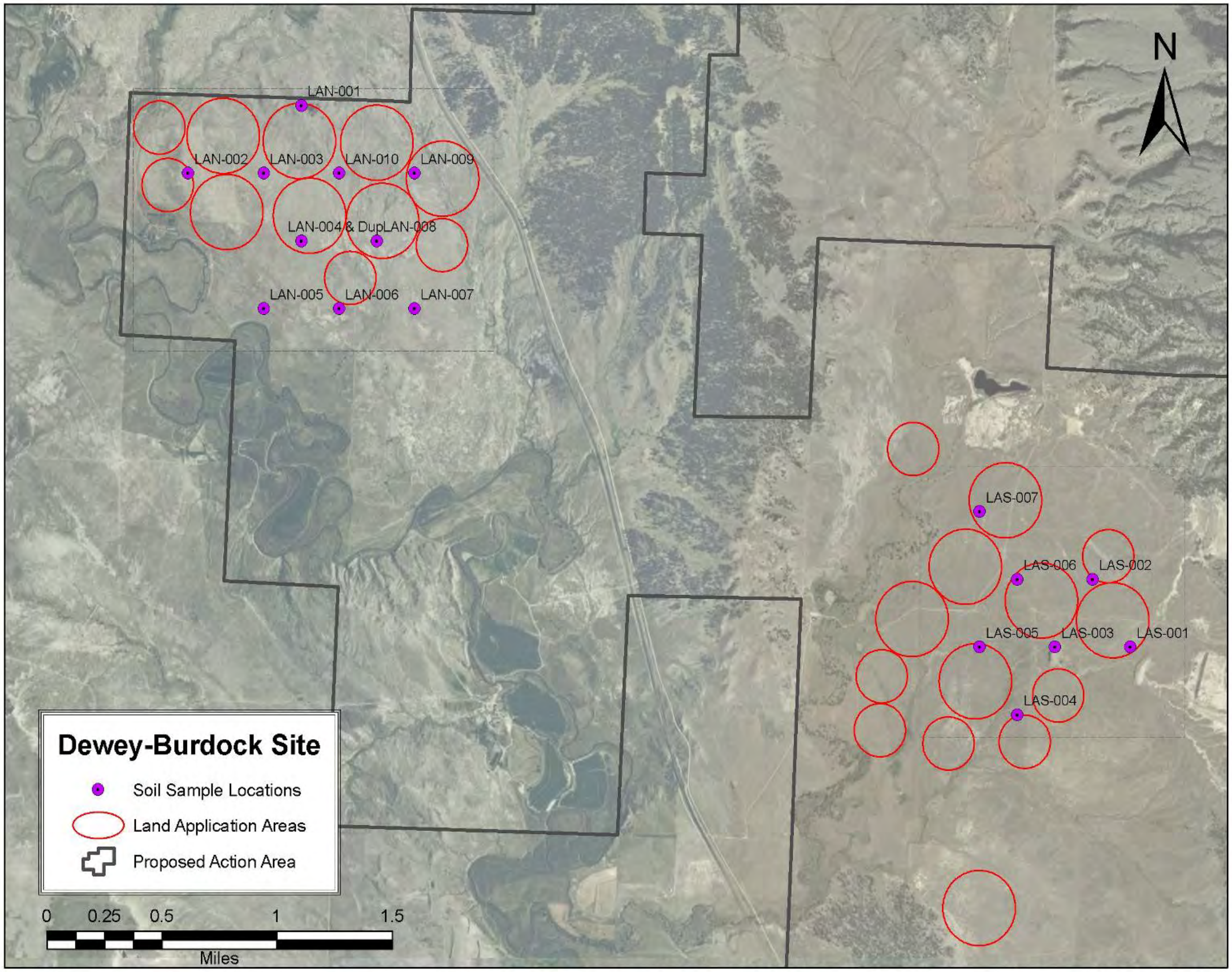

Figure 5.1-11 Soil Sample Locations in Land Application Areas

5.1.3.2 Soil Sampling Results

Table 5.1-5 presents the radium-226 concentrations in the soil samples collected in the main permit, surface mine, and land application areas. The results described in this section are those determined using only EPA Method 901.1. The laboratory analytical data reports are provided in Appendix 5.1-A.

Samples are identified as follows, with duplicates labeled as "Dup":

- AMS: air monitoring station
- SMA: surface mine area
- MPA: main
- NEA: northeast area
- RFA: roll front area
- LAN: land application area north (Dewey)
- LAS: land application south (Burdock)

Table 5.1-5 Radionuclide Concentrations in All Soil Samples

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
AMS-1	9/27/2007	0-5	-	9.6E-07	2.0E-06	3.0E-07	4.0E-07	1.0E-07	1.4E-06	2.0E-07
AMS-2	9/27/2007	0-5	-	9.5E-07	3.0E-06	3.0E-07	5.0E-07	1.0E-07	1.1E-06	2.0E-07
AMS-3	9/27/2007	0-5	-	8.2E-07	2.0E-06	2.0E-07	4.0E-07	1.0E-07	1.5E-06	2.0E-07
AMS-4	9/27/2007	0-5	-	1.4E-06	2.0E-06	2.0E-07	8.0E-07	2.0E-07	1.5E-06	3.0E-07
AMS-5	9/27/2007	0-5	-	6.8E-07	2.0E-06	2.0E-07	6.0E-07	1.0E-07	1.3E-06	3.0E-07
AMS-6	9/27/2007	0-5	-	5.5E-07	1.0E-06	2.0E-07	4.0E-07	1.0E-07	8.0E-07	2.0E-07
AMS-7	9/27/2007	0-5	-	5.8E-07	2.0E-06	2.0E-07	3.0E-07	8.0E-08	1.1E-06	2.0E-07
AMS-BKG	9/27/2007	0-5	-	1.9E-06	2.0E-06	2.0E-07	9.0E-07	1.0E-07	2.4E-06	4.0E-07
MPA-B01	9/25/2007	0-15	13824	-	-	-	-	-	1.4E-06	3.0E-07
MPA-B02	9/25/2007	0-15	14176	-	-	-	-	-	1.1E-06	2.0E-07
MPA-B03	9/25/2007	0-15	13006	-	-	-	-	-	1.3E-06	3.0E-07
MPA-R01	9/24/2007	0-15	13749	-	-	-	-	-	1.4E-06	2.0E-07
MPA-R02	9/24/2007	0-15	16059	-	-	-	-	-	2.6E-06	3.0E-07
MPA-R03	9/24/2007	0-15	10796	7.5E-07	7.0E-07	1.0E-07	4.0E-07	1.0E-07	1.1E-06	2.0E-07
MPA-R04	9/24/2007	0-15	10810	-	-	-	-	-	9.0E-07	2.0E-07
MPA-R04-Dup	9/24/2007	0-15	-	-	-	-	-	-	8.0E-07	2.0E-07
MPA-R05	9/24/2007	0-15	11850	-	-	-	-	-	1.2E-06	2.0E-07
NEA-R01	9/24/2007	0-15	12302	9.1E-07	7.0E-07	2.0E-07	6.0E-07	1.0E-07	1.1E-06	2.0E-07
NEA-R02	9/24/2007	0-15	13176	-	-	-	-	-	1.3E-06	2.0E-07
NEA-R03	9/24/2007	0-15	16393	-	-	-	-	-	2.2E-06	3.0E-07
NEA-R04	9/24/2007	0-15	17356	-	-	-	-	-	2.3E-06	3.0E-07
NEA-R04-Dup	9/24/2007	0-15	-	-	-	-	-	-	2.5E-06	3.0E-07
NEA-R05	9/24/2007	0-15	17269	-	-	-	-	-	2.8E-06	3.0E-07
RFA-B01A	9/26/2007	0-15	13115	8.7E-07	1.0E-06	2.0E-07	7.0E-07	1.0E-07	1.2E-06	2.0E-07
RFA-B01A-Dup	9/26/2007	0-15	-	9.0E-07	8.0E-07	1.0E-07	7.0E-07	1.0E-07	1.1E-06	2.0E-07

Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
RFA-B02A	9/26/2007	0-15	13360	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B03	9/25/2007	0-15	14253	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B04	9/25/2007	0-15	13963	-	-	-	-	-	1.5E-06	3.0E-07
RFA-B06	9/25/2007	0-15	13819	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B07	9/25/2007	0-15	12700	-	-	-	-	-	1.7E-06	2.0E-07
RFA-B08	9/25/2007	0-15	13433	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B08-Dup	9/25/2007	0-15	13528	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B09	9/25/2007	0-15	14825	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B10	9/25/2007	0-15	13366	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B11	9/25/2007	0-15	14253	8.8E-07	1.0E-06	2.0E-07	5.0E-07	1.0E-07	1.8E-06	3.0E-07
RFA-B12	9/25/2007	0-15	13135	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B13A	9/26/2007	0-15	13987	-	-	-	-	-	1.8E-06	3.0E-07
RFA-B02A	9/26/2007	0-15	13360	-	-	-	-	-	1.6E-06	2.0E-07
RFA-B14	9/25/2007	0-15	13872	-	-	-	-	-	1.7E-06	3.0E-07
RFA-B15A	9/26/2007	0-15	13535	-	-	-	-	-	1.4E-06	3.0E-07
RFA-B16	9/25/2007	0-15	13675	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B17A	9/26/2007	0-15	16283	-	-	-	-	-	2.0E-06	3.0E-07
RFA-B19	9/25/2007	0-15	13689	-	-	-	-	-	1.2E-06	2.0E-07
RFA-B20	9/25/2007	0-15	13113	8.8E-07	1.0E-06	2.0E-07	5.0E-07	1.0E-07	1.3E-06	3.0E-07
RFA-B21A	9/26/2007	0-15	16641	-	-	-	-	-	5.6E-06	4.0E-07
RFA-B22	9/25/2007	0-15	14087	-	-	-	-	-	1.5E-06	2.0E-07
RFA-B23	9/25/2007	0-15	19674	-	-	-	-	-	3.6E-06	4.0E-07
RFA-B24	9/25/2007	0-15	12766	-	-	-	-	-	1.3E-06	2.0E-07
RFA-B25	9/25/2007	0-15	10300	6.7E-07	1.0E-06	2.0E-07	4.0E-07	1.0E-07	1.2E-06	2.0E-07
RFA-B26	9/25/2007	0-15	11791	-	-	-	-	-	1.1E-06	2.0E-07

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Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
RFA-B27	9/25/2007	0-15	13794	-	-	-	-	-	1.5E-06	2.0E-07
RFA-B28	9/25/2007	0-15	15246	-	-	-	-	-	2.4E-06	3.0E-07
RFA-B28-Dup	9/25/2007	0-15	-	-	-	-	-	-	1.8E-06	3.0E-07
RFA-B29	9/25/2007	0-15	14345	-	-	-	-	-	1.7E-06	3.0E-07
RFA-B30A	9/26/2007	0-15	12461	-	-	-	-	-	1.8E-06	2.0E-07
RFA-B31	9/25/2007	0-15	12221	-	-	-	-	-	1.3E-06	2.0E-07
RFA-B33	9/25/2007	0-15	13221	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B34	9/25/2007	0-15	13408	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B35	9/25/2007	0-15	12290	-	-	-	-	-	1.2E-06	2.0E-07
RFA-B36A	9/25/2007	0-15	12465	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B37A	9/26/2007	0-15	11170	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B38	9/25/2007	0-15	11852	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B39	9/25/2007	0-15	11478	-	-	-	-	-	1.1E-06	2.0E-07
RFA-B40	9/25/2007	0-15	12629	5.6E-07	1.0E-06	2.0E-07	3.0E-07	1.0E-07	1.1E-06	2.0E-07
RFA-B41	9/25/2007	0-15	11806	-	-	-	-	-	1.2E-06	2.0E-07
RFA-B43	9/25/2007	0-15	13264	-	-	-	-	-	1.7E-06	3.0E-07
RFA-B44	9/25/2007	0-15	11436	-	-	-	-	-	1.4E-06	2.0E-07
RFA-B45	9/25/2007	0-15	12242	-	-	-	-	-	1.6E-06	3.0E-07
SMA-B01	9/24/2007	0-15	10459	1.2E-06	6.0E-07	1.0E-07	5.0E-07	1.0E-07	9.0E-07	2.0E-07
SMA-B01-Dup	9/24/2007	0-15	-	1.5E-06	2.0E-06	2.0E-07	6.0E-07	1.0E-07	1.4E-06	3.0E-07
SMA-B03	9/24/2007	0-15	22410	-	-	-	-	-	1.5E-06	2.0E-07
SMA-B04	9/24/2007	0-15	15263	-	-	-	-	-	1.0E-06	2.0E-07
SMA-B07	9/24/2007	0-15	22925	-	-	-	-	-	3.2E-06	3.0E-07
SMA-B09	9/24/2007	0-15	12879	-	-	-	-	-	1.2E-06	2.0E-07
SMA-B09-Dup	9/24/2007	0-15	-	-	-	-	-	-	1.7E-06	2.0E-07

Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
SMA-B10	9/25/2007	0-15	13184	-	-	-	-	-	1.4E-06	2.0E-07
SMA-B11	9/24/2007	0-15	17346	-	-	-	-	-	2.3E-06	3.0E-07
SMA-B13	9/25/2007	0-15	13252	-	-	-	-	-	1.7E-06	3.0E-07
SMA-B14	9/24/2007	0-15	14483	-	-	-	-	-	1.4E-06	3.0E-07
SMA-B14-Dup	9/24/2007	0-15	-	-	-	-	-	-	1.6E-06	2.0E-07
SMA-B15	9/24/2007	0-15	8474	-	-	-	-	-	8.0E-07	2.0E-07
SMA-B16	9/24/2007	0-15	10235	-	-	-	-	-	9.0E-07	2.0E-07
SMA-B17	9/24/2007	0-15	10139	-	-	-	-	-	1.0E-06	2.0E-07
SMA-B18	9/25/2007	0-15	8511	-	-	-	-	-	5.0E-07	1.0E-07
SMA-B18-Dup	9/25/2007	0-15	-	-	-	-	-	-	4.0E-07	1.0E-07
SMA-B19	9/24/2007	0-15	10074	-	-	-	-	-	1.2E-06	2.0E-07
SMA-B20	9/27/2007	0-15	10897	-	-	-	-	-	9.0E-07	2.0E-07
SMA-B21	9/24/2007	0-15	16712	-	-	-	-	-	1.4E-06	2.0E-07
SMA-B22	9/24/2007	0-15	10618	-	-	-	-	-	8.0E-07	2.0E-07
SMA-B23	9/24/2007	0-15	16233	-	-	-	-	-	2.7E-06	3.0E-07
SMA-B23-Dup	9/24/2007	0-15	-	-	-	-	-	-	2.8E-06	3.0E-07
SMA-B24	9/24/2007	0-15	12662	-	-	-	-	-	1.3E-06	2.0E-07
SMA-B25	9/24/2007	0-15	9991	-	-	-	-	-	1.0E-06	2.0E-07
SMA-B26	9/28/2007	0-15	73243	-	-	-	-	-	1.1E-05	5.0E-07
SMA-B27	9/28/2007	0-15	130293	6.7E-05	3.0E-05	8.0E-07	3.0E-05	8.0E-07	4.0E-05	1.1E-06
SMA-B28	9/29/2007	0-15	39061	-	-	-	-	-	6.4E-06	4.0E-07
SMA-B29	9/28/2007	0-15	231041	1.6E-05	2.0E-05	7.0E-07	2.0E-05	6.0E-07	2.9E-05	9.0E-07
SMA-B30	9/28/2007	0-15	89139	-	-	-	-	-	3.4E-05	9.0E-07
LAN 001A	7/18/2008	0-15	-	1.8E-06	2.4E-06	2.3E-06	1.2E-06	6.0E-07	8.0E-07	9.0E-08
LAN 002A	7/18/2008	0-15	-	8.6E-07	3.4E-06	2.3E-06	9.0E-07	5.0E-07	9.0E-07	1.0E-07

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Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
LAN 003A	7/18/2008	0-15	-	7.8E-07	8.0E-07	2.2E-06	7.0E-07	6.0E-07	1.2E-06	1.0E-07
LAN 004A	7/18/2008	0-15	-	6.9E-07	1.0E-06	1.4E-06	6.0E-07	6.0E-07	1.9E-06	2.0E-07
LAN 004A-DUP	7/18/2008	0-15	-	7.2E-07	5.0E-07	1.4E-06	4.0E-07	3.0E-07	7.0E-07	1.0E-07
LAN 005A	7/18/2008	0-15	-	8.4E-07	1.2E-06	1.4E-06	9.0E-07	5.0E-07	4.4E-06	3.0E-07
LAN 006A	7/18/2008	0-15	-	7.1E-07	-5.0E-09	1.4E-06	3.0E-07	5.0E-07	1.1E-06	1.0E-07
LAN 007A	7/18/2008	0-15	-	8.1E-07	6.0E-07	1.4E-06	3.0E-07	5.0E-07	7.0E-07	1.0E-07
LAN 008A	7/18/2008	0-15	-	2.1E-06	1.0E-06	1.4E-06	1.0E-06	7.0E-07	9.0E-07	1.0E-07
LAN 009A	7/18/2008	0-15	-	1.1E-06	-4.0E-07	1.4E-06	3.0E-07	6.0E-07	8.0E-07	1.0E-07
LAN 010A	7/18/2008	0-15	-	1.6E-06	1.8E-06	1.2E-06	1.2E-06	6.0E-07	1.2E-06	2.0E-07
LAS 001A	7/19/2008	0-15	-	1.2E-06	1.6E-06	1.2E-06	6.0E-07	5.0E-07	9.0E-07	1.0E-07
LAS 002A	7/19/2008	0-15	-	4.8E-07	1.4E-06	1.2E-06	1.0E-07	5.0E-07	7.0E-07	1.0E-07
LAS 003A	7/19/2008	0-15	-	5.0E-07	1.4E-06	1.2E-06	3.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 004A	7/19/2008	0-15	-	1.1E-06	1.2E-06	1.2E-06	6.0E-07	5.0E-07	8.0E-07	1.0E-07
LAS 005A	7/19/2008	0-15	-	1.2E-06	1.6E-06	1.2E-06	4.0E-07	3.0E-07	9.0E-07	1.0E-07
LAS 006A	7/19/2008	0-15	-	3.7E-07	7.0E-07	1.1E-06	6.0E-07	6.0E-07	7.0E-07	1.0E-07
LAS 007A	7/19/2008	0-15	-	4.3E-07	6.0E-07	1.5E-06	6.0E-07	1.0E-07	8.0E-07	1.0E-07
RFA-B01B	9/26/2007	15-30	13115	1.1E-06	2.0E-06	2.0E-07	9.0E-01	2.0E-01	1.7E-06	2.0E-07
RFA-B01B-Dup	9/26/2007	15-30	-	9.9E-07	9.0E-07	2.0E-07	9.0E-01	2.0E-01	1.5E-06	2.0E-07
RFA-B02B	9/26/2007	15-30	-	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B13B	9/26/2007	15-30	-	-	-	-	-	-	1.8E-06	2.0E-07
RFA-B15B	9/26/2007	15-30	-	-	-	-	-	-	1.5E-06	2.0E-07
RFA-B17B	9/26/2007	15-30	-	-	-	-	-	-	2.2E-06	3.0E-07
RFA-B21B	9/26/2007	15-30	-	-	-	-	-	-	1.3E-06	2.0E-07
RFA-B30B	9/26/2007	15-30	-	-	-	-	-	-	2.1E-06	3.0E-07
RFA-B36B	9/26/2007	15-30	-	-	-	-	-	-	1.1E-06	2.0E-07

Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
RFA-B37B	9/26/2007	15-30	-	-	-	-	-	-	7.0E-07	2.0E-07
LAN 001B	7/18/2008	15-30	-	1.9E-06	4.6E-06	2.3E-06	1.4E-06	6.0E-07	8.0E-07	1.0E-07
LAN 002B	7/18/2008	15-30	-	7.5E-07	1.5E-06	2.3E-06	4.0E-07	4.0E-07	1.0E-06	1.0E-07
LAN 003B	7/18/2008	15-30	-	1.1E-06	2.4E-06	2.3E-06	8.0E-07	5.0E-07	1.2E-06	1.0E-07
LAN 004B	7/18/2008	15-30	-	7.9E-07	2.2E-06	1.4E-06	2.0E-07	5.0E-07	1.3E-06	2.0E-07
LAN 004B-DUP	7/18/2008	15-30	-	6.8E-07	-3.0E-07	1.4E-06	5.0E-07	4.0E-07	7.0E-07	1.0E-07
LAN 005B	7/18/2008	15-30	-	7.1E-07	9.0E-07	1.4E-06	6.0E-07	4.0E-07	1.6E-06	2.0E-07
LAN 006B	7/18/2008	15-30	-	7.5E-07	5.0E-07	1.4E-06	6.0E-07	4.0E-07	1.3E-06	1.0E-07
LAN 007B	7/18/2008	15-30	-	1.5E-06	6.0E-07	1.4E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAN 008B	7/18/2008	15-30	-	3.5E-06	1.0E-07	1.4E-06	9.0E-07	7.0E-07	1.0E-06	1.0E-07
LAN 009B	7/18/2008	15-30	-	1.8E-06	-3.0E-07	1.4E-06	7.0E-07	5.0E-07	4.1E-06	3.0E-07
LAN 010B	7/18/2008	15-30	-	1.5E-06	1.1E-06	1.1E-06	7.9E-06	1.2E-06	1.4E-06	2.0E-07
LAS 001B	7/19/2008	15-30	-	8.6E-07	1.1E-06	1.2E-06	4.0E-07	5.0E-07	8.0E-07	1.0E-07
LAS 002B	7/19/2008	15-30	-	7.1E-07	7.0E-07	1.2E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 003B	7/19/2008	15-30	-	1.2E-06	1.1E-06	1.1E-06	5.0E-07	4.0E-07	9.0E-07	1.0E-07
LAS 004B	7/19/2008	15-30	-	9.5E-07	1.3E-06	1.2E-06	5.0E-07	4.0E-07	8.0E-07	1.0E-07
LAS 005B	7/19/2008	15-30	-	1.6E-06	1.4E-06	1.1E-06	4.0E-07	4.0E-07	1.0E-06	2.0E-07
LAS 006B	7/19/2008	15-30	-	4.8E-07	1.4E-06	1.2E-06	3.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 007B	7/19/2008	15-30	-	4.5E-07	6.0E-07	1.5E-06	6.0E-07	1.0E-07	7.0E-07	1.0E-07
LAN 008B	7/18/2008	15-30	-	3.5E-06	1.0E-07	1.4E-06	9.0E-07	7.0E-07	1.0E-06	1.0E-07
LAN 009B	7/18/2008	15-30	-	1.8E-06	-3.0E-07	1.4E-06	7.0E-07	5.0E-07	4.1E-06	3.0E-07
LAN 010B	7/18/2008	15-30	-	1.5E-06	1.1E-06	1.1E-06	7.9E-06	1.2E-06	1.4E-06	2.0E-07
LAS 001B	7/19/2008	15-30	-	8.6E-07	1.1E-06	1.2E-06	4.0E-07	5.0E-07	8.0E-07	1.0E-07

Table 5.1-5 Radionuclide Concentrations in All Soil Samples (cont'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
LAS 002B	7/19/2008	15-30	-	7.1E-07	7.0E-07	1.2E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 003B	7/19/2008	15-30	-	1.2E-06	1.1E-06	1.1E-06	5.0E-07	4.0E-07	9.0E-07	1.0E-07
LAS 004B	7/19/2008	15-30	-	9.5E-07	1.3E-06	1.2E-06	5.0E-07	4.0E-07	8.0E-07	1.0E-07
LAS 005B	7/19/2008	15-30	-	1.6E-06	1.4E-06	1.1E-06	4.0E-07	4.0E-07	1.0E-06	2.0E-07
LAS 006B	7/19/2008	15-30	-	4.8E-07	1.4E-06	1.2E-06	3.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 007B	7/19/2008	15-30	-	4.5E-07	6.0E-07	1.5E-06	6.0E-07	1.0E-07	7.0E-07	1.0E-07
RFA-B01C	9/26/2007	30-100	-	1.5E-06	6.0E-07	1.0E-07	8.0E-01	1.0E-01	1.2E-06	2.0E-07
RFA-B01C-Dup	9/29/2007	30-100	-	1.3E-06	1.0E-06	2.0E-07	1.0E+00	2.0E-01	1.7E-06	3.0E-07
RFA-B02C	9/26/2007	30-100	-	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B13C	9/26/2007	30-100	-	-	-	-	-	-	1.6E-06	2.0E-07
RFA-B15C	9/26/2007	30-100	-	-	-	-	-	-	1.5E-06	3.0E-07
RFA-B17C	9/26/2007	30-100	-	-	-	-	-	-	2.5E-06	3.0E-07
RFA-B21C	9/26/2007	30-100	-	-	-	-	-	-	1.2E-06	2.0E-07
RFA-B30C	9/26/2007	30-100	-	-	-	-	-	-	1.7E-06	3.0E-07
RFA-B36C	9/26/2007	30-100	-	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B37C	9/26/2007	30-100	-	-	-	-	-	-	1.1E-06	2.0E-07
LAN 001C	7/18/2008	30-100	-	1.9E-06	1.9E-06	2.2E-06	1.6E-06	7.0E-07	9.0E-07	1.0E-07

Table 5.1-5 Radionuclide Concentrations in All Soil Samples (concl'd)

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
LAN 002C	7/18/2008	30-100	-	1.5E-06	1.1E-06	2.2E-06	3.0E-07	3.0E-07	1.2E-06	1.0E-07
LAN 003C	7/18/2008	30-100	-	2.0E-06	2.6E-06	2.3E-06	6.0E-07	3.0E-07	1.0E-06	1.0E-07
LAN 004C	7/18/2008	30-100	-	1.5E-06	8.0E-07	1.4E-06	7.0E-07	5.0E-07	1.0E-06	1.0E-07
LAN 004C-DUP	7/18/2008	30-100	-	1.3E-06	1.2E-06	1.4E-06	5.0E-07	4.0E-07	8.0E-07	1.0E-07
LAN 005C	7/18/2008	30-100	-	7.1E-07	6.0E-07	1.4E-06	5.0E-07	4.0E-07	1.5E-06	2.0E-07
LAN 006C	7/18/2008	30-100	-	1.1E-06	7.0E-07	1.4E-06	5.0E-07	3.0E-07	1.4E-06	2.0E-07
LAN 007C	7/18/2008	30-100	-	2.5E-06	1.0E-07	1.4E-06	8.0E-07	6.0E-07	4.0E-07	1.0E-07
LAN 009C	7/18/2008	30-100	-	1.6E-06	5.0E-07	1.4E-06	1.1E-06	6.0E-07	3.9E-06	3.0E-07
LAN 010C	7/18/2008	30-100	-	2.7E-06	1.9E-06	1.2E-06	1.9E-06	8.0E-07	1.5E-06	2.0E-07
LAS 001C	7/19/2008	30-100	-	6.1E-07	9.0E-07	1.1E-06	1.0E-07	3.0E-07	8.0E-07	1.0E-07
LAS 002C	7/19/2008	30-100	-	6.3E-07	4.0E-07	1.1E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 003C	7/19/2008	30-100	-	9.3E-07	7.0E-07	1.2E-06	1.0E-06	5.0E-07	8.0E-07	1.0E-07
LAS 004C	7/19/2008	30-100	-	1.3E-06	1.2E-06	1.1E-06	5.0E-07	3.0E-07	9.0E-07	1.0E-07
LAS 005C	7/19/2008	30-100	-	9.8E-07	1.2E-06	1.1E-06	7.0E-07	5.0E-07	1.1E-06	2.0E-07
LAS 006C	7/19/2008	30-100	-	6.5E-07	-3.0E-07	1.5E-06	3.0E-07	9.0E-08	6.0E-07	1.0E-07
LAS 007C	7/19/2008	30-100	-	7.2E-07	-7.0E-07	1.5E-06	5.0E-07	1.0E-07	7.0E-07	1.0E-07

Notes:All errors reported are ± 2σ.

5.1.3.2.1 Surface Soil Sample Results

Radium-226 Concentrations in the First Set of 80 Locations

In the set of 80 surface samples, the mean and median radium-226 concentrations are 2.9 and 1.3 pCi/g, respectively. Q1 and Q3 are 1.1 and 1.7 pCi/g, respectively. The IQR is 0.6. The mode is 1.1 pCi/g (12 observations). One result (0.45 pCi/g, Sample Location SMA-18) was a low outlier. Thirteen values exceeded 2.3 pCi/g, the cutoff for high outliers.

The soil data were fitted to normal and lognormal distributions. The p-values for both distributions are less than 0.005, indicating that at a 95 percent confidence level ($p = 0.05$), the distributions are non-normal and non-lognormal.

Considering that the data do not fit normal or lognormal distributions, and clear differences in the gamma-ray count rates obtained in the surface mine and main PAAs are indicative of differences in the levels of gamma-emitting radionuclides therein, the set of surface soil data was divided into surface mine and main PAA subsets, as discussed in the following sections.

Radium-226 Concentrations in the Surface Mine Area

Twenty-five surface soil samples were collected in the surface mine area. The data did not fit a parametric distribution. The median radium-226 concentration was 1.4 pCi/g. Five of the concentrations were outliers, exceeding a cutoff (1.5 times Q3) of 5.9 pCi/g. The outliers are the radium-226 concentrations in the five biased samples, all collected in the surface mine area.

The data set with the outliers removed fit a lognormal distribution. The central tendency and variability of a lognormal distribution are best represented by the geometric mean and geometric standard deviation, each of which is 1.3 pCi/g radium-226 in the case of the surface mine area data set. The data lie within a population range of 0.76 to 2.2 pCi/g.

Radium-226 Concentrations in the Main Area

Fifty-five surface soil samples were collected in the main PAA. The data did not fit a parametric distribution. The median radium-226 concentration was 1.3 pCi/g. Three of the concentrations were outliers, exceeding a cutoff (1.5 times Q3) of 2.6 pCi/g.

The data set with the outliers removed fit a lognormal distribution. The geometric mean and geometric standard deviation of the set of main PAA radium-226 concentrations are each 1.3 pCi/g. The data lie within a population range of 0.76 to 2.2 pCi/g.

Radium-226 Concentrations in the North Section of Main PAA

It was stated above that elevated gamma-ray count rates were observed in an approximately 600-acre area located at the north end of the main PAA. Considering that the elevated levels are likely due to relatively higher increased levels of one or more gamma-emitting radionuclides, radium-226 concentrations in soil samples collected from this area were evaluated.

Eight surface soil samples were collected in this area (MPA-R01, NEA-R02, NEA-R03, NEA-R04, NEA-R05, RFA-03, RFA-06, and RFA-17). One of these samples was considered an outlier of the main PAA data set (NEA-R05).

There are too few soil samples collected in this area to characterize it statistically. However, the gamma-ray count rates therein differ from the main PAA, with statistical significance.

Radium-226 Concentrations in the Proposed Land Application Areas

Radium-226 concentrations in surface soils in the land application areas are summarized as follows:

- Averaged 1.1 pCi/g and ranged from 0.7 to 4.4 pCi/g in both areas
- Averaged 1.3 pCi/g in the Dewey land application area

- Averaged 0.8 pCi/g in the Burdock land application area

The concentrations of surrogate radionuclides, uranium, lead-210, and thorium-230 concentrations are consistently lower in the Burdock than in the Proposed Dewey Land Application Area, indicating that the lower radium-226 concentration is not a laboratory artifact.

Discussion of Radium-226 Concentrations
Although the distributions of the main permit and surface mine area radium-226 concentration data sets are similar, the gamma-ray count rate distributions in these two areas differ, with statistical significance. The gamma-ray count rates observed in the anomalous portion of the main area also differ from the main area.

With outliers removed, both the surface mine and main area radium-226 concentration data sets fit a lognormal distribution. The geometric mean and geometric standard deviation of both data sets is 1.3 pCi/g. The data lie within a population range of 0.76 to 2.2 pCi/g. The mean of 1.3 pCi/g is representative of a general background value in the majority of the PAA surface soils. Exceptional areas include those in and around the artesian well discharge and historical open pit mines. At this time, radium-226 concentrations are not well characterized in the northern anomalous area in the main area and along the northwest edge of the surface mine area.

The range of radium-226 concentrations in the land application areas lies within the range of overall radium-226 concentrations, averaging 1.3 and 0.8 pCi/g in the Dewey and Burdock areas, respectively.

Other Radionuclides
Table 5.1-6 summarizes the analytical results for all samples analyzed for the extended suite of radiological parameters (all locations and depths combined). Although the sample number isn't sufficient to allow any definitive conclusions to be drawn regarding distributional characteristics or trends of non radium-226 parameters, a positive relationship between the concentrations of radium-226 and natural uranium, thorium-230, and lead-210 is apparent.

Table 5.1-6 Radionuclide Concentrations in All Soil Samples

Sample ID	Date Collected	Depth (cm)	1-minute Gamma-Ray Count Rate (cpm)	U-nat (µCi/g)	Pb-210 (µCi/g)	Pb-210 Error (µCi/g)	Th-230 (µCi/g)	Th-230 Error (µCi/g)	Ra-226 (µCi/g)	Ra-226 Error (µCi/g)
LAS 002B	7/19/2008	15-30	-	7.1E-07	7.0E-07	1.2E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 003B	7/19/2008	15-30	-	1.2E-06	1.1E-06	1.1E-06	5.0E-07	4.0E-07	9.0E-07	1.0E-07
LAS 004B	7/19/2008	15-30	-	9.5E-07	1.3E-06	1.2E-06	5.0E-07	4.0E-07	8.0E-07	1.0E-07
LAS 005B	7/19/2008	15-30	-	1.6E-06	1.4E-06	1.1E-06	4.0E-07	4.0E-07	1.0E-06	2.0E-07
LAS 006B	7/19/2008	15-30	-	4.8E-07	1.4E-06	1.2E-06	3.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 007B	7/19/2008	15-30	-	4.5E-07	6.0E-07	1.5E-06	6.0E-07	1.0E-07	7.0E-07	1.0E-07
RFA-B01C	9/26/2007	30-100	-	1.5E-06	6.0E-07	1.0E-07	8.0E-01	1.0E-01	1.2E-06	2.0E-07
RFA-B01C-Dup	9/29/2007	30-100	-	1.3E-06	1.0E-06	2.0E-07	1.0E+00	2.0E-01	1.7E-06	3.0E-07
RFA-B02C	9/26/2007	30-100	-	-	-	-	-	-	9.0E-07	2.0E-07
RFA-B13C	9/26/2007	30-100	-	-	-	-	-	-	1.6E-06	2.0E-07
RFA-B15C	9/26/2007	30-100	-	-	-	-	-	-	1.5E-06	3.0E-07
RFA-B17C	9/26/2007	30-100	-	-	-	-	-	-	2.5E-06	3.0E-07
RFA-B21C	9/26/2007	30-100	-	-	-	-	-	-	1.2E-06	2.0E-07
RFA-B30C	9/26/2007	30-100	-	-	-	-	-	-	1.7E-06	3.0E-07
RFA-B36C	9/26/2007	30-100	-	-	-	-	-	-	1.0E-06	2.0E-07
RFA-B37C	9/26/2007	30-100	-	-	-	-	-	-	1.1E-06	2.0E-07
LAN 001C	7/18/2008	30-100	-	1.9E-06	1.9E-06	2.2E-06	1.6E-06	7.0E-07	9.0E-07	1.0E-07
LAN 002C	7/18/2008	30-100	-	1.5E-06	1.1E-06	2.2E-06	3.0E-07	3.0E-07	1.2E-06	1.0E-07
LAN 003C	7/18/2008	30-100	-	2.0E-06	2.6E-06	2.3E-06	6.0E-07	3.0E-07	1.0E-06	1.0E-07
LAN 004C	7/18/2008	30-100	-	1.5E-06	8.0E-07	1.4E-06	7.0E-07	5.0E-07	1.0E-06	1.0E-07
LAN 004C-DUP	7/18/2008	30-100	-	1.3E-06	1.2E-06	1.4E-06	5.0E-07	4.0E-07	8.0E-07	1.0E-07
LAN 005C	7/18/2008	30-100	-	7.1E-07	6.0E-07	1.4E-06	5.0E-07	4.0E-07	1.5E-06	2.0E-07
LAN 006C	7/18/2008	30-100	-	1.1E-06	7.0E-07	1.4E-06	5.0E-07	3.0E-07	1.4E-06	2.0E-07
LAN 007C	7/18/2008	30-100	-	2.5E-06	1.0E-07	1.4E-06	8.0E-07	6.0E-07	4.0E-07	1.0E-07
LAN 009C	7/18/2008	30-100	-	1.6E-06	5.0E-07	1.4E-06	1.1E-06	6.0E-07	3.9E-06	3.0E-07
LAN 010C	7/18/2008	30-100	-	2.7E-06	1.9E-06	1.2E-06	1.9E-06	8.0E-07	1.5E-06	2.0E-07
LAS 001C	7/19/2008	30-100	-	6.1E-07	9.0E-07	1.1E-06	1.0E-07	3.0E-07	8.0E-07	1.0E-07
LAS 002C	7/19/2008	30-100	-	6.3E-07	4.0E-07	1.1E-06	4.0E-07	4.0E-07	7.0E-07	1.0E-07
LAS 003C	7/19/2008	30-100	-	9.3E-07	7.0E-07	1.2E-06	1.0E-06	5.0E-07	8.0E-07	1.0E-07
LAS 004C	7/19/2008	30-100	-	1.3E-06	1.2E-06	1.1E-06	5.0E-07	3.0E-07	9.0E-07	1.0E-07
LAS 005C	7/19/2008	30-100	-	9.8E-07	1.2E-06	1.1E-06	7.0E-07	5.0E-07	1.1E-06	2.0E-07
LAS 006C	7/19/2008	30-100	-	6.5E-07	-3.0E-07	1.5E-06	3.0E-07	9.0E-08	6.0E-07	1.0E-07
LAS 007C	7/19/2008	30-100	-	7.2E-07	-7.0E-07	1.5E-06	5.0E-07	1.0E-07	7.0E-07	1.0E-07

Notes:
All errors reported are ± 2σ.

Limits of Detection
A summary of the results with respect to reporting limits and minimum detectable concentrations (MDCs) is as follows:

- The radium-226, lead-210, and thorium-230 lower limits of detection (LLD) (reported as MDCs or reporting limits) in the NEA, MPA, RFA, and SMA soil samples were all $1*10^{-7}$ µCi/g.
- The natural uranium LLDs in the NEA, MPA, RFA, and SMA samples ranged from $1.7*10^{-8}$ to $2.0*10^{-8}$ µCi/g.
- None of the results NEA, MPA, RFA, and SMA samples were below their respective LLDs.
- The lead-210 LLDs for the LAN and LAS samples ranged from $1.9*10^{-6}$ to $3.8*10^{-6}$ µCi/g. In all but one case, the lead-210 results were lower than their respective LLDs.
- The radium-226 LLDs for the LAN and LAS samples ranged from $4.0*10^{-8}$ to $1.0*10^{-7}$ µCi/g. All of the LAN and LAS results exceeded their respective LLDs.
- The thorium-230 LLD for the LAN and LAS samples was $1.0*10^{-7}$ µCi/g. Results for 17 of the 53 (surface and subsurface) samples were reported below $1.0*10^{-7}$ µCi/g.
- The natural uranium LLD for the LAN and LAS samples was $7.0*10^{-9}$ µCi/g. All of the results exceeded the LLD.

The LLD recommended in RG 4.14 for natural uranium, thorium-230, radium-226, and lead-210 in soils is $2*10^{-7}$ µCi/g. The only case for which the guidance was not followed was the LLD for lead-210 in the LAN and LAS samples.

5.1.3.2.2 Subsurface Soil Sample Results
Table 5.1-6 lists the subset of subsurface biased samples that were collected at depth in the project roll front areas: RFA-B01, RFA-B02 RFA-B13 RFA-B15, RFA-B17, RFA-B21, RFA-B30, RFA-B36, and RFA-B37. The table also lists results obtained in subsurface samples collected in the two land application areas: LAN-001 through LAN-009 and LAS-001 through LAS-007.

5.1.3.2.3 Data Uncertainty
This section briefly summarizes the results of the quality control (QC) samples collected for the baseline soil sampling program. The results of this QC effort are documented in Table 5.1-7, which lists the errors and LLDs for each duplicate pair. Table 5.1-7 documents associated comparisons, presenting the corresponding RPD (in the case of natural uranium) and/or Replicate Error Ratio (RER) for each QC pair. The calculation of RPDs and RERs is a standard technique used to evaluate laboratory precision.

The RPD is calculated as follows:

$$RPD = \frac{|A-B|}{\frac{A+B}{2}}$$

Where A and B are the sample and duplicate results, respectively.

The RER is calculated as follows:

$$RER = \frac{|S - R|}{\sqrt{(Sx0.15)^2 + (E_s)^2} + \sqrt{(Rx0.15)^2 + (E_R)^2}}$$

Where S and are the sample and duplicate concentrations, respectively. E_S and E_R are the sample (E_S) and duplicate errors (E_R). The factor of 0.15 accounts for any inherent systematic error which cannot be quantified. The acceptance criteria are an RPD and RER of less than 40 and 1 percent for data above the MDC, respectively, as established in a QAPP (ERG 2006). This data set shows four cases where the RER for lead-210 was greater than 1 and five cases where the RPD exceeded 40. There are three cases where the RER and RPD for radium-226 are exceeded (two concurrently).

Table 5.1-7 Quality Control Analysis for Soil Samples

		Relative Percent Difference (%)				Replicate Error Ratio		
Sample ID	**Depth (cm)**	**U-nat**	**Pb-210**	**Th-230**	**Ra-226**	**Pb-210**	**Th-230**	**Ra-226**
MPA-R04+Duplicate	0-15	-	-	-	11.8	-	-	0.2
NEA-R04+Duplicate	0-15	-	-	-	8.3	-	-	0.2
RFA-B01A+Duplicate	0-15	3.4	22.2	0.0	8.7	0.0	0.0	0.2
RFA-B01B+Duplicate	15-30	10.5	**75.9**	0.0	12.5	**1.8**	0.0	0.3
RFA-B01C+Duplicate	30-100	14.3	**50.0**	22.2	34.5	**1.0**	0.5	0.8
RFA-B08+Duplicate	0-15	-	-	-	0.0	-	-	0.0
RFA-B28+Duplicate	0-15	-	-	-	28.6	-	-	0.7
SMA-B01+Duplicate	0-15	22.2	**107.7**	18.2	**43.5**	**2.8**	0.4	0.8
SMA-B09+Duplicate	0-15	-	-	-	34.5	-	-	0.8
SMA-B14+Duplicate	0-15	-	-	-	13.3	-	-	0.3
SMA-B18+Duplicate	0-15	-	-	-	22.2	-	-	0.4
SMA-B23+Duplicate	0-15	-	-	-	3.6	-	-	0.1
LAN-004A+Duplicate	0-15	-4.3	**66.7**	40.0	**92.3**	0.5	0.6	**8.5**
LAN-004B+Duplicate	15-30	15.0	**263.2**	-85.7	**60.0**	**2.5**	0.9	**4.2**
LAN-004C+Duplicate	30-100	14.3	-40.0	33.3	22.2	0.4	0.6	**1.4**

Notes:
The radium-226, lead-210, and thorium-230 LLDs were all $1*10^{-7}$ µCi/g. All results are greater than 5 times their respective MDC, with the exception of radium-226 in Sample Location SMA-B18-Dup.
The natural uranium LLDs ranged from $1.7*10^{-8}$ to $2.0*10^{-8}$ µCi/g.
None of the results were below their respective LLDs.
Bolded values are anomalous QC results.

The consequences of one radium-226 and three lead-210 results exceeding the acceptance criteria are minimal since in each case the concentrations are low. In addition, lead-210 largely has no impact when addressing the impact of the baseline radiological characteristics of the site and potential impacts from site operations.

There is close agreement for all other analytical results reported for each duplicate pair collected for all parameters. Overall, duplicate results are generally comparable for the majority of QC samples collected. Considering the low level of radioactivity observed in most of the QC pairs, the laboratory performance on blind duplicates is satisfactory.

5.1.3.3 Conclusions

Main Permit and Surface Mine Areas
Main permit and surface mine areas' subsurface radium-226 concentrations, ranging from 0.7 to 5.6 pCi/g, are comparable to those observed in the 0-15 cm surface samples in the samples. There is no apparent trend with depth.

Land Application Areas
Subsurface concentrations in the land applications can be summarized as follows:

- Radium-226 concentrations range from 0.4 to 4.1 pCi/g, with a median of 0.9 pCi/g.
- Radium-226 concentrations in the project land application area have a median of 1.0 pCi/g.
- Radium-226 concentrations in the project land application area have a median of 0.8 pCi/g.

The subsurface results in both land application areas are comparable to those observed in the 0-15 cm surface samples. There is no apparent trend with depth.

5.1.4 Sediment Sampling

In June and August of 2008, baseline sediment sampling was conducted at the proposed project site in accordance with NRC Regulatory Guide 4.14 (NRC, 1980), which requires stream sediment samples during both seasonal runoff and low-flow conditions and one sediment sample at each impoundment to characterize radionuclide content. Stream sediment samples were collected at the same locations at which surface water quality sampling sites were located: upstream and downstream sites on Pass Creek, Beaver Creek, and the Cheyenne River, and one site on each of two ephemeral drainages located within the proposed project boundary. Impoundment sediment samples were collected in the same impoundments at which surface water chemistry was sampled. Figure 5.1-12 and Table 5.1-8 provide sediment sampling locations.

Stream sediment samples were collected upstream and downstream sites on three primary streams (Pass Creek, Beaver Creek, and the Cheyenne River) and sites on two other ephemeral drainages.

Sediment samples were collected in June 2008 from 11 surface water impoundments located in the area. Impoundments primarily consist of stockponds but also include historical open pit mines within the proposed permit boundary. At the time of sampling, the majority of subimpoundments had water present. As indicated by NRC Regulatory Guide 4.14, a one-time sampling event is sufficient to document radiological conditions of surface water impoundment sediments.

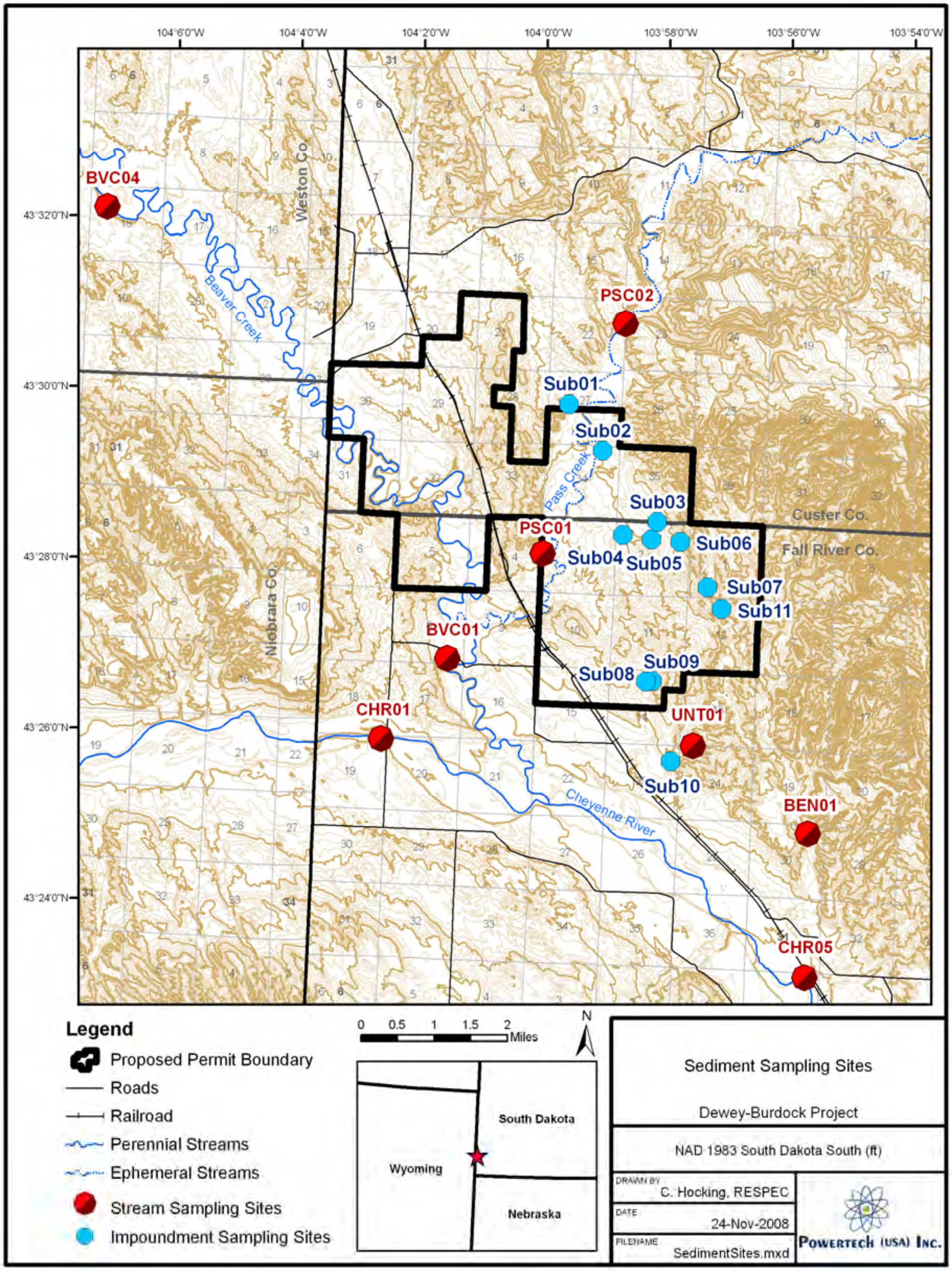

Figure 5.1-12 Sediment Sampling Sites

Table 5.1-8 Sampling Locations - Stream and Impoundment Sediment Sampling Locations

	Site ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Type / Name	Groundwater Influence
Subimpoundments	Sub01	998654	446816	stock pond	
	Sub02	1001071	443526	Triangle Mine Pit	x
	Sub03	1005005	438448	mine dam	
	Sub04	1002542	437518	stock pond	
	Sub05	1004591	437191	mine dam	
	Sub06	1006665	437019	Darrow Mine pit - Northwest	
	Sub07	1009312	434360	stock dam	
	Sub08	1004195	427057	stock pond	x
	Sub09	1004640	427089	stock pond	
	Sub10	1005961	421367	stock pond	
	Sub11	1009659	432225	stock pond	
Streams	BVC01	989871	428716	Beaver Creek downstream	
	BVC04	965366	460922	Beaver Creek upstream	
	CHR01	985098	423010	Cheyenne River upstream	
	CHR05	1015626	405925	Cheyenne River downstream	
	PSC01	996764	436205	Pass Creek downstream	
	PSC02	1002722	452563	Pass Creek upstream	
	BEN01	1015872	416196	Bennet Canyon	
	UNT01	1007565	422482	Un-named Tributary	

5.1.4.1 Stream Sediments Sampling

At each location, four sediment sub-samples were collected with a plastic hand trowel to a depth of 5 cm each, along a transect spanning the width of the channel in areas where active sediment deposition was occurring. Prior to sampling at each site, the trowel was cleaned by rinsing with a liquid Alconox solution followed by a deionized water rinse. To represent the average radionuclide concentration across the channel, the four sub-samples were composited into a single sample. The composite sample was placed in a plastic zipper bag labeled with site ID, date, and time of collection, which was then placed into another plastic zipper bag and into a cooler with ice.

Samples were hand-delivered to ELI in Rapid City, SD along with the chain of custody forms. At the lab, samples were dried, crushed, ground, and thoroughly homogenized prior to analysis. All samples were analyzed for natural uranium, thorium-230, radium-226, and lead-210 by wet radiochemical methods.

5.1.4.1.1 Surface Water Impoundment Sediment Sampling

Sediment sampling locations for surface water impoundments were the same as the subset of impoundments selected for water quality analysis. Impoundments were identified on aerial photographs and topographic maps and then field verified (Figure 5.1-13). A subset of 11 of the total 48 impoundments within a 2 km radius of the proposed permit boundary were chosen based on presence of water at commencement of water-quality sampling activities and their spatial distribution. The sampled impoundments include two open pit uranium mines and nine stock dams, one of which is fed by a free-flowing artesian Sundance well.

At each of the 11 sampled impoundments, a single sample was collected with a trowel to a depth of 5 cm. Prior to sampling at each site, the trowel was cleaned by rinsing with a liquid Alconox solution followed by a deionized water rinse. Samples were collected near the waters edge in a location appearing relatively undisturbed. In dry impoundments samples were collected near the upstream side of the impoundment in an area that would be submerged if water was present. The samples were placed in a plastic zipper bag labeled with site ID, date, and time of collection, then placed into another plastic zipper bag and into a cooler with ice.

Samples were hand-delivered to ELI in Rapid City, SD along with the chain of custody forms. At the lab, samples were dried, crushed, ground, and thoroughly homogenized prior to analysis. All samples were analyzed for natural uranium, thorium-230, radium-226, and lead-210 by wet radiochemical methods.

5.1.4.2 Stream Sediment Sample Results

Results of the stream sediment data for each stream channel sampling location and impoundment location are provided in Table 5.1-9. Beaver Creek sediment sample results from the historical TVA survey (TVA EIS, 1980) are provided in Table 5.1-10.

Figure 5.1-13 Surface Water Impoundments

Table 5.1-9 Radionuclide Concentrations in Stream Sediment Samples

		U-nat, Total	Ra-226, Total		Pb-210, Total			Th-230, Total	
		Result	Result	Precision	Result	Precision		Result	Precision
SiteID	Date	mg/kg-dry	pCi/g-dry	+/- pCi/g-dry	pCi/g-dry	+/- pCi/g-dry	Qualifier	pCi/g-dry	+/- pCi/g-dry
BEN01	6/23/2008	1.8	0.6	0.1	2.3	2.1	U	0.6	0.2
	8/21/2008	2.4	0.6	0.1	2.0	0.7		0.5	0.02
BVC01	6/17/2008	2.0	1.3	0.2	0.5	2	U	0.8	0.2
	8/21/2008	2.0	0.6	0.1	2.6	0.7		1.2	0.03
BVC04	6/17/2008	2.0	1.5	0.2	1.9	2.1	U	0.7	0.2
	8/21/2008	2.0	1.0	0.1	1.8	0.7		1.0	0.03
CHR01	6/17/2008	1.7	1.0	0.2	0.2	2	U	0.6	0.2
	8/21/2008	2.7	0.9	0.1	1.7	0.6		1.4	0.03
CHR05	6/17/2008	6.2	2.1	0.2	1.7	2	U	1.9	0.4
	8/21/2008	1.2	0.6	0.1	1.3	0.7		0.5	0.02
PSC01	6/17/2008	3.9	2.9	0.3	4.7	2.1		2.0	0.5
	8/21/2008	6.5	1.8	0.2	4.0	0.7		4.1	0.06
PSC02	6/17/2008	1.1	0.6	0.1	1.2	2	U	0.4	0.1
	8/21/2008	1.0	0.4	0.1	0.4	0.6	U	0.4	0.02
UNT01	6/23/2008	2.0	0.8	0.1	2.2	2.1	U	0.5	0.2
	8/21/2008	2.5	0.7	0.1	1.7	0.7		1.0	0.03
Sub01	6/18/2008	2.2	1.2	0.2	0.5	2	U	0.7	0.2
	8/21/2008	3.3	1.1	0.1	1.0	0.7	U	1.0	0.03
Sub02	6/18/2008	18	3.9	0.3	2.8	2.1	U	2.9	0.7
	8/21/2008	19	1.3	0.2	3.1	0.7		6.8	0.07
Sub03	6/18/2008	7.2	4.1	0.3	3.9	2.1		2.1	0.6
	8/21/2008	4.2	1.1	0.2	3.2	0.7		1.9	0.04
Sub04	6/17/2008	6.5	2.5	0.2	1.2	2	U	0.9	0.2
	8/21/2008	5.1	0.7	0.1	2.1	0.7		1.8	0.04

Table 5.1-9 Radionuclide Concentrations in Stream Sediment Samples (concl'd)

		U-nat, Total	Ra-226, Total		Pb-210, Total			Th-230, Total	
		Result	Result	Precision	Result	Precision		Result	Precision
SiteID	Date	mg/kg-dry	pCi/g-dry	+/- pCi/g-dry	pCi/g-dry	+/- pCi/g-dry	Qualifier	pCi/g-dry	+/- pCi/g-dry
Sub05	6/18/2008	8.5	4.2	0.3	4.2	2.1		2.4	0.5
	8/21/2008	6.0	3.0	0.2	2.8	0.7		2.3	0.04
Sub06	6/23/2008	37	8.6	0.4	9.6	2.2		7.8	1.6
	8/21/2008	32	5.2	0.3	4.0	0.7		5.9	0.07
Sub07	6/23/2008	1.7	0.7	0.1	0.6	2	U	0.5	0.2
	8/21/2008	2.2	0.4	0.1	1.9	0.7		0.9	0.03
Sub08	6/23/2008	1.2	0.6	0.1	0.6	2.1	U	0.4	0.1
	8/21/2008	1.9	0.4	0.1	1.7	0.7		0.8	0.02
Sub09	6/23/2008	2.4	1.0	0.2	1.5	2	U	0.7	0.2
	8/21/2008	2.3	0.6	0.1	1.7	0.7		0.9	0.03
Sub10	6/23/2008	1.5	0.8	0.1	1.5	2.1	U	0.7	0.3
	8/21/2008	2.1	0.6	0.1	0.9	0.7	U	0.7	0.03
Sub11	6/23/2008	2.7	0.8	0.1	2.1	2.1	U	0.5	0.2
	8/21/2008	1.8	0.6	0.1	1.5	0.7		0.8	0.03

Table 5.1-10 Historical Radionuclide Concentrations in Beaver Creek Sediment Samples (TVA EIS, 1980)

Sampling Location	Date Collected	Natural U µg/g	Ra-226 pCi/g	Pb-210 pCi/g	Th-230 pCi/g
Beaver Creek at Old Hwy 85 Bridge	7/31/1975	-	1.06 ± 0.04	-	-
	5/5/1976	2.57	1.29 ± 0.03	-	0.3 ± 0.2
	8/25/1976	1.48	1.06 ± 0.03	-	1.5 ± 0.2
	11/12/1976	1.12	0.98 ± 0.03	-	2.1 ± 0.2
	4/27/1977	1.42	1.15 ± 0.03	-	0.3 ± 0.1
	7/21/1977	3.4	0.91 ± 0.03	-	-0.05 ± 0.07
	11/15/1977	0.02	0.44 ± 0.02	3.3 ± 0.4	0.8 ± 0.2
Beaver Creek at Mouth	5/5/1976	2.65	1.25 ± 0.03	-	0.06 ± 0.2
	8/25/1976	2.23	1.71 ± 0.04	-	0.4 ± 0.1
	11/12/1976	0.86	0.84 ± 0.03	-	2.6 ± 0.3
	4/27/1977	0.87	1.31 ± 0.03	-	0.2 ± 0.1
	7/21/1977	4.1	2.45 ± 0.05	-	0.5 ± 0.2
	11/15/1977	0.72	0.83 ± 0.02	5.5 ± 0.5	0.2 ± 0.1
Beaver Creek Upstream	5/5/1976	4.37	1.03 ± 0.03	-	0.4 ± 0.3
	8/25/1976	3.01	1.23 ± 0.03	-	0.9 ± 0.2
	11/12/1976	1.5	1.01 ± 0.03	-	2.9 ± 0.3
	4/27/1977	0.89	1.34 ± 0 03	-	0.02 ± 0.07
	7/21/1977	3.7	1.41 ± 0.04	-	0.02 ± 0.08

5.1.4.3 Conclusions

The radionuclide concentrations in sediments at the project site are generally consistent with observed US soil concentrations (Myrick 1983). Exceptions are the Darrow Mine Pit (Sub 06) and the Triangle Mine Pit (Sub 02), both of which appear to contain radionuclide concentrations in sediments considerably higher than observed in soil by Myrick, 1983. The Darrow and Triangle Mine Pits are historical open pit uranium mines and elevated radionuclide concentrations in sediments would be expected.

Radionuclide concentrations in sediment at downstream locations of Pass Creek (PSC01) and the Cheyenne River (CHR05) are elevated compared to upstream locations for the same surface water bodies indicating potential impacts from disturbed and mineralized areas of the historic uranium mines on and adjacent to the site. Radionuclide concentrations in sediment at the downstream location on Beaver Creek (BVCO1) are similar to the upstream location (BVC04). The course of Beaver Creek through the PAA is entirely over the marine shales of the Graneros Group which do not contain uranium-bearing minerals.

5.1.5 Ambient Gamma and Radon Monitoring

5.1.5.1 Ambient Gamma Dose Rate Monitoring

Ambient exposure rates were determined for three periods using TLDs supplied and analyzed by Landauer, Inc. The monitoring periods were: August 18, 2007 to February 4, 2008, February 4 to May 17, 2008, and May 17 to July 17, 2008.
The TLDs were deployed at each of the eight AMS locations. Duplicates were deployed at AMS-01 and the background location (AMS-BKG).

Five of the nine TLDs deployed in the August 2007 to February 2008 period were lost, presumably by way of cattle consumption and/or disturbance.

5.1.5.1.1 Ambient Radon-222 Monitoring

Radtrak passive track etch detectors were placed at each of the eight AMS locations and an additional eight biased locations to measure radon-222 concentrations in air. For QC purposes, one duplicate detector was placed at each of two locations during each sampling event. The locations of the passive radon detectors are shown on Figure 5.1-9.

The detector measures average radon-222 concentrations in air over the measurement period. The results are reported in picocuries per liter (pCi/L).

A temporal overlap occurred across the group of detectors, but not on an individual location basis, the four quarterly measurement periods were as shown below in Table 5.1-11.

Table 5.1-11 Quarterly Measurement Periods

Period 1	August	14	2007	September	27	2007
Period 2	September	27	2007	February	1-12	2008
Period 3	February	1-12	2008	May	17	2008
Period 4	May	17	2008	July	17	2008

5.1.5.2 Results

5.1.5.2.1 Ambient Gamma Dose Rate Monitoring

The ambient gamma dose rate monitoring results are listed in Table 5.1-12. The results for the TLDs reported in mrem ambient dose equivalents are as follows:

- AMS-01: 94.9 for 303 monitored days, projected to 114 mrem/year
- AMS-02: 54.0 for 61 monitored days, projected to 323 mrem/year
- AMS-03: 38.6 for 103 monitored days, projected to 137 mrem/year
- AMS-04: 152.8 for 303 monitored days, projected to 184 mrem/year
- AMS-05: 123.7 for 303 monitored days, projected to 149 mrem/year
- AMS-06: 88.0, for 164 monitored days projected to 196 mrem/year
- AMS-07: 145.3 for 303 monitored days, projected to 175 mrem/year
- AMS-BKG: 167.8 for 303 monitored days, projected to 202 mrem/year

Excluding the result at AMS-02, the range of exposure rates, 114-202 mrem/year, is similar to average worldwide exposures to natural radiation sources comprised of cosmic radiation, cosmogenic radionuclides, and external terrestrial radiation reported in the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR),2000 Report to the General Assembly, Sources and Effects of Ionizing Radiation, Annex B . The typical ranges of average worldwide exposures reported in this reference document are 60 to 160 mrem/year.

Table 5.1-12 Ambient Gamma Dose Rates

Location	Starting Date	End Date	Dose (mrem)	Projected Doses (mrem)
AMS-01	9/18/07	2/4/08	-	114
	2/4/08	5/17/08	37.2a	
	5/17/08	7/17/08	57.7a	
AMS-02	9/18/07	2/4/08	-	323
	2/4/08	5/17/08	-	
	5/17/08	7/17/08	54.0	
AMS-03	9/18/07	2/4/08	-	137
	2/4/08	5/17/08	38.6	
	5/17/08	7/17/08		
AMS-04	9/18/07	2/4/08	62.4	184
	2/4/08	5/17/08	36.1	
	5/17/08	7/17/08	54.3	
AMS-05	9/18/07	2/4/08	50.6	149
	2/4/08	5/17/08	36.7	
	5/17/08	7/17/08	36.4	
AMS-06	9/18/07	2/4/08	-	196
	2/4/08	5/17/08	36.9	
	5/17/08	7/17/08	51.1	
AMS-07	9/18/07	2/4/08	73.7	175
	2/4/08	5/17/08	35.5	
	5/17/08	7/17/08	36.1	
AMS-BKG	9/18/07	2/4/08	68.8a	202
	2/4/08	5/17/08	40.5a	
	5/17/08	7/17/08	58.5a	

Notes: Result is average of measurement plus duplicate.

Ambient Radon-222 Monitoring

The ambient radon monitoring results are listed in Table 5.1-13. Period 1 ambient radon concentrations ranged from 1.0 to 9.8, averaging 2.4 pCi/L. Period 2 concentrations ranged from 0.4 to 1.8, averaging 1.2 pCi/L. Period 3 concentrations ranged from 0.4 to 3.3, averaging 1.8 pCi/L. Period 4 concentrations ranged from 0.5 to 0.8, averaging 0.5 pCi/L.

Table 5.1-13 Radon Concentrations in Air

Location	Starting Date	Ending Date	Radon-222 Conc. (µCi/ml)	Error ± (µCi/ml)	LLD (µCi/ml)	Average Rn-222 Conc. (µCi/ml)	Standard Deviation of Average (µCi/ml)	Minimum Rn-222 Conc. (µCi/ml)	Maximum Rn-222 Conc. (µCi/ml)	Percent Effluent Conc.
AMS-1	8/14/07	9/27/07	1.00E-09	-	6.82E-10	7.23E-10	2.09E-10	4.92E-10	1.00E-09	1000
	9/27/07	2/1/08	7.00E-10	-	2.00E-10					700
	2/1/08	5/17/08	7.00E-10	7.1E-11	2.83E-10					700
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
AMS-1[a]	8/14/07	9/27/07	1.00E-09	-	6.82E-10	5.73E-10	2.88E-10	4.00E-10	1.00E-09	1000
	9/27/07	2/1/08	4.00E-10	-	2.00E-10					400
	2/1/08	5/17/08	4.00E-10	5.2E-11	2.83E-10					400
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
AMS-2	8/15/07	9/27/07	2.20E-09	-	6.98E-10	1.70E-09	7.62E-10	4.92E-10	2.20E-09	2200
	9/27/07	2/1/08	1.20E-09	-	2.00E-10					1200
	2/1/08	5/17/08	7.00E-10	7.0E-11	2.83E-10					700
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
AMS-3	8/14/07	9/27/07	1.20E-09	-	6.82E-10	1.20E-09	9.30E-10	4.92E-10	2.70E-09	1200
	9/27/07	2/4/08	1.20E-09	-	2.00E-10					1200
	2/4/08	5/17/08	2.70E-09	7.9E-11	2.91E-10					2700
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
AMS-4	8/14/07	9/24/07	1.20E-09	-	7.32E-10	1.20E-09	9.98E-10	5.75E-10	2.90E-09	1200
	9/27/07	2/4/08	1.20E-09	-	2.00E-10					1200
	2/4/08	5/17/08	2.90E-09	7.8E-11	2.91E-10					2900
	5/17/08	7/17/08	5.75E-10	-	4.92E-10					575
AMS-5	8/15/07	9/27/07	2.20E-09	-	6.98E-10	1.60E-09	7.16E-10	4.92E-10	2.20E-09	2200
	9/27/07	2/1/08	1.00E-09	-	2.00E-10					1000
	2/1/08	5/17/08	1.20E-09	7.9E-11	2.83E-10					1200
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492

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Table 5.1-13 Radon Concentrations in Air (Cont'd)

Location	Starting Date	Ending Date	Radon-222 Conc. (µCi/ml)	Error ± (µCi/ml)	LLD (µCi/ml)	Average Rn-222 Conc. (µCi/ml)	Standard Deviation of Average (µCi/ml)	Minimum Rn-222 Conc. (µCi/ml)	Maximum Rn-222 Conc. (µCi/ml)	Percent Effluent Conc.
AMS-6	8/17/07	9/27/07	2.60E-09	-	7.32E-10	1.80E-09	8.40E-10	6.89E-10	2.60E-09	2600
	9/27/07	2/1/08	1.00E-09	-	2.00E-10					1000
	2/11/08	5/17/08	1.30E-09	7.6E-11	2.83E-10					1300
	5/17/08	7/17/08	6.89E-10	-	4.92E-10					689
AMS-7	8/14/07	9/27/07	1.10E-09	-	6.82E-10	1.30E-09	4.15E-10	4.92E-10	1.50E-09	1100
	9/27/07	2/1/08	1.50E-09	-	2.00E-10					1500
	2/1/08	5/17/08	1.00E-09	7.2E-11	2.83E-10					1000
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
AMS-BKG	8/14/07	9/24/07	2.00E-09	-	7.32E-10	1.80E-09	6.58E-10	4.95E-10	2.00E-09	2000
	9/27/07	2/1/08	1.60E-09	-	2.00E-10					1600
	2/1/08	5/17/08	1.70E-09	8.1E-11	2.83E-10					1700
	5/17/08	7/17/08	4.95E-10	-	4.92E-10					495
AMS-BKG[a]	8/14/07	9/27/07	2.70E-09	-	6.82E-10	2.10E-09	9.03E-10	4.92E-10	2.70E-09	2700
	9/27/07	2/1/08	1.50E-09	-	2.00E-10					1500
	2/1/08	5/17/08	1.50E-09	8.1E-11	2.83E-10					1500
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
Rn 01	8/14/07	9/23/07	2.00E-09	-	7.50E-10	1.65E-09	8.35E-10	5.00E-10	2.40E-09	2000
	9/23/07	2/11/08	1.30E-09	-	2.00E-10					1300
	2/11/08	5/17/08	2.40E-09	8.5E-11	3.13E-10					2400
	5/17/08	7/17/08	5.00E-10	-	4.76E-10					500
Rn 02	8/14/07	9/23/07	9.80E-09	-	7.50E-10	3.86E-09	5.15E-09	5.75E-10	9.80E-09	9800
	9/23/07	2/11/08	1.20E-09	-	2.00E-10					1200
	no data	-	-	-	-					-
	5/17/08	7/17/08	5.75E-10	1.5E-10	4.92E-10					575

Table 5.1-13 Radon Concentrations in Air (Concl'd)

Location	Starting Date	Ending Date	Radon-222 Conc. (µCi/ml)	Error ± (µCi/ml)	LLD (µCi/ml)	Average Rn-222 Conc. (µCi/ml)	Standard Deviation of Average (µCi/ml)	Minimum Rn-222 Conc. (µCi/ml)	Maximum Rn-222 Conc. (µCi/ml)	Percent Effluent Conc.
Rn 03	8/14/07	9/23/07	1.20E-09	-	7.50E-10	1.05E-09	9.63E-10	4.92E-10	2.70E-09	1200
	9/23/07	2/11/08	9.00E-10	-	2.00E-10					900
	2/11/08	5/17/08	2.70E-09	8.6E-11	3.13E-10					2700
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
Rn 04	8/14/07	9/23/07	2.00E-09	-	7.50E-10	1.70E-09	6.34E-10	5.00E-10	2.00E-09	2000
	9/23/07	2/1/08	1.40E-09	-	2.00E-10					1400
	2/11/08	5/17/08	1.00E-09	7.7E-11	2.83E-10					1000
	5/17/08	7/17/08	5.00E-10	-	4.92E-10					500
Rn 05	8/14/07	9/23/07	1.50E-09	-	7.50E-10	1.30E-09	7.82E-10	8.18E-10	2.60E-09	1500
	9/23/07	2/12/08	1.10E-09	-	2.00E-10					1100
	2/11/08	5/17/08	2.60E-09	8.6E-11	3.16E-10					2600
	5/17/08	7/17/08	8.18E-10	-	4.92E-10					818
Rn 06	8/19/07	9/23/07	3.30E-09	-	8.57E-10	2.30E-09	1.35E-09	4.92E-10	3.30E-09	3300
	9/23/07	2/11/08	1.30E-09	-	2.00E-10					1300
	2/11/08	5/17/08	3.00E-09	8.5E-11	3.13E-10					3000
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492
Rn 07	8/15/07	9/23/07	3.00E-09	-	7.69E-10	2.40E-09	1.18E-09	7.21E-10	3.30E-09	3000
	9/23/07	2/12/08	1.80E-09	-	2.00E-10					1800
	2/12/08	5/17/08	3.30E-09	8.3E-11	3.16E-10					3300
	5/17/08	7/17/08	7.21E-10	-	4.92E-10					721
Rn 08	8/14/07	9/23/07	1.50E-09	-	7.50E-10	1.40E-09	4.39E-10	4.92E-10	1.50E-09	1500
	9/23/07	2/1/08	1.30E-09	-	2.00E-10					1300
	9/23/07	2/1/08	1.00E-09	7.2E-11	2.83E-10					1000
	5/17/08	7/17/08	4.92E-10	-	4.92E-10					492

Notes: [a]Duplicate track etch detector
[a]Seal potentially compromised

With the exception of one location (AMS-3), Period 1 concentrations exceeded Period 2 concentrations. On average, the radon concentrations decreased by an average of 35 percent. The range in the data sets decreased from 2.1 (Period 1) to 0.3 pCi/L (Period 2), as the largest value in Period 1, 9.8 pCi/L, decreased to 1.2 pCi/L.

There are many factors to explain the variability. The most important are:

- Wind speed and direction
- Topography- Radon is heavier than air and will concentrate and flow down low areas and drainages on calm days.
- Soil moisture and ground cover influence the radon flux from the soil to the air
- Air temperature and barometric pressure
- Sources of radon such as mines

All these can influence the radon concentration at a given monitoring location and all are part of the baseline condition. To identify which of the above parameters specifically contributed to the observed variability would be speculative.

Figure 5.1-14 presents the ambient radon concentrations in relation to the radium-226 concentrations predicted from the gamma-ray count rate data. One expects higher radon concentrations in the mined areas. However, there is only one case where this is true: the Q1 observation at Rn-02, located adjacent to the edge of an open pit mine, is 9.8 pCi/L. There appear to be no spatial trends in the current data set, other than the levels are within the same order of magnitude across the site, i.e., all less than 10 pCi/L and averaging 2.4, 1.2, 1.8, and 0.5 pCi/L in Periods 1 through 4, respectively.

Duplicates were collected at AMS-01 and AMS-BKG in all periods. The QC summary for the radon monitoring is as follows:

AMS-01: In Period 1, each concentration was 1.0 pCi/L and the relative percent difference (RPD) was 0. In Periods 2 and 3, the concentrations of the sample and its duplicate were 0.7 and 0.4 pCi/L. The RPD was 55.5. In Period 4, each concentration was 0.49 pCi/L and the RPD was 0.

AMS-BKG: In Period 1, the concentrations of the sample and its duplicate were 2.0 and 2.7 pCi/L. The RPD was 29.8. In Period 2, the concentrations of the sample and its duplicate were 1.6 and 1.5 pCi/L, with an RPD of 6.5. In Period 3, the concentrations of the sample and its duplicate were 1.7 and 1.5 pCi/L, with an RPD of 12.5. In Period 4, the concentrations of the sample and its duplicate were 0.5 and 0.49 pCi/L, with an RPD of 0.7.

There are two cases where the RPDs do not meet the project acceptance criterion of 40: AMS-01 in Period 2 and 3.

Conclusions

In terms of effluent limits, the measured values exceed the 10 CFR 20 limit of 0.1 pCi/L for radon-222 with daughters present. However, on average the measured values are within the range of reported worldwide ambient background radon concentrations, 0.027 to 2.7 pCi/L (United Nations Scientific Committee on the Effects of Atomic Radiation [UNSCEAR], 2000).

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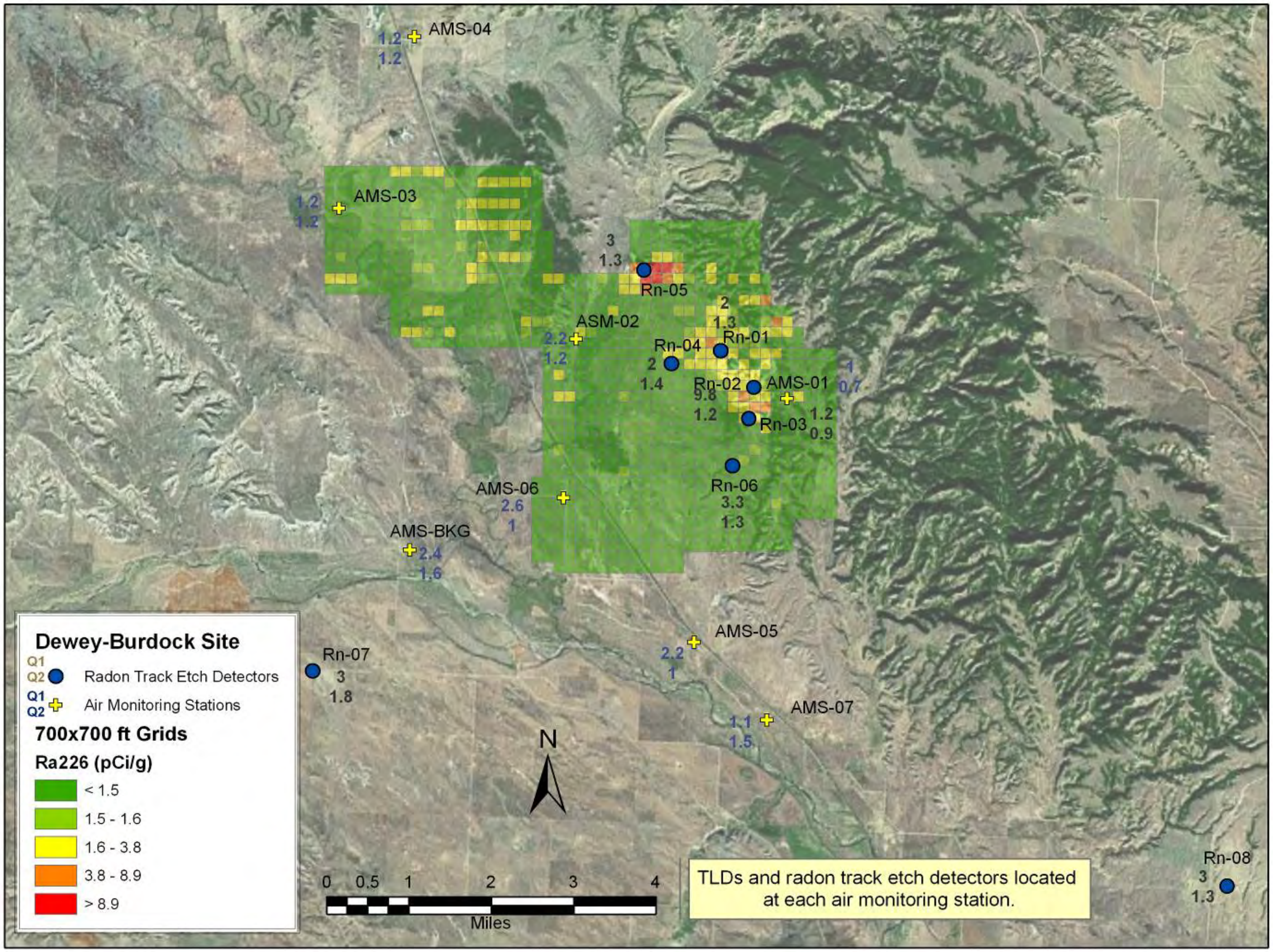

Figure 5.1-14 Radon Concentrations in Air in Relation to Predicted Radium-226 Concentrations

Air Particulate Monitoring
Air particulate monitoring was conducted at the project for one year. Particulates were collected using high volume air samplers.

Methods
Eight Hi-Q Model HVP-4200AFC high volume air samplers were established within and surrounding the proposed PAA. The samplers operated from August 2007 to August 2008. The locations of the air samplers are shown on Figures 5.1-9 and 5.1-14.

Each high volume air sampler was equipped with an 8-in. by 10-in. 0.8 micron glass fiber filter paper. The air filters were collected approximately bi-weekly, prior to saturation, from each of the eight air samplers. Flow rate and total flow data were recorded at the same time. The samples were collected as follows:

- Period 1: August 28 to October 2, 2007
- Period 2: October 2, 2007 to January 1, 2008
- Period 3: January 4 to April 1, 2008
- Period 4: April 1 to July 9, 2008
- Period 5: July 9 to August 13, 2008

The samples were composited and digested by the external independent analytical laboratory. The samples were analyzed for radium-226, thorium-230, natural uranium, and lead-210, using the same methods as listed for the soil samples.

The laboratory data were reported in units of picocuries per filter composite (pCi/f). The data were converted to units of microcuries per milliliter (µCi/ml), as follows:

$$Concentration,\ \mu Ci/ml = \frac{Filter\ Concentration}{Total\ Flow}(1*10^{-12})$$

The units of total flow and filter concentration in the equation are cubic meters and pCi/f, respectively. The resulting concentrations for each radionuclide and high volume sampler were compared to effluent concentration limits listed in Table 2 of 10 CFR 20 Appendix B and reported in Table 5.1-13 as percentages of the respective effluent limits. The most conservative effluent limits were applied to thorium-230 ($3*10^{-12}$ µCi/ml) and lead-210 ($6*10^{-13}$ µCi/ml). The Class D and W limits were applied to natural uranium ($3*10^{-12}$ µCi/ml) and radium-226 ($9*10^{-13}$ µCi/ml), respectively.

Air Particulate Sampling Results
In general and relative to one another (e.g., natural uranium to radium-226), the average concentrations of radionuclides were consistent at each location from period to period. The lowest average concentration was radium-226, followed by thorium-230, natural uranium, and lead-210. Average radium-226 concentrations were five orders of magnitude lower than lead-210 concentrations. The data are listed in Table 5.1-14 and summarized as averages and ranges in Table 5.1-15.

Site-wide, the data can be summarized as follows:

- Natural uranium concentrations ranged from $-3.0*10^{-17}$ to $9.1*10^{-15}$ µCi/ml and averaged $7.5*10^{-16}$ µCi/ml.

- Thorium-230 concentrations ranged from $-9.5*10^{-19}$ to $5.6*10^{-17}$ µCi/ml and averaged $1.2*10^{-17}$ µCi/ml.
- Radium-226 concentrations ranged from $-4.9*10^{-17}$ to $4.7*10^{-17}$ µCi/ml and averaged $8.9*10^{-19}$ µCi/ml.
- Lead-210 concentrations ranged from $-1.1*10^{-16}$ to $4.1*10^{-14}$ µCi/ml and averaged $1.4*10^{-14}$ µCi/ml.

There are no clear patterns in the data, in terms of radionuclide concentrations, when evaluating them spatially or temporally. Natural uranium concentrations at each location were on the order of 10^{-16} µCi/ml over the course of monitoring. Thorium-230 concentrations fluctuated between the orders of 10^{-17} and 10^{-18} µCi/ml. Radium-226 concentrations fluctuated between the orders of 10^{-17} and 10^{-19} µCi/ml. Finally, lead-210 concentrations at each location were all on the order of 10^{-14} µCi/ml over the course of monitoring.

Table 5.1-14 Radionuclide Concentrations in Air

Location	Monitoring Period[a]	Concentration (µCi/ml)							% of Effluent Concentration				Lower Limit of Detection (µCi/ml)			
		U-nat	Th-230	Th-230 2σ Error	Ra-226	Ra-226 2σ Error	Pb-210	Pb-210 2σ Error	U-nat	Th-230	Ra-226	Pb-210	U-nat	Th-230	Ra-226	Pb-210
AMS-01	1	-1.3E-17	3.4E-18	1.0E-17	1.8E-17	1.7E-17	2.1E-14	2.4E-16	0.00%	0.00%	0.00%	3.54%	1.7E-18	1.7E-18	1.2E-17	2.1E-16
	2	2.4E-17	1.3E-17	9.8E-18	1.4E-17	9.7E-18	2.1E-14	4.9E-16	0.00%	0.00%	0.00%	3.51%	1.5E-18	1.5E-18	8.3E-18	4.2E-16
	3	3.7E-15	1.3E-17	4.2E-17	1.2E-17	5.7E-17	1.9E-14	9.8E-16	0.12%	0.00%	0.00%	3.13%	3.9E-15	2.3E-18	5.7E-17	3.7E-16
	4	0.0E+00	1.6E-18	1.1E-17	7.2E-18	9.1E-18	4.1E-14	6.9E-16	0.00%	0.00%	0.00%	6.78%	1.6E-16	1.6E-18	1.6E-18	7.9E-18
	5	-1.7E-17	6.5E-18	2.5E-17	-3.1E-17	2.7E-17	1.0E-14	6.5E-16	0.00%	0.00%	0.00%	1.74%	4.3E-18	4.3E-18	5.6E-17	6.7E-16
AMS-02	1	-2.0E-17	4.7E-18	1.1E-17	-8.6E-18	1.3E-17	8.9E-15	2.5E-16	0.00%	0.00%	0.00%	1.49%	1.6E-18	1.6E-18	1.1E-17	1.9E-16
	2	4.2E-18	0.0E+00	7.4E-18	-4.2E-18	7.4E-18	8.2E-15	4.2E-16	0.00%	0.00%	0.00%	1.37%	1.4E-18	1.4E-18	7.6E-18	3.9E-16
	3	2.9E-15	1.8E-18	2.5E-17	-2.6E-17	3.3E-17	1.2E-14	7.5E-16	0.10%	0.00%	0.00%	1.96%	3.1E-15	1.8E-18	4.1E-17	3.0E-16
	4	0.0E+00	1.6E-17	1.1E-17	-2.3E-18	7.0E-18	2.0E-14	4.7E-16	0.00%	0.00%	0.00%	3.26%	1.5E-16	1.5E-18	1.5E-18	7.6E-18
		-1.3E-17	0.0E+00	8.0E-18	-4.9E-17	2.3E-17	1.5E-14	6.5E-16	0.00%	0.00%	0.01%	2.44%	4.0E-18	4.0E-18	5.3E-17	6.2E-16
AMS-03	1	-3.0E-17	9.3E-18	1.2E-17	-1.4E-17	1.3E-17	9.2E-15	2.5E-16	0.00%	0.00%	0.00%	1.53%	1.5E-18	1.5E-18	1.2E-17	1.9E-16
	2	1.8E-17	8.9E-18	9.0E-18	9.6E-18	9.5E-18	8.0E-15	4.4E-16	0.00%	0.00%	0.00%	1.34%	1.5E-18	1.5E-18	8.9E-18	4.1E-16
	3	2.8E-15	6.9E-18	2.2E-17	-4.8E-18	3.7E-17	1.2E-14	7.5E-16	0.09%	0.00%	0.00%	1.98%	2.9E-15	1.7E-18	3.6E-17	2.8E-16
	4	0.0E+00	9.3E-18	1.0E-17	5.4E-18	8.8E-18	1.3E-14	3.9E-16	0.00%	0.00%	0.00%	2.16%	1.6E-16	1.6E-18	1.6E-18	7.8E-18
	5	-1.6E-17	1.9E-17	9.7E-18	-3.2E-18	3.1E-17	1.2E-14	6.5E-16	0.00%	0.00%	0.00%	1.99%	4.2E-18	4.2E-18	5.0E-17	6.6E-16
AMS-04	1	-2.6E-17	2.5E-18	1.1E-17	-2.8E-17	1.2E-17	8.5E-15	2.6E-16	0.00%	0.00%	0.00%	1.42%	1.7E-18	1.7E-18	9.9E-18	2.0E-16
	2	1.9E-17	6.6E-18	9.0E-18	1.2E-17	9.5E-18	1.0E-14	4.6E-16	0.00%	0.00%	0.00%	1.74%	1.5E-18	1.5E-18	8.1E-18	4.1E-16
	3	3.0E-15	-9.5E-19	3.0E-17	2.5E-17	4.7E-17	-1.1E-16	7.0E-16	0.10%	0.00%	0.00%	0.02%	3.2E-15	1.9E-18	4.4E-17	3.1E-16
	4	0.0E+00	9.4E-18	1.1E-17	2.3E-18	8.3E-18	2.2E-14	5.1E-16	0.00%	0.00%	0.00%	3.66%	1.6E-16	1.6E-18	1.6E-18	7.8E-18
	5	-1.0E-18	2.7E-17	9.7E-18	-5.2E-18	3.3E-17	1.3E-14	6.7E-16	0.00%	0.00%	0.00%	2.23%	4.2E-18	4.2E-18	5.5E-17	6.6E-16
AMS-05	1	1.0E-18	4.7E-18	1.1E-17	1.1E-17	1.5E-17	1.0E-14	2.3E-16	0.00%	0.00%	0.00%	1.66%	1.6E-18	1.6E-18	1.1E-17	1.9E-16
	2	2.7E-17	1.5E-17	1.0E-17	1.5E-17	9.9E-18	1.1E-14	4.8E-16	0.00%	0.00%	0.00%	1.91%	1.5E-18	1.5E-18	8.5E-18	4.3E-16
	3	2.8E-15	3.6E-17	2.3E-17	-1.3E-17	4.0E-17	1.0E-14	7.2E-16	0.09%	0.00%	0.00%	1.68%	2.9E-15	1.7E-18	4.3E-17	2.8E-16
	4	0.0E+00	2.0E-17	1.4E-17	4.7E-17	1.3E-17	2.5E-14	5.3E-16	0.00%	0.00%	0.01%	4.09%	1.5E-16	1.5E-18	1.5E-18	7.7E-18
	5	2.4E-17	5.6E-17	9.5E-18	2.2E-17	3.4E-17	1.1E-14	6.3E-16	0.00%	0.00%	0.00%	1.85%	4.1E-18	4.1E-18	4.9E-17	6.4E-16
AMS-06	1	-1.4E-17	9.4E-18	1.2E-17	0.0E+00	1.4E-17	6.0E-15	2.2E-16	0.00%	0.00%	0.00%	1.00%	1.6E-18	1.6E-18	1.1E-17	1.9E-16
	2	1.7E-17	5.5E-18	1.0E-17	-5.5E-18	8.4E-18	1.1E-14	4.9E-16	0.00%	0.00%	0.00%	1.80%	1.6E-18	1.6E-18	9.5E-18	4.4E-16
	3	2.9E-15	1.0E-17	2.4E-17	-2.0E-17	3.9E-17	1.7E-14	8.2E-16	0.10%	0.00%	0.00%	2.89%	3.1E-15	1.8E-18	4.2E-17	2.9E-16
	4	0.0E+00	1.4E-17	1.2E-17	2.3E-17	1.0E-17	2.1E-14	4.8E-16	0.00%	0.00%	0.00%	3.56%	1.5E-16	1.5E-18	1.5E-18	7.3E-18
	5	-2.6E-18	2.0E-17	9.1E-18	6.9E-18	3.3E-17	1.9E-14	6.9E-16	0.00%	0.00%	0.00%	3.25%	4.0E-18	4.0E-18	4.9E-17	6.2E-16
AMS-07	1	-1.1E-17	6.4E-18	9.1E-18	-1.3E-17	1.1E-17	7.2E-15	2.2E-16	0.00%	0.00%	0.00%	1.20%	1.4E-18	1.4E-18	9.2E-18	1.7E-16
	2	2.0E-17	7.9E-18	8.1E-18	-6.6E-19	7.5E-18	1.3E-14	4.4E-16	0.00%	0.00%	0.00%	2.13%	1.3E-18	1.3E-18	7.3E-18	3.7E-16
	3	9.1E-15	2.0E-17	2.6E-17	3.9E-18	4.2E-17	1.7E-14	7.8E-16	0.30%	0.00%	0.00%	2.85%	2.9E-15	1.7E-18	4.3E-17	2.8E-16
	4	0.0E+00	1.3E-17	1.2E-17	2.9E-17	1.0E-17	2.8E-14	5.4E-16	0.00%	0.00%	0.00%	4.66%	1.4E-16	1.4E-18	1.4E-18	7.0E-18
	5	-9.2E-19	1.7E-17	8.5E-18	1.4E-17	3.0E-17	1.3E-14	5.9E-16	0.00%	0.00%	0.00%	2.10%	3.7E-18	3.7E-18	4.6E-17	5.8E-16
AMS-BKG	1	1.6E-18	2.0E-17	1.3E-17	-5.6E-18	1.4E-17	8.3E-15	2.5E-16	0.00%	0.00%	0.00%	1.38%	1.6E-18	1.6E-18	1.2E-17	2.2E-16
	2	2.1E-17	2.0E-18	1.2E-17	3.0E-18	1.1E-17	1.8E-14	6.6E-16	0.00%	0.00%	0.00%	3.05%	2.0E-18	2.0E-18	1.2E-17	5.7E-16
	3	3.0E-15	2.8E-17	2.9E-17	-5.1E-18	4.0E-17	1.3E-14	7.7E-16	0.10%	0.00%	0.00%	2.18%	3.2E-15	1.9E-18	4.1E-17	2.5E-16
	4	0.0E+00	-7.8E-19	9.4E-18	1.2E-17	9.5E-18	2.0E-14	4.8E-16	0.00%	0.00%	0.00%	3.29%	1.6E-16	1.6E-18	1.6E-18	7.8E-18
	5	-8.1E-18	2.4E-17	9.3E-18	-1.7E-17	2.4E-17	1.2E-14	6.3E-16	0.00%	0.00%	0.00%	2.00%	4.0E-18	4.0E-18	4.0E-17	5.3E-16

Notes: The laboratory reported no blank assay data for Period 5. Blank assays in the sample concentration calculation were assumed to be 50 percent of the values for blanks reported for the previous period. The assumption is based on the relative, approximate run-time of the air samplers in both periods; NR = Not reported by the laboratory.

Table 5.1-15 Summary of Radionuclide Concentrations in Air

Location	U-nat Concentration (µCi/ml)				Th-230 Concentration (µCi/ml)				Ra-226 Concentration (µCi/ml)				Pb-210 Concentration (µCi/ml)			
	Avg	σ	Min	Max	Avg	σ	Min	Max	Avg	σ	Min	Max	Avg	σ	Min	Max
AMS-01	7.3E-16	1.6E-15	-1.7E-17	3.7E-15	7.4E-18	5.2E-18	1.6E-18	1.3E-17	4.0E-18	2.0E-17	-3.1E-17	1.8E-17	2.2E-14	2.0E-17	9.1E-18	5.7E-17
AMS-02	5.8E-16	1.3E-15	-2.0E-17	2.9E-15	4.5E-18	6.7E-18	0.0E+00	1.6E-17	-1.8E-17	2.0E-17	-4.9E-17	-2.3E-18	1.3E-14	1.1E-17	7.0E-18	3.3E-17
AMS-03	5.5E-16	1.2E-15	-3.0E-17	2.8E-15	1.1E-17	4.7E-18	6.9E-18	1.9E-17	-1.4E-18	9.2E-18	-1.4E-17	9.6E-18	1.1E-14	1.3E-17	8.8E-18	3.7E-17
AMS-04	6.0E-16	1.3E-15	-2.6E-17	3.0E-15	9.0E-18	1.1E-17	-9.5E-19	2.7E-17	1.2E-18	2.0E-17	-2.8E-17	2.5E-17	1.1E-14	1.7E-17	8.3E-18	4.7E-17
AMS-05	5.6E-16	1.2E-15	0.0E+00	2.8E-15	2.6E-17	2.0E-17	4.7E-18	5.6E-17	1.6E-17	2.2E-17	-1.3E-17	4.7E-17	1.3E-14	1.4E-17	9.9E-18	4.0E-17
AMS-06	5.8E-16	1.3E-15	-1.4E-17	2.9E-15	1.2E-17	5.4E-18	5.5E-18	2.0E-17	8.6E-19	1.6E-17	-2.0E-17	2.3E-17	1.5E-14	1.4E-17	8.4E-18	3.9E-17
AMS-07	1.8E-15	4.1E-15	-1.1E-17	9.1E-15	1.3E-17	5.7E-18	6.4E-18	2.0E-17	6.6E-18	1.6E-17	-1.3E-17	2.9E-17	1.6E-14	1.5E-17	7.5E-18	4.2E-17
AMS-BKG	5.9E-16	1.3E-15	-8.1E-18	3.0E-15	1.5E-17	1.3E-17	-7.8E-19	2.8E-17	-2.5E-18	1.1E-17	-1.7E-17	1.2E-17	1.4E-14	1.2E-17	9.5E-18	4.0E-17

In terms of comparison to 10 CFR 20 Appendix B effluent limits, the data can be summarized as follows:

- Natural uranium concentrations were 0.0 to 0.3 percent of its effluent limit.
- Thorium-230 concentrations were 0.0 percent of its effluent limit.
- Radium-226 concentrations were -0.01 to 0.01 percent of its effluent limit.
- Lead-210 concentrations were -0.02 to 6.78 percent of its effluent limit.

The LLDs, in pCi/f, reported by the laboratory for each radionuclide were converted to µCi/ml by multiplying pCi/f by $1*10^{-12}$. In no cases were the LLDs higher that their respective 10 CFR 20 effluent concentration limits. The LLDs reported in Period 2 by the laboratory for uranium exceeded the recommendation in NRC Regulatory Guide 4.14.

The LLDs for each of the radionuclides are listed in Table 5.1-14.

Conclusions
With the exception of natural uranium, the values determined above are similar to U.S. background concentrations reported in the UNSCEAR Report to the General Assembly, Sources and Effects of Ionizing Radiation, Annex B. The regional concentrations reported in this reference document are: uranium-238 ($2.4*10^{-17}$ to $1.4*10^{-16}$ µCi/ml), thorium-230 ($1.6*10^{-17}$ µCi/ml), radium-226 ($1.6*10^{-17}$ µCi/ml), and lead-210 ($2.7*10^{-15}$ to $2.7*10^{-14}$ µCi/ml).

Radon Flux Measurements
Radon flux rates were measured at nine locations on three occasions in the Dewey and Burdock roll front areas. The locations are shown on Figure 5.1-9. The locations coincide with the nine soil samples collected from 0-100 cm below ground surface (not in land application areas).

The first round of flux canisters was deployed on September 26, retrieved on September 27, and analyzed on September 28, 2007. The second round of flux canisters was deployed on April 20, retrieved on April 21, and analyzed on April 22, 2008. The third round of flux canisters was deployed on July 14, retrieved on July 15, and analyzed on July 16, 2008. The canisters were analyzed using EPA Test Method 115, Monitoring for Radon-222 Emissions. Results are documented in the Table 5.1-16. Sampling for the three periods yielded flux rates of 1.22, 0.74, and 1.5 picocuries per meter squared second (pCi/m^2-s), respectively. Flux rates ranged between 0.68 and 1.77 pCi/m^2-s in fall 2007, 0.28 and 1.33 pCi/m^2-s in spring 2008 and 0.48 and 2.38 pCi/m^2-s in summer 2008.

Table 5.1-16 Baseline Radon Flux Measurements

Location	Date	Flux (pCi/m²s)	Std. Dev. (pCi/m²s)	LLD (pCi/m²s)	Average Flux @ Location (pCi/m²s)
RFA-B01	September 2007	1.68	0.06	0.18	1.57
	April 2008	0.64	0.05	0.15	
	July 2008	2.38	0.06	0.15	
RFA-B02	September 2007	0.89	0.05	0.15	0.86
	April 2008	0.76	0.05	0.16	
	July 2008	0.94	0.05	0.15	
RFA-B13	September 2007	1.77	0.06	0.17	1.53
	April 2008	0.56	0.05	0.16	
	July 2008	2.27	0.06	0.15	
RFA-B15	September 2007	1.22	0.05	0.15	1.35
	April 2008	1.12	0.06	0.16	
	July 2008	1.71	0.05	0.15	
RFA-B17	September 2007	1.25	0.06	0.16	1.05
	April 2008	0.61	0.05	0.16	
	July 2008	1.30	0.05	0.15	
RFA-B21	September 2007	0.97	0.05	0.14	0.71
	April 2008	0.28	0.05	0.16	
	July 2008	0.89	0.05	0.14	
RFA-B30	September 2007	1.73	0.06	0.17	1.49
	April 2008	0.70	0.05	0.16	
	July 2008	2.03	0.05	0.15	
RFA-B36	September 2007	0.68	0.05	0.16	0.60
	April 2008	0.64	0.05	0.16	
	July 2008	0.48	0.06	0.15	
RFA-B37	September 2007	0.80	0.05	0.14	1.13
	April 2008	1.33	0.06	0.16	
	July 2008	1.27	0.05	0.14	

Conclusions

The flux rates determined at the PAA are one to two orders of magnitude below the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) requirements of 20 pCi/m²-s specified in 10 CFR 40, Appendix A, Criterion 6. Although the latter requirement applies to tailings and thus is not directly germane to this characterization, it is useful as a context to demonstrate the relatively low magnitude of baseline radon flux rates measured at the site.

5.1.6 Groundwater Sampling

TVA sponsored a groundwater sampling investigation within the Burdock area, in support of a Draft Environmental Statement (DES) in order to quantify groundwater quality within the Edgemont Uranium Mining Project area. The investigation was conducted over the one year period of November 1976 through November of 1977. The groundwater data represents the Fall River and Lakota Formations that form the Inyan Kara Group.

In summary of the investigation a brief discussion is provided in support of current groundwater quality data:

Historic TVA Sampling

The TVA groundwater investigation observed the water from Fall River and Lakota intermixed within some of the wells, thus representing a composite sample of the two formations. Dissolved solids averaged 1,000 mg/L and rated very hard; principle cations for both formations of the Burdock area were observed to be calcium and sodium; principle anions were sulfate and bicarbonates. Concentrations of dissolved solids, sulfates, iron and manganese exceeded the EPA secondary water quality standards. Lead exceeded the EPA standard (1,600 g/L) in one non-flowing well.

PA Baseline Sampling

At the project site, baseline groundwater sampling was conducted in general accordance with NRC Regulatory Guide 4.14 (NRC, 1980). Because of the significant number of groundwater wells, their geochemical similarities, and an abundance of historical water quality data, a representative subset of the wells was selected for sampling. The wells were selected based on type of use, aquifer, and location in relation to the ore bodies. The baseline study for the NRC license application consisted of 19 groundwater wells (14 existing and 5 newly drilled) making up a representative sampling group for the area (Figure 5.1-15, Table 5.1-17). The wells selected for sampling include eight domestic wells, six stock watering wells, with three of the 14 existing wells being hydrologically upgradient of the proposed recovery areas. The total number of wells chosen for site characterization of the groundwater includes wells within the Fall River Formation (4), Lakota Formation (7), Inyan Kara Group (Fall River or Lakota) (2), Sundance Formation (1), and alluvium (5). Initial baseline sampling of these wells was conducted quarterly, from July 2007 through June 2008.

As required by the SD DENR (rule ARSD 74:29), an additional 12 wells were sampled monthly beginning in March 2008 and continued through February 2009 for a final total of all wells sampled of 31. The 12 wells required by DENR are represented in (Figure 5.1-16 and Table 5.1-18). Of the 12 wells, six wells are located in the Dewey area and six wells are located in and near the Burdock area. Of the Dewey wells, there is a set of Fall River and Lakota wells sampled, upgradient of, within the PAA, and down gradient of proposed production activities. Near the Burdock area, the same well arrangement applies with two wells upgradient of, two wells within the proposed production area, and two downgradient of the proposed production area. Data for radiological parameters available to date are presented in this section.

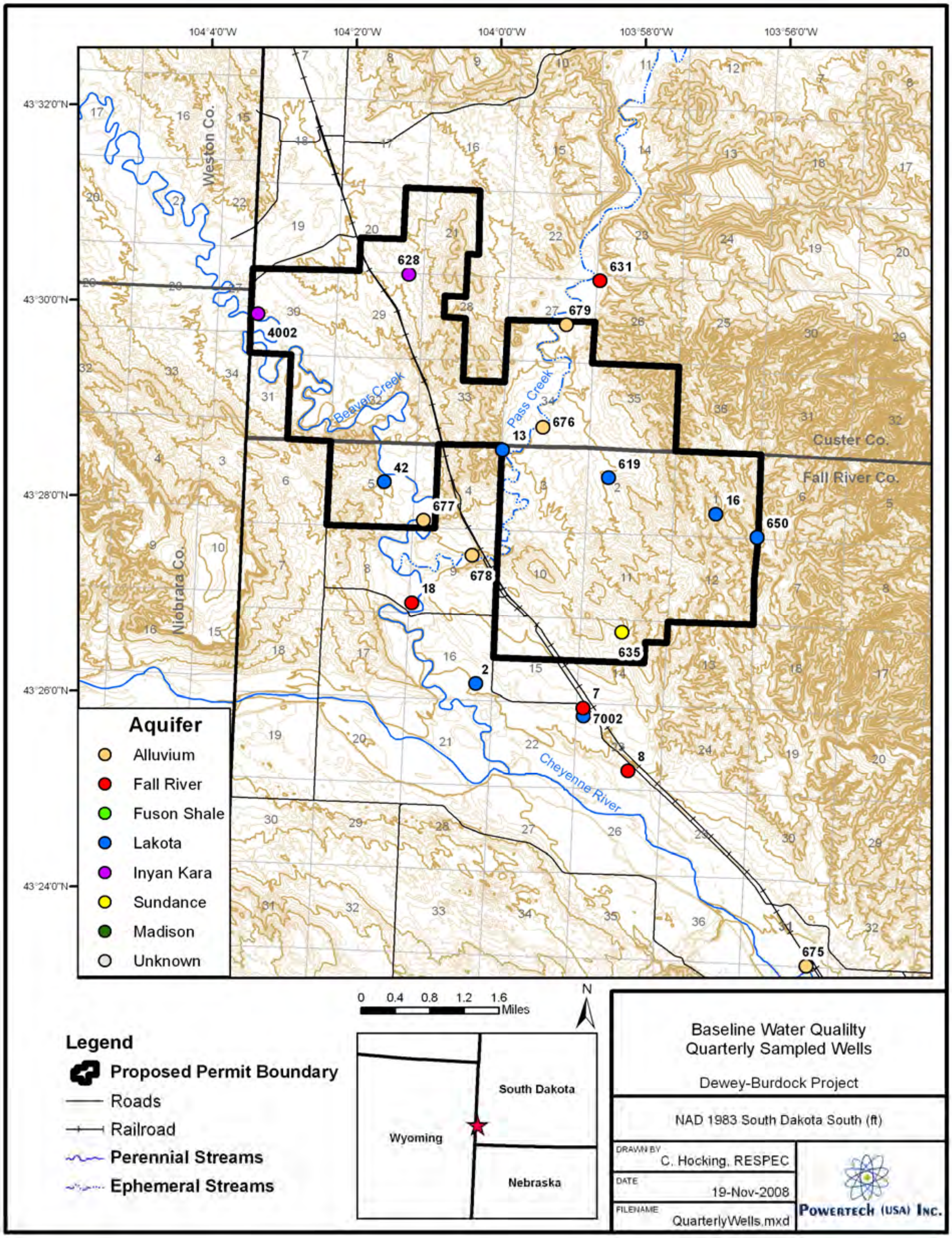

Figure 5.1-15 Baseline Groundwater Quality Quarterly Sampled Wells

Powertech (USA) Inc.

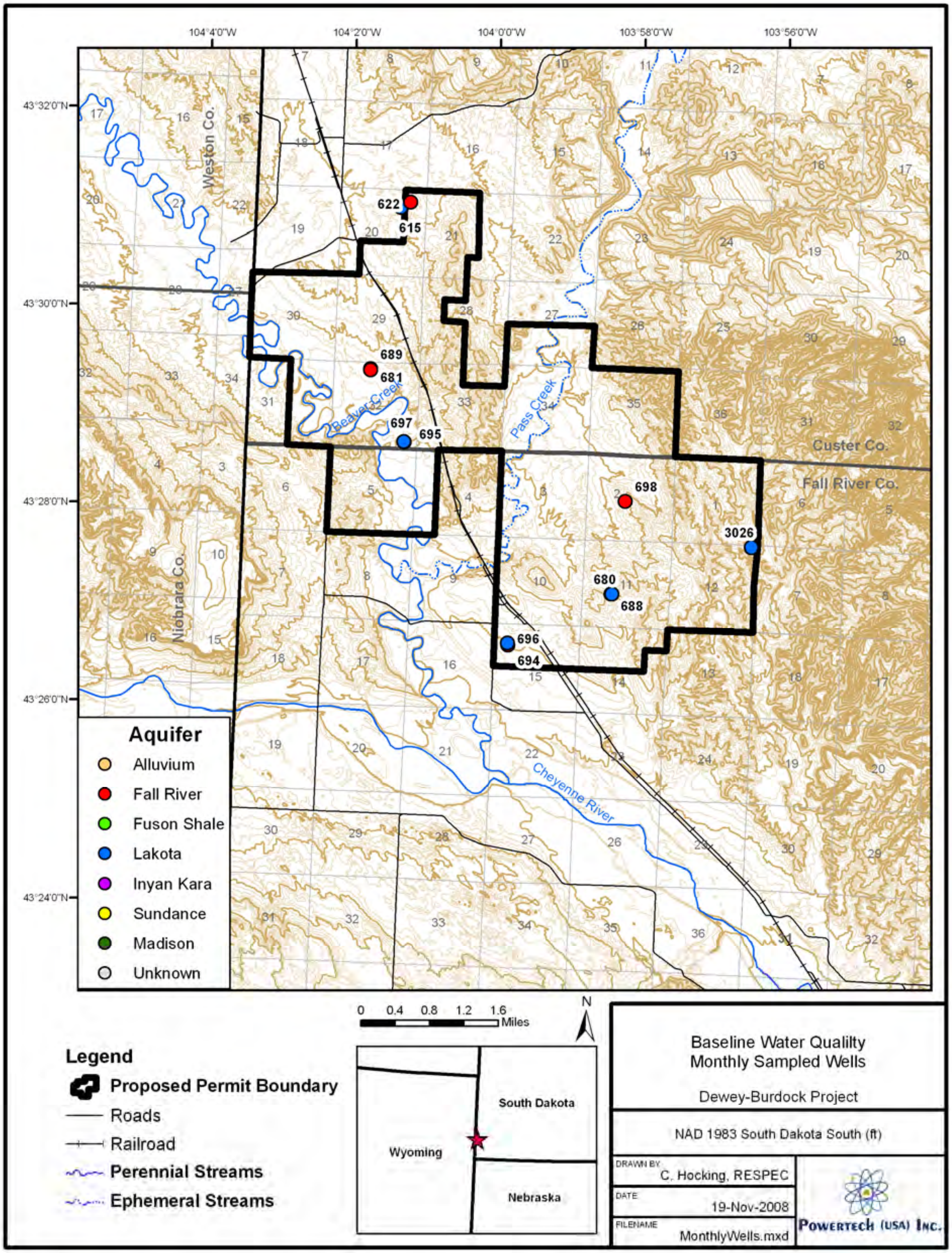

Figure 5.1-16 Baseline Groundwater Quality Monthly Sampled Wells

Table 5.1-17 Quarterly Sampled Water Quality Well Data

ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Formation	Depth, ft	Screened Interval, ft	Description
2	995122.6	423922.6	Lakota	650	566 - 650	Peterson Domestic and Stock
7	1001702.8	422416.9	Fall River	200	unknown	Kennobie Domestic
8	1004451.2	418618.3	Fall River	240	unknown	Englebert Domestic
13	996758.9	438470.4	Lakota	625	580 - 625	C. Spencer Domestic
16	1009827.6	434446.9	Lakota	330	unknown	Daniel Domestic
18	991210.6	428960.1	Fall River	527	unknown	D. Anderson Domestic
42	989542.9	436481.4	Lakota	600	unknown	L. Putnam Domestic
619	1003106.9	437045.9	Lakota	280	unknown	Daniel West – Weather Station Stock
628	990894.7	449719.2	Inyan Kara	unknown	unknown	Abandoned Windmill Stock
631	1002575.7	449309.8	Fall River	80	30 - 80	Putnam Big Pump Stock
635	1004084.6	427130.8	Sundance	880	666 - 780	Sundance Pond Stock
650	1012180.5	433331.4	Lakota	unknown	unknown	Daniel East Stock
675	1015340.3	406352.2	Alluvium	14.4	4 - 14	Marietta Alluvial
676	999245.0	439891.6	Alluvium	22.5	12 - 22	Pass Cr. Spencer Alluvial
677	991947.3	434035.9	Alluvium	14.5	4 - 14	Putnam Alluvial
678	995023.4	431834.9	Alluvium	14.5	4 - 14	Pass Cr. Alluvial
679	1000303.0	446248.3	Alluvium	39	29 - 39	Pass Cr. Doran Alluvial
4002	981812.9	446932.2	Inyan Kara	unknown	unknown	Swimming Pool Stock
7002	1001731.5	421930.8	Lakota	500	unknown	Kennobie Stock

Table 5.1-18 Monthly Sampled Water Quality Well Data

ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Formation	Depth, ft	Screened interval, ft	Description
615	990571.0	453708.9	Lakota	800	712 - 800	TVA No. 2
622	991174.5	454033.8	Fall River	520	503 - 580	TVA No. 8
680	1003476.6	429969.1	Lakota	436	426 - 436	Burdock Pump Test
681	988728.3	443725.3	Fall River	600	585 - 600	Dewey Pump Test
688	1003425.8	429974.4	Fall River	255	245 - 255	Burdock Pump Test West Piezo
689	988715.0	443789.2	Lakota	730	715 - 730	Dewey Pump Test North Piezo
694	997116.1	426836.1	Fall River	392	377 - 392	School House NW
695	990783.4	439312.5	Fall River	508	493 - 508	Putnam East
696	997086.2	426946.4	Lakota	587	572 - 587	School House SE
697	990748.4	439347.4	Lakota	682	667 - 682	Putnam West
698	1004307.8	435651.1	Fall River	205	180 - 205	Weather Station
3026	1012037.4	432833.2	Lakota	196	166 - 196	Daniel New Stock

Methods

Static water levels were measured at most wells prior to sample collection with regard to a reference elevation, usually a mark on the well or on a permanent structure above or near to the well. When possible, pressure of artesian wells was measured with a 15 psi or 30 psi N.I.S.T. – certified pressure gauge; the well was shut in and the pressure was allowed to stabilize before a reading was recorded. Pressure values were recorded to within at least one tenth of a psi and typically to within a hundredth of a psi. Wells with subsurface water levels were measured using an electric water level tape with measurements reported to within at least one tenth of a foot and typically to within a hundredth of a foot.

Exceptions to this were domestic wells that could not be accessed at the well head or were behind a pressure tank (wells 7, 8, 13, 16, 18, 42), free-flowing wells that could not be sealed due to leaks caused by corrosion and age (wells 2, 635, 4002), free-flowing wells that could not be sealed due to poor valve fittings or cracked valves (well 696), free-flowing wells where existed the possibility of rupturing a line when pressurized due to age (well 7002), and wells that contained pumps and pump tubing making it difficult to retrieve a water level tape (well 619).

All pumped wells, with the exception of 631, had permanent pumps installed in order to obtain samples. An existing high-capacity pump in well 631, used to pump water up a hill several hundred feet to a stock tank, was not used for sampling purposes due to logistical hurdles except for the first sample collected there on September 27, 2007. For the next three samples, a small dedicated pump was used each time the well was sampled.

Continuous free-flowing wells were sampled before pressure measurements were made and were not purged before sampling. For these wells (2, 18, 42, 635, 4002, 7002), it was assumed that free-flowing well water adequately represented formation water. After collecting a sample, a spot check with a water-quality probe was made and temperature, specific conductivity, turbidity, and pH were recorded. Pressure was then measured at the wells where it was possible within limits of feasibility.

After measuring the pressure of capped free-flowing wells (where possible), the well valve was opened and the flow rate was allowed to stabilize, then flow measurements were made using a stopwatch and a marked container (usually a 5-gallon pail, but sometimes a 1-gallon container at slower-flowing wells). Casing purge time was calculated based on water column height, casing diameter, and flow rate. Three well volumes were required to have been purged before the well water was sampled. Additionally, a water-quality sonde with a flow-through cell was connected to the well and. water quality parameters (pH, temperature and conductivity) were periodically recorded If parameters had not stabilized after purging three volumes, wells were allowed to continue to purge until parameters had stabilized, or until the purged volume was >> three well volumes.

Pumped wells were purged of three pore volumes and once one or more of the water quality parameters stabilized (conductivity, temperature, and pH) flow from the formation was sampled.

After measuring water level (where possible), the pump was started and flow rate was measured using stopwatch and 5-gallon marked pail.

A water-quality probe equipped with a flow-through cell was connected to outflow.

Wells with a high enough yield were purged for a minimum of three well volumes, and also until one or more indicator parameters had stabilized. Parameters monitored for stabilization were specific conductance, temperature, and pH. Field measurements were recorded periodically during purging of 3 volumes, and at least 3 minutes apart after purging three volumes. Table 5.1-19 provides requirements for parameter stabilization. After three well volumes had been purged and parameters stabilized, a sample was collected.

Wells that had yields too low to be continuously pumped and purged of three well volumes were pumped dry and allowed to recover. After the well had sufficiently recovered, it was pumped and sampled. Accurate records of well purging are maintained to document the number of casing volumes purged from the well before sampling, but in all cases a minimum of one casing volume was purged before sampling.

After calculating casing volume, alluvial wells were purged of three well volumes into a 5-gallon marked pail using either disposable bailers or a peristaltic pump. When using bailers, water quality parameters were recorded after each well volume was purged using a water-quality probe. When using the peristaltic pump, a water quality probe equipped with flow-through cell was connected to pump outflow and parameters (pH, temperature and conductivity) were recorded periodically during the purge.

Table 5.1-19 Stability Criteria for Collecting Groundwater Samples at Pumped Wells

Field Measurement	Stability Criteria[1]
pH	+/- 0.1 standard units
Temperature	+/- 0.2 C
Specific conductivity	+/- 5% (SC <= 100 µS/cm); otherwise +/- 3%

[1]Allowable variation between 5 or more sequential field-measurement values

Additional steps taken during water quality sampling include the following:

- Sampling procedures required a qualified technician (wearing gloves) to label each sample bottle with site ID, date, time of sampling, triple rinsing the bottle with sample water, then filling and capping it.
- Radon sample bottles were filled and capped immediately and with no headspace.
- Field replicate samples, consisting of a second set of samples collected at the same time following the same protocols as the sample set, were collected periodically to determine data accuracy.
- Field blanks were collected by transporting deionized water supplied by the contract laboratory to the field during regular sampling, then transferred to collection bottles in the field in order to subject the blank water to the same transportation, handling, storage, and field conditions as regular samples.
- All samples were immediately placed in coolers on ice after collection.
- Water quality sondes used to collect field parameter measurements were calibrated periodically using N.I.S.T.-traceable standards.

A groundwater quality constituent list was developed based on NUREG-1569 groundwater parameters, NRC 4.14 parameters, and added parameters from a constituent-list review with SD DENR.

Groundwater Sampling Radiological Results

Results to date for dissolved radiological groundwater parameters are shown in Table 5.2-20 and Table 5.2-21.

Table 5.1-20 Summary of Groundwater Radionuclide Concentrations from Quarterly Sampled Wells

Parameter	Aquifer	Alpha Particle-Dissolved				Uranium-Dissolved				Uranium-Total				Radium-226 -Dissolved				Radium-226-Total				Radon-222		
Units		pCi/L				mg/L				mg/L				pCi/L				pCi/L				pCi/L		
Sampling Quarter / Sample ID		3rd Quarter 2007	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008	3rd Quarter 2007	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008	3rd Quarter 2007	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008	3rd Quarter 2007	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008	3rd Quarter 2007	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008	4th Quarter 2007	1st Quarter 2008	2nd Quarter 2008
Domestic Wells																								
2	Lakota	1.4	8.7	3.5	8.2	ND	ND	0.0004	ND	0.0004	NS	0.0004	ND	ND	1.3	1.1	2.1	2.2	NS	NS	NS	674	908	727
7	Fall River	4.4	7.2	15.5	3.3	ND	ND	ND	ND	NS	NS	ND	ND	0.6	1.1	0.7	0.9	ND	NS	NS	NS	206	242	451
8	Fall River	5	8.7	5.4	3.2	ND	0.0003	ND	ND	ND	NS	ND	ND	ND	NS	1.5	1.2	3.5	NS	NS	NS	123	329	514
13	Lakota	8.9	7.5	19.5	4.2	ND	ND	ND	ND	NS	NS	ND	ND	1.8	1.6	1.1	1.6	1.1	NS	NS	NS	305	258	412
16	Lakota	62.7	12.2	85.7	28.3	0.0021	0.0007	0.0007	<0.0003	NS	NS	0.0007	<0.0003	26.2	8.1	15.3	6.4	17.4	NS	NS	NS	1090	28200	3150
18	Fall River	15.7	18.9 (Rep 20.0)	31.7	27.5	0.0061	0.0066 (Rep 0.0065)	0.0066	0.0059	NS	NS	0.0062	0.0062	ND	3.2 (Rep 3.6)	3.2	2.6	4.0	NS	NS	NS	945 (Rep 944)	1220	1210
4002A	Other Inyan Kara	120 (Rep 141)	227	314	127	0.0026 (Rep 0.0026)	0.0026	0.0026	0.0023	NS	NS	0.0025	0.0025	63.6 (Rep 60.0)	54.2	57.0	52.3	62.7 (Rep 79.4)	NS	NS	NS	8010	9890	8780
7002	Lakota	45.6	39.8	91.4	29.5	0.0007	0.0006	0.0006	0.0005	NS	NS	0.0005	0.0006	8.5	8.1	8.8	8.0	6.3	NS	NS	NS	938	752	1270
Domestic/Stock Wells																								
42	Lakota	371	375	526	558	0.0150	0.0324	0.0194	0.0142	NS	NS	0.0198	0.0149	96.5	102	100	100	79.7	NS	NS	NS	132000	175000	219000
Stock Wells																								
619	Lakota	367	341	438	398	0.0020	0.0015	0.0015	0.0016	NS	NS	0.0018	0.0018	120	100	99.7	110	120	NS	NS	NS	2990	5580	5770
628	Other Inyan Kara	29.9	83.9	64.5	39	0.0017	0.0034	0.0030	0.0027	NS	NS	0.0031	0.0029	7.4	20.7	9.0	6.1	6.8	NS	NS	NS	2740	4360	5040
631	Fall River	51.0	46.5	162	60.7	0.0027	0.0029	0.0027	0.0026	0.003	NS	0.0026	0.0028	12.9	9.5	19.4	22.1	15.2	NS	NS	NS	4220	3920	4430
635	Sundance / Unkpapa	2.5	4.4	14.8	13.2	0.0020	0.0020	0.0021	0.0017	0.002	NS	0.0021	0.0017	1.6	0.8	1.3	NS	NS	NS	NS	NS	902	806	1070
650	Lakota	13.1	5.6	2.9	2.1	0.0019	ND	ND	ND	NS	NS	0.0004	ND	2.7	2.4	1.4	1.2	3.2	NS	NS	NS	134	202	254
Piezometer																								
675	Alluvial	18.8	18.3	29.3	55.2 (Rep 51.1)	0.0372	0.0307	0.0387	0.0493 (Rep 0.0485)	NS	NS	0.0387	0.0505 (Rep 0.0516)	ND	0.5	ND	0.7 (Rep 0.7)	2.3	NS	NS	NS	712	783	960 (Rep 960)
676	Alluvial	37.1	31.9	95.5	NS	0.0494	0.0548	0.0586	NS	NS	0	0.0687	NS	ND	ND	ND	NS	ND	NS	NS	NS	453	686	NS
677	Alluvial	41.0	38.7	129	43.1	0.0218	0.0443	0.0402	0.045	NS	0	0.0414	0.0471	0.9	ND	ND	0	ND	NS	NS	0	892	808	1250
678	Alluvial	23.2	18.9	41.4 (Rep 30.2)	54.7	0.0352	0.0349	0.0368	0.0355	NS	NS	0.0379	0.0387	ND	ND	ND (Rep ND)	NS	ND	NS	NS	NS	391	487 (Rep 418)	687
679	Alluvial	19.9	13.3	18.4	NS	0.0157	0.0144	0.0139	NS	NS	NS	0.0154	NS	ND	ND	0.9	NS	2.5	NS	NS	NS	819	2170	NS

Notes:

Yellow highlights designate concentrations over the EPA MCL

Blue highlights designate concentrations over the proposed EPA MCL (300 pCi/L) for radon

ND = Not detected

NS = No sample

Rep = duplicate analysis

Table 5.1-21 Summary of Groundwater Radionuclide Concentrations from Monthly Sampled Wells

Parameter	Aquifer	Alpha Particle-Dissolved				Uranium-Dissolved				Uranium-Total				Radium-226 -Dissolved				Radium-226-Total				Radon-222			
Units		pCi/L				mg/L				mg/L				pCi/L				pCi/L				pCi/L			
Sampling Quarter / Sample ID		Mar-08	Apr-08	May-08	Jun-08	Mar-08	Apr-08	May-08	Jun-08	Mar-08	Apr-08	May-08	Jun-08	Mar-08	Apr-08	May-08	Jun-08	Mar-08	Apr-08	May-08	Jun-08	Mar-08	Apr-08	May-08	Jun-08
615	Fall River	18	15.1	15.3	38.3	0.0026	0.0025	0.0024	0.0024	0.0026	0.0025	0.0025	0.0023	2.1	2	2	7.2	2.4	1.8	2.2	6.8	1370	1180	1070	1830
622	Fall River	15	22.6	32.6	36.4	<0.0003	0.0054	0.0056	0.0051	<0.0003	0.0065	0.0068	0.0059	2.3	2.7	3.2	4.1	3	3.6	4.2	3.9	501	1090	804	1950
680	Lakota	6440	4270	5500	4370	0.0569	0.0303	0.0343	0.0227	0.0541	0.0291	0.0256	0.0244	1150	1230	1340	1410	1152	1232	1353	1415	81000	151000	255000	91700
681	Fall River	2170	1400	1720	1390	0.0092	0.0098	0.0096	0.0097	0.0099	0.0102	0.0106	0.0102	414	377	415	434	418	377	417	435	254000	253000	462000	389000
688	Lakota	2.9	10.1	17.3	13.2	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.3	1.2	2.5	0.6	1.2	1.2	2.2	13.5	608	307	749	426
689	Fall River	64.3	25.5	34.9	36.5	0.0032	0.0037	0.0043	0.0034	0.0041	0.004	0.0117	0.006	7.9	4.2	5.7	5.5	9.9	4.2	6.2	5	1950	1540	1390	2520
694	Lakota	8.8	18.6	10.6	23.7	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	1.6	4	1.9	2.2	2.6	3.5	1.7	1.9	313	251	619	611
695	Lakota	NS	29.4	25.6	39.7	NS	0.0029	0.0029	0.0027	NS	0.0032	0.0029	0.0027	NS	5	3.7	5.2	NS	4.6	3.5	5.1	NS	1400	2090	2120
696	Lakota	3.9	5.2	14.3	23.9	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	1	0.5	1.8	3.3	1.6	0.3	1.7	2.9	190	185	497	517
697	Lakota	32.2	8.1	4.1	11.9	<0.0003	0.0030	<0.0003	<0.0003	<0.0003	0.0031	<0.0003	<0.0003	3.9	1.7	1.1	0.8	4.5	1.6	4.9	0.4	862	284	570	413
698	Fall River	1820	2110	1300	1790	0.109	0.11	0.102	0.104	0.123	0.119	0.118	0.113	393	370	413	429	408	376	427	441	30800	25800	24000	40700
3026	Lakota	47.6	43.8	92.4	116	0.0151	0.015	0.0281	0.0183	0.0097	0.0196	0.0322	0.0216	3.6	2.8	9.6	4.7	6.9	2.9	10.8	4.6	440	304	213	950

Notes:

Yellow highlights designate concentrations over the EPA MCL

Blue highlights designate concentrations over the proposed EPA MCL (300 pCi/L) for radon

ND = Not detected

NS = No sample

5.2 Groundwater

5.2.1 Regional Groundwater Use

The PAA is located at the southwestern edge of the Black Hills. The major aquifers of the Black Hills are the Inyan Kara, Minnelusa, Madison and Deadwood (see Section 7.8.1). Within Fall River and Custer Counties, each of these aquifers is used, with wells generally being drilled into the next underlying aquifer below the surface. There is no public data available to quantify the use from each of these aquifers within Fall River or Custer County.

5.2.2 Site Area Groundwater Use

In the PAA, the Fall River and Lakota Formations, together forming the Inyan Kara aquifer, are the principal sources of water. An inventory of private water-supply wells within an approximate 2 km radius of the proposed permit boundary was conducted in June 2007, during which about 80 wells were located (see Appendix 5.2-A). Most wells within 2 km of the site serve as water supply for livestock (26), although some wells are used for domestic (10) or other purposes (47) including piezometers, mine dewatering wells, and garden watering.

Wells within 2 km of the site include 24 wells known to obtain water from the Fall River Formation, with 12 of these wells being flowing artesian wells. Based on measurements from flowing wells and estimates from others, an estimated 15 gpm is currently being consumed from the Fall River. Within this same 2 km radius, there are 39 wells currently obtaining water from the Lakota Formation, 14 of which are flowing artesian. The estimated flow from these Lakota wells is 46 gpm. Additionally, 10 wells are completed within an unknown formation of the Inyan Kara aquifer (Fall River, Lakota, or both). The total estimated flow from the Inyan Kara (including wells screened within the Fall River, Lakota, or both) within 2 km of the site is approximately 70 gpm. There are six wells completed in the Sundance/Unkpapa, with four that are flowing. Within 2 km, an additional eight wells are completed into an unknown aquifer. Wells within the PAA that are currently in use are shown on Figure 5.2-1. Twenty-six wells in the vicinity of the PAA were deemed abandoned because of the condition and inactivity of the well; these wells termed abandoned are not considered properly plugged and abandoned (Figure 5.2-2).

Well completion reports and other related data are found in Appendix 5.2-B.

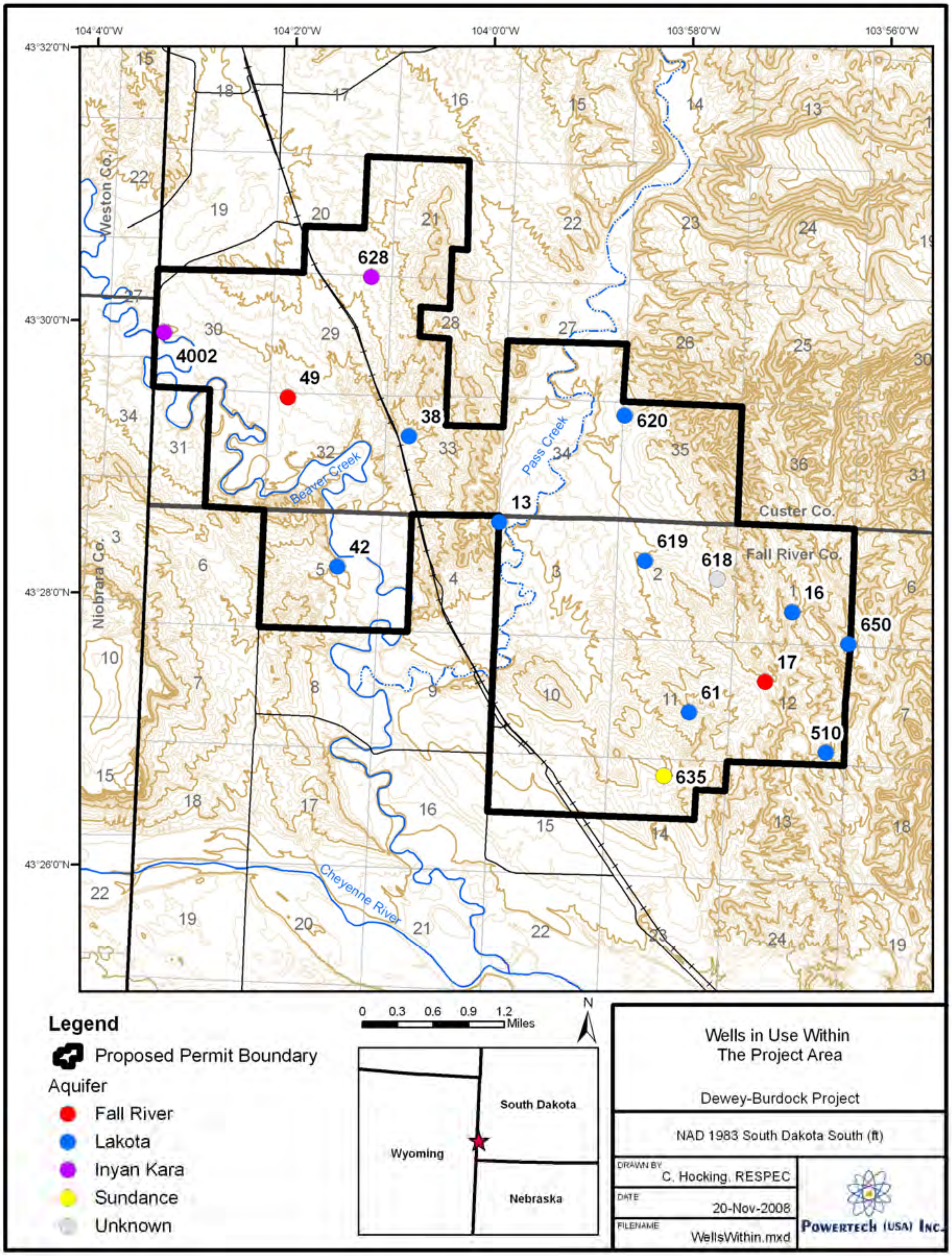

Figure 5.2-1 Wells in Use within the PAA

Powertech (USA) Inc.

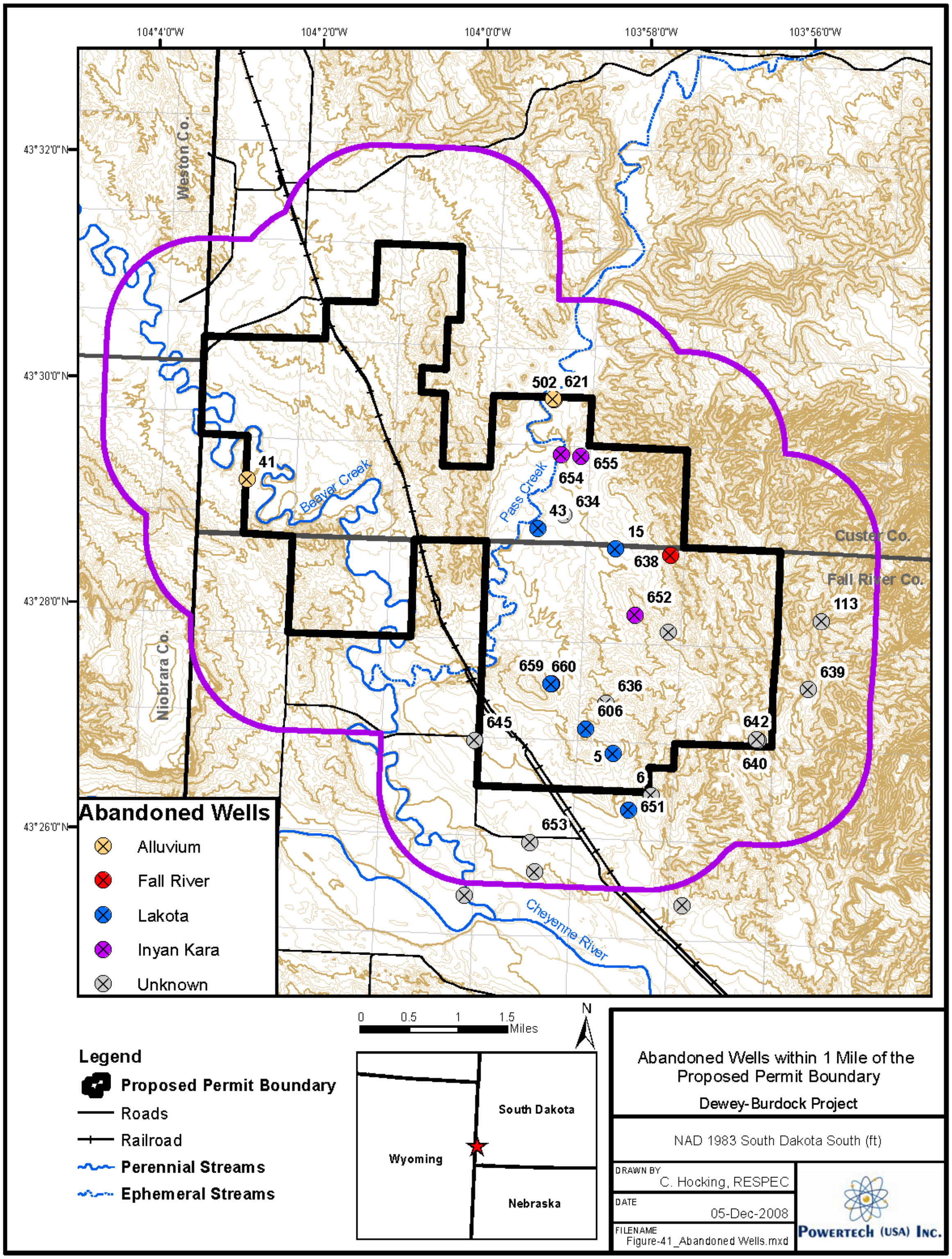

Figure 5.2-2 Abandoned Wells Within 1 Mile of the Proposed Permit Boundary

5.2.3 Regional Hydrology

Five major aquifers are utilized as groundwater resources in the Black Hills. These main aquifers are the Inyan Kara, Minnelusa, Madison, and Deadwood. The groundwater hydrology is influenced by distribution and variation in recharge, leakage between overlying and underlying hydrogeologic units, lateral flow within the aquifers, and discharge to pumping wells, artesian wells, and springs.

Regionally, the general direction of groundwater flow is downdip or radially away from the central part of the Black Hills where the aquifers are recharged via infiltration from local rainfall. The aquifers transition from unconfined at the outcrop areas to confined away from the central highlands. At some distance away from the highlands the groundwater often is under sufficient pressures for artesian conditions and flowing artesian wells to exist.

Figure 5.2-3 provides an overview of the hydrologic setting and general hydrogeologic flow within the Black Hills. See Section 7.8.1 for description of hydrostratigraphic units.

POWERTECH (USA) INC.

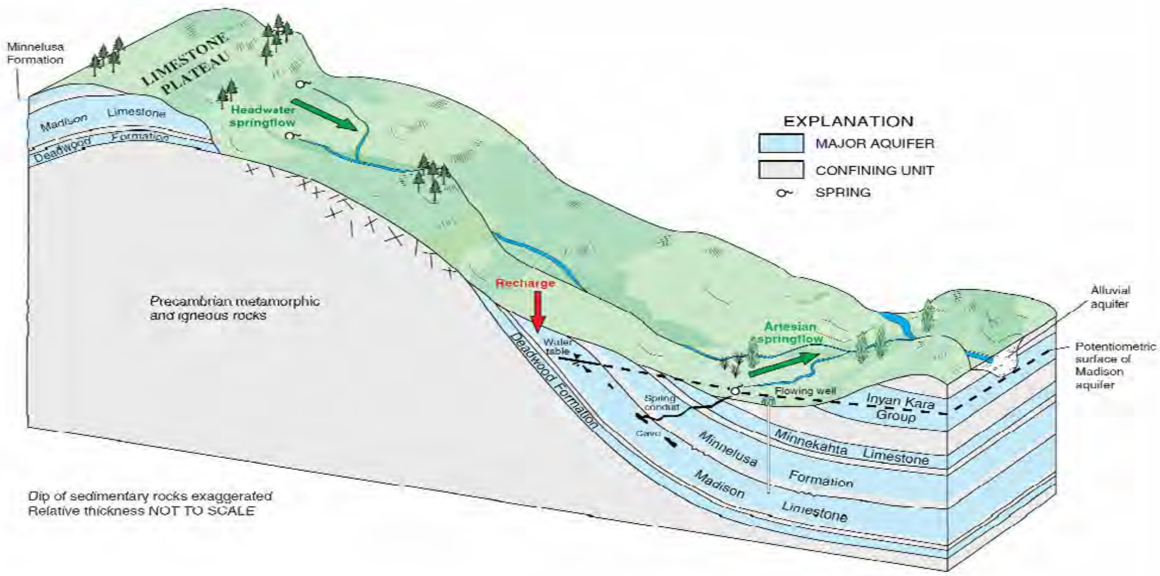

DIAGRAM SHOWING A SIMPLIFIED VIEW OF THE HYDROGEOLOGIC SETTING OF THE BLACK HILLS AREA (modified from Driscoll et al, 2002)

DEWEY–BURDOCK PROJECT

DRAWN	L. Tafoya
DATE	12–Nov–2008
SCALE	NONE
FILENAME	Figure 5.1.dwg

POWERTECH (USA) INC.

Figure 5.2-3 Diagram Showing a Simplified View of the Hydrogeologic Setting of the Black Hills Area

5.2.3.1 Groundwater Quality

This section presents a summary of analyses of recent groundwater quality samples, field measurements, laboratory results. Complete groundwater quality data results are available in Appendix 5.2-C. A number of parameters in the groundwater samples collected at the PAA exceeded the National Primary Drinking Water Standards. Constituents with samples exceeding the standards include arsenic, lead, uranium, radium-226, and gross alpha particles.

5.2.3.2 Field Parameter Results

Results of the groundwater field data gathered during well sampling activities are presented below. Table 5.2-1 gives summary statistics for temperature, dissolved oxygen, specific conductivity, pH, and turbidity for all field data. Tables 5.2-2 and 5.2-3 give field parameter statistics for Lakota, Fall River, and Inyan Kara wells where samples were collected monthly and quarterly, respectively. Table 5.2-4 gives field parameter statistics for alluvial well samples. A comparison of pH and specific conductance values for field and laboratory measurements reveals that laboratory results are within reasonable limits. Most pH values taken in the field are within a few hundredths to few tenths of a pH unit from that measured in the laboratory. For example, the highest pH recorded was 12.67 during sampling of Fall River well 691 on July 1, 2008. The high pH value was verified by the contracting laboratory which reported a pH of 12.4 in the sample. (This represents extremely alkaline water far outside the typical range of groundwater pH. Based on drill core, beds of the Fall River Formation in this area can be extremely well cemented with calcite.)

In the field, a maximum specific conductance of 12,220 uS/cm was measured at alluvial well 677 on September 28, 2007. The laboratory measured a specific conductance of this sample of 11,000 uS/cm. It is important to note that the laboratory conductance is given for the sample at 25°C and at the time of field measurements, the temperature of nearly every sample was much lower.

Table 5.2-1 Statistics for all Field Parameters Collected During Well Sampling Activities

	Temperature, C	pH	Dissolved Oxygen, mg/L	Specific Conductance, uS/cm	Turbidity, NTU
N	156	165	99	169	136
Mean	12.62	7.63	1.29	2122	25.7
StDev	2.09	0.77	2.17	1843	133
Q1	11.73	7.10	0.17	1250	0.6
Median	12.63	7.62	0.29	1409	3.2
Q3	14.08	7.92	1.35	2390	7.5
Min	0.75	6.09	0.02	740	-0.4
Max	16.08	12.67	10.02	12220	1092

N = The number of measurements for a particular parameter.
Mean = Arithmetic mean.
StDev = Standard deviation.
Q1 = First Quartile. The value holding ranked position 0.25 x (n + 1) for each parameter. Value may be interpolated.
Median = The middle value of ranked n. Value may be interpolated.
Q3 = Third Quartile. The value holding ranked position 0.75 x (n + 1) for each parameter. Value may be interpolated.
Min = The minimum value recorded from all wells.
Max = The maximum value recorded from all wells.

Table 5.2-2 Field Parameter Statistics for Inyan Kara Wells (Monthly)

	Temperature, C	pH	Dissolved Oxygen, mg/L	Specific Conductance, uS/cm	Turbidity, NTU
N	82	79	53	82	78
Mean	13.41	7.54	0.33	1593	7.2
StDev	1.39	0.76	0.58	611	10.5
Q1	12.33	7.03	0.12	1176	0.7
Median	13.15	7.53	0.19	1345	4.35
Q3	14.56	7.8	0.27	2196	7.5
Min	10.86	6.09	0.02	925	-0.2
Max	16.08	10.79	3.83	3098	71

Table 5.2-3 Field Parameter Statistics for Inyan Kara Wells (Quarterly)

	Temperature, C	pH	Dissolved Oxygen, mg/L	Specific Conductance, uS/cm	Turbidity, NTU
n	42	51	29	53	36
Mean	11.63	7.79	1.80	1469	4.2
StDev	2.59	0.40	1.82	419	9.4
Q1	11.21	7.5	0.43	1214	0.3
Median	11.96	7.86	1.32	1408	0.70
Q3	12.74	8.07	1.87	1579	2.2
Min	0.75	6.96	0.05	740	-0.4
Max	15.78	8.65	7.09	2390	40.9

Table 5.2-4 Field Parameter Statistics for Alluvial Wells

	Temperature, C	pH	Dissolved Oxygen, mg/L	Specific Conductance, uS/cm	Turbidity, NTU
n	18	20	11	19	10
Mean	10.91	7.06	4.53	5964	268
StDev	2.03	0.26	4.05	3195	438
Q1	9.15	6.93	0.91	2920	3
Median	10.99	7.04	1.67	5872	16.9
Q3	12.17	7.18	8.83	6779	505
Min	7.67	6.32	0.55	2609	1.4
Max	15.18	7.52	10.02	12220	1092

5.2.3.3 Laboratory Parameter Results

Summary statistics for baseline monitoring program laboratory samples are contained in Appendices 5.2-D and 5.2-E. Appendix 5.2-D gives statistics for all groundwater constituents detected at or above PQL by constituent. Appendix 5.2-E gives the minimum and maximum value for all sampled constituents detected at or above the PQL, and the site ID and date of the sample that had minimum and maximum detection value. Complete laboratory analytical results for each well are provided in Appendix 5.2-C.

5.2.3.3.1 Comparison of Site Baseline Water Quality to Drinking Water Standards

US EPA and South Dakota Primary Drinking Water Standards

Table 5.2-5 gives current National Primary and Secondary Drinking Water Standards as regulated by EPA. Also listed is the number of samples analyzed for each constituent, the total number of detections above the reporting limit, and the total number of detections equal to or above the Maximum Contaminant Level (MCL) for each constituent. These standards or MCLs are enforced by the EPA on public drinking water systems but can only serve as a guide for private water systems. Private water systems, as defined by the EPA, serve less than 25 people and have less than 15 service connections; all other systems are defined as public water systems. All drinking water wells within the PAA are private water systems.

As of August 24, 2004 all of the South Dakota Drinking Water Standards rules (ARSD 74:04:05) and Public Notice rules (ARSD 74:04:06) were repealed. In their place is ARSD 74:04:12. This new rule adopts by reference the latest published version of the Code of Federal Regulations (40 CFR Part 141), making South Dakota drinking water standards the same as EPA Primary Drinking Water Quality standards (Table 5.2-5).

Table 5.2-5 Sampling Statistics with Water Quality Regulatory Limits for Public Drinking Water Supply Systems

Test Analyte/Parameter	Units	EPA Maximum Contaminant Level (MCL)	Number of Samples Analyzed*	Number of Detections	Number of Detections equal to or above MCL
BULK PROPERTIES					
pH	pH Units	6.5- 8.5 [1]	141	141	6
Total Dissolved Solids (TDS)	mg/L	500 [1]	141	141	141
CATIONS/ANIONS					
Sodium, Na	mg/L	200 [1]	141	141	63
Chloride, Cl	mg/L	250 [1]	141	141	4
Fluoride, F	mg/L	4; 2[1]	141	136	0
Sulfate, SO4	mg/L	250 [1]	141	141	141
Nitrate (as Nitrogen)	mg/L	10	141	29	0
Nitrite (as Nitrogen)	mg/L	1	141	0	0
Nitrate and Nitrite (Combined)	mg/L	10	141	29	0
TRACE METALS (total)**					
Antimony, Sb	mg/L	0.006	98	0	0
Aluminum, Al	mg/L	0.05-0.2 [1]	141	0	0
Arsenic, As	mg/L	0.01	98	80	11
Barium, Ba	mg/L	2	98	6	0
Beryllium, Be	mg/L	0.004	98	2	0
Boron, B	mg/L	1.4 [2]	98	29	3
Cadmium, Cd	mg/L	0.005	98	0	0
Chromium, Cr	mg/L	0.1	98	1	0
Copper, Cu	mg/L	1.0 [1]; 1.3 [3]	98	5	0
Iron, Fe	mg/L	0.3 [1]; 5 [4]	98	95	2 [1], 1 [4]
Mercury, Hg	mg/L	0.002	170	1	0
Manganese, Mn	mg/L	0.05 [1]; 0.8 [4]	98	98	89 [1], 19 [4]
Molybdenum, Mo	mg/L	0.04 [2]	98	8	2
Nickel, Ni	mg/L	0.1 [2]	98	1	1
Lead, Pb	mg/L	0.015 [3]	98	18	8
Selenium, Se	mg/L	0.05	98	26	0
Silver, Ag	mg/L	0.1 [1], [2]	98	0	0
Strontium, Sr	mg/L	4 [2]	98	97	37
Thallium, Tl	mg/L	0.002	98	0	0
Uranium, U	mg/L	0.030	102	77	18
Zinc, Zn	mg/L	5 [1]; 2 [2]	98	35	0
RADIONUCLIDES					
Alpha Particles (dissolved)	pCi/L	15	141	141	104
Beta Particles and Photons	mRem/Year	4	141	137	N/A
Radium 226 and 228 (Combined)	pCi/L	5	135	119	59
Radon-222 (total)	pCi/L	300 [5]	121	121	105

Notes: [1] "Secondary" guideline value above which use of water may give rise to complaints by consumers; [2] Health Advisory-Lifetime; [3] Action level which if exceeded triggers treatment; [4] Region 8 Permit Limit; [5] Proposed MCL; N/A – Not available
* Number of samples includes results for only those wells that were sampled quarterly or monthly as part of the baseline sampling plan.
**Number of samples analyzed under trace metals is based on samples that were analyzed for total trace metals.

5.2.3.3.2 Exceedances of Primary Drinking Water Standards

A number of groundwater samples collected at the PAA exceeded the National Primary Drinking Water Standards. Constituents with samples exceeding the standards include arsenic (Table 5.2-6), lead (Table 5.2-7), uranium (Table 5.2-8), radium-226 dissolved, suspended, and total (Tables 5.2-9 to 5.2-11), and gross alpha particles (Table 5.2-12); these tables provide constituent concentrations, well ID, and sample date for regulated constituents detected at or above MCL levels.

As shown on the table, nearly 75 percent of the samples exceeded the MCL for gross alpha particles (15 pCi/L), with the exceedances occurring in samples from the Inyan Kara aquifer and alluvial aquifer. The range of gross alpha particles in alluvial wells was 13.3 to 129 pCi/L. The range of gross alpha particles in Inyan Kara wells was 1.4 to 6500 pCi/L. Two of the three wells (680 and 681) having gross alpha concentrations over 1000 pCi/L are known to be directly within an ore body. The third is downgradient of open pit mines within the Fall River Formation.

Each sample collected from wells 615 and 3026 exceeded the MCL for arsenic. Also, half of all uranium exceedances are from alluvial aquifer samples.

5.2.3.3.3 Exceedances of Other Drinking Water Standards

In addition to primary drinking water standards established by the EPA, there are also a number of constituents (including radon-222) that have proposed standards which have not yet been adopted. Secondary drinking water standards (SMCL) set by the EPA are designated for constituents that alter the color, taste, and odor of water; these constituents are not considered health risks but may deter human consumption. These constituents, along with the number of samples that exceed these guidelines, are presented in Table 5.2-5.

Bulk water quality properties with SMCLs include pH and TDS. For samples collected as part of the baseline study, six wells exceeded the SMCL for pH with values ranging from 8.6 to 10.3. All of the samples exceeded the recommended concentration of TDS. Values of TDS ranged from 670 to 9700 mg/L with the highest values obtained from alluvial well samples.

A number of samples also exceeded the SMCL for sodium and sulfate. A total of 63 samples exceeded the secondary standard for sodium with values ranging from 201 to 2140 mg/L. The highest values of sodium were again from alluvial well samples. To date, all 141 samples exceeded the SMCL for sulfate of 250 mg/L; 86 of these samples were over double the limit (over 500 mg/L), and 59 samples were over 1000 mg/L sulfate. Fourteen samples had concentrations of sulfate over 3000 mg/L, all of which were from the alluvial aquifers.

Exceedances were noted for trace metals including boron, iron, manganese, and strontium. The three exceedances for boron were all collected from well 678 with values from 1.4 to 1.6 mg/L. Nearly half of the samples collected exceeded the SMCL of 0.3 mg/L for iron; 16 samples exceeded the Region 8 limit of 5.0 mg/L. The only water supply wells exceeding the Region 8 limit for iron are stock wells 619 and 650. The SMCL for manganese was exceeded by 89 of 98 samples; the Region 8 limit of 0.8 mg/L was exceeded by 19 samples. Values of manganese over the secondary guideline range from 0.05 to 3.4 mg/L. Strontium was exceeded in 37 of 98 samples analyzed with values ranging from 4.2 to 11.6 mg/L. The alluvial wells had the highest values for SMCL exceeded trace metals including boron, iron, manganese, and strontium.

South Dakota has recently adopted the proposed EPA MCL of 300 pCi/L groundwater standard for Radon-222. Of the 121 samples analyzed for Radon-222 as part of the Proposed Action baseline sampling program, 105 samples exceed the recommended level. Values of samples exceeding the limit range from 304 to 462,000 pCi/L. Thirty-six samples have over 10 times the recommended concentration of radon-222; 20 of these samples are over 100 times the proposed MCL. The wells with the highest concentration include wells 680 and 681, which are directly in a known ore body, and well 42, a private well used for domestic and stock water. The only well not exceeding the radon-222 limit is well 650, a Lakota well upgradient of historic uranium mining activities.

Table 5.2-6 Samples with Arsenic (Total) Results Equal to or Greater than the Arsenic MCL of 0.01 mg/L

Well	Sample Date	Result, mg/L	Well Use
615	01-Apr-08	0.024	Monitoring
615	01-Apr-08	0.025	Monitoring
615	21-Apr-08	0.024	Monitoring
615	28-May-08	0.024	Monitoring
615	25-Jun-08	0.024	Monitoring
676	05-Feb-08	0.021	Alluvial Monitoring
679	18-May-08	0.011	Alluvial Monitoring
3026	30-Mar-08	0.023	Monitoring
3026	22-Apr-08	0.022	Monitoring
3026	28-May-08	0.028	Monitoring
3026	24-Jun-08	0.025	Monitoring

Table 5.2-7 Samples with Lead (Total) Results Equal to or Greater than the Lead MCL of 0.015 mg/L

Well	Sample Date	Result, mg/L	Well Use
622	21-Apr-08	0.026	Monitoring
622	28-May-08	0.023	Monitoring
622	25-Jun-08	0.03	Monitoring
650	24-Mar-08	0.05	Discontinued Stock
676	05-Feb-08	0.06	Alluvial Monitoring
679	03-Feb-08	0.015	Alluvial Monitoring
679	18-May-08	0.022	Alluvial Monitoring
689	25-Jun-08	0.017	Monitoring

Table 5.2-8 Samples with Uranium (total) Results Equal to or Greater than the Uranium MCL of 0.03 mg/L

Well	Sample Date	Result, mg/L	Well Use
675	05-Feb-08	0.0387	Alluvial Monitoring
675	29-Apr-08	0.0502	Alluvial Monitoring
675	29-Apr-08	0.0516	Alluvial Monitoring
676	05-Feb-08	0.0687	Alluvial Monitoring
676	29-Apr-08	0.0591	Alluvial Monitoring
677	05-Feb-08	0.0414	Alluvial Monitoring
677	29-Apr-08	0.0471	Alluvial Monitoring
678	05-Feb-08	0.0379	Alluvial Monitoring
678	05-Feb-08	0.0352	Alluvial Monitoring
678	29-Apr-08	0.0387	Alluvial Monitoring
680	31-Mar-08	0.0541	Monitoring
698	30-Mar-08	0.123	Monitoring
698	30-Mar-08	0.122	Monitoring
698	22-Apr-08	0.119	Monitoring
698	28-May-08	0.116	Monitoring
698	28-May-08	0.119	Monitoring
698	24-Jun-08	0.113	Monitoring
3026	28-May-08	0.0322	Monitoring

Table 5.2-9 Samples with Radium-226 (Dissolved) Results Equal to or Greater than the Radium-226 MCL of 5 pCi/L

Well	Sample Date	Result, pCi/L	Well Use
16	27-Sep-07	26.2	Domestic
16	12-Nov-07	8.1	Domestic
16	30-Mar-08	15.3	Domestic
16	30-Jun-08	6.4	Domestic
42	28-Sep-07	96.5	Domestic
42	12-Nov-07	102	Domestic
42	5-Feb-08	100	Domestic
42	30-May-08	100	Domestic
615	25-Jun-08	7.2	Monitoring
619	27-Sep-07	120	Stock
619	12-Nov-07	100	Stock
619	24-Mar-08	99.7	Stock
619	17-Jun-08	110	Stock
628	28-Sep-07	7.4	Stock
628	14-Nov-07	20.7	Stock
628	20-Feb-08	9	Stock
628	29-May-08	6.1	Stock
631	26-Sep-07	12.9	Stock
631	14-Nov-07	9.5	Stock
631	20-Feb-08	19.4	Stock
631	19-May-08	22.1	Stock
680	30-Jan-08	1180	Stock

Table 5.2-9 Samples with Radium-226 (Dissolved) Results Equal to or Greater than the Radium-226 MCL of 5 pCi/L (concl'd)

Well	Sample Date	Result, pCi/L	Well Use
680	31-Mar-08	1150	Monitoring
680	21-Apr-08	1230	Monitoring
680	13-May-08	1430	Monitoring
680	21-May-08	1240	Monitoring
680	10-Jun-08	1410	Monitoring
680	7-Jul-08	1280	Monitoring
681	30-Jan-08	421	Monitoring
681	30-Mar-08	414	Monitoring
681	21-Apr-08	377	Monitoring
681	12-May-08	407	Monitoring
681	18-May-08	423	Monitoring
681	25-Jun-08	434	Monitoring
681	1-Jul-08	357	Monitoring
688	7-Jul-08	6.7	Monitoring
689	30-Mar-08	7.9	Monitoring
689	28-May-08	5.7	Monitoring
689	25-Jun-08	5.5	Monitoring
689	1-Jul-08	7.7	Monitoring
695	22-Apr-08	5	Monitoring
695	24-Jun-08	5.2	Monitoring
697	31-Mar-08	6.3	Monitoring
698	30-Mar-08	387	Monitoring
698	30-Mar-08	398	Monitoring
698	22-Apr-08	370	Monitoring
698	28-May-08	412	Monitoring
698	28-May-08	413	Monitoring
698	24-Jun-08	429	Monitoring
3026	28-May-08	9.6	Monitoring
4002	27-Sep-07	63.6	Stock
4002	27-Sep-07	60	Stock
4002	14-Nov-07	54.2	Stock
4002	12-Feb-08	57	Stock
4002	19-May-08	52.3	Stock
7002	28-Sep-07	8.5	Stock
7002	12-Nov-07	8.1	Stock
7002	20-Feb-08	8.8	Stock
7002	29-May-08	8	Stock

Table 5.2-10 Samples with Radium-226 (Suspended) Results Equal to or Greater than the Radium-226 MCL of 5 pCi/L

Well	Sample Date	Result, pCi/L	Well Use
42	05-Feb-08	5.1	Domestic
619	24-Mar-08	11.4	Stock
619	17-Jun-08	8.8	Stock
676	05-Feb-08	11.4	Alluvial Monitoring
679	03-Feb-08	9	Alluvial Monitoring
680	30-Jan-08	12.7	Monitoring
680	13-May-08	13.2	Monitoring
681	30-Jan-08	9.9	Monitoring
698	30-Mar-08	15.3	Monitoring
698	30-Mar-08	12.4	Monitoring
698	22-Apr-08	6.4	Monitoring
698	28-May-08	14	Monitoring
698	28-May-08	13.5	Monitoring
698	24-Jun-08	11.6	Monitoring
4002	27-Sep-07	19.4	Stock
4002	12-Feb-08	37	Stock
4002	19-May-08	8.4	Stock

Table 5.2-11 Samples with Radium-226 (Total) Results Equal to or Greater than the Radium-226 MCL of 5 pCi/L

Well	Sample Date	Result, pCi/L	Well Use
16	27-Sep-07	17.4	Domestic
42	28-Sep-07	79.7	Domestic
619	27-Sep-07	120	Stock
628	28-Sep-07	6.8	Stock
631	26-Sep-07	15.2	Stock
4002	27-Sep-07	62.7	Stock
4002	27-Sep-07	79.4	Stock
7002	28-Sep-07	6.3	Stock

Note: Radium-228 was not analyzed due to the absence of Thorium-232 in samples

Table 5.2-12 Samples with Gross Alpha (Total) Results Equal to or Greater than the Gross Alpha MCL of 15 pCi/L

Well	Sample Date	Result, pCi/L	Well Use
7	20-Feb-08	15.5	Domestic
13	20-Feb-08	19.5	Domestic
16	27-Sep-07	62.7	Domestic
16	30-Mar-08	85.7	Domestic
16	30-Jun-08	28.3	Domestic
18	26-Sep-07	15.7	Domestic
18	12-Nov-07	20	Domestic
18	12-Nov-07	18.9	Domestic
18	12-Feb-08	31.7	Domestic
18	30-May-08	27.5	Domestic
42	28-Sep-07	371	Domestic
42	12-Nov-07	375	Domestic
42	5-Feb-08	526	Domestic
42	30-May-08	558	Domestic
615	1-Apr-08	18.2	Monitoring
615	1-Apr-08	17.7	Monitoring
615	21-Apr-08	15.1	Monitoring
615	28-May-08	15.3	Monitoring
615	25-Jun-08	38.3	Monitoring
619	27-Sep-07	367	Stock
619	12-Nov-07	341	Stock
619	24-Mar-08	438	Stock
619	17-Jun-08	398	Stock
622	1-Apr-08	15	Monitoring
622	21-Apr-08	22.6	Monitoring
622	28-May-08	32.6	Monitoring
622	25-Jun-08	36.4	Monitoring
628	28-Sep-07	29.9	Stock
628	14-Nov-07	83.9	Stock
628	20-Feb-08	64.5	Stock
628	29-May-08	39	Stock
631	26-Sep-07	51	Stock
631	14-Nov-07	46.5	Stock
631	20-Feb-08	162	Stock
631	19-May-08	60.7	Stock
675	28-Sep-07	18.8	Monitoring
675	27-Nov-07	18.3	Monitoring
675	5-Feb-08	29.3	Monitoring
675	29-Apr-08	55.2	Monitoring
675	29-Apr-08	51.1	Monitoring
676	28-Sep-07	37.1	Monitoring
676	27-Nov-07	31.9	Monitoring
676	5-Feb-08	95.5	Monitoring
676	29-Apr-08	51.6	Monitoring

Table 5.2-12 Samples with Gross Alpha (Total) Results Equal to or Greater than the Gross Alpha MCL of 15 pCi/L (cont'd)

Well	Sample Date	Result, pCi/L	Well Use
677	28-Sep-07	41	Monitoring
677	27-Nov-07	38.7	Monitoring
677	5-Feb-08	129	Monitoring
677	29-Apr-08	43.1	Monitoring
678	28-Sep-07	23.2	Monitoring
678	27-Nov-07	18.9	Monitoring
678	5-Feb-08	41.5	Monitoring
678	5-Feb-08	30.2	Monitoring
678	29-Apr-08	54.7	Monitoring
679	28-Sep-07	19.9	Monitoring
679	3-Feb-08	18.4	Monitoring
679	18-May-08	22.4	Monitoring
680	30-Jan-08	4090	Monitoring
680	31-Mar-08	6440	Monitoring
680	21-Apr-08	4270	Monitoring
680	13-May-08	6500	Monitoring
680	21-May-08	4500	Monitoring
680	7-Jul-08	4280	Monitoring
680	10-Jun-08	4370	Monitoring
681	30-Jan-08	656	Monitoring
681	30-Mar-08	2170	Monitoring
681	21-Apr-08	1400	Monitoring
681	12-May-08	2220	Monitoring
681	18-May-08	1220	Monitoring
681	25-Jun-08	1390	Monitoring
681	1-Jul-08	1180	Monitoring
688	10-Jun-08	17.3	Monitoring
688	7-Jul-08	29.8	Monitoring
689	30-Mar-08	64.3	Monitoring
689	21-Apr-08	25.5	Monitoring
689	28-May-08	34.9	Monitoring
689	25-Jun-08	36.5	Monitoring
689	1-Jul-08	33.4	Monitoring
694	21-Apr-08	19.2	Monitoring
694	21-Apr-08	18.1	Monitoring
694	24-Jun-08	23.7	Monitoring
695	22-Apr-08	29.4	Monitoring
695	21-May-08	25.6	Monitoring
695	24-Jun-08	39.7	Monitoring
696	24-Jun-08	23.9	Monitoring
697	31-Mar-08	52.2	Monitoring
698	30-Mar-08	1750	Monitoring
698	30-Mar-08	1880	Monitoring
698	22-Apr-08	2110	Monitoring

Table 5.2-12 Samples with Gross Alpha (Total) Results Equal to or Greater than the Gross Alpha MCL of 15 pCi/L (concl'd)

Well	Sample Date	Result, pCi/L	Well Use
698	28-May-08	1210	Monitoring
698	28-May-08	1390	Monitoring
698	24-Jun-08	1790	Monitoring
3026	30-Mar-08	47.6	Monitoring
3026	22-Apr-08	43.8	Monitoring
3026	28-May-08	92.4	Monitoring
3026	24-Jun-08	116	Monitoring
4002	27-Sep-07	141	Stock
4002	27-Sep-07	120	Stock
4002	14-Nov-07	227	Stock
4002	12-Feb-08	314	Stock
4002	19-May-08	127	Stock
7002	28-Sep-07	45.6	Stock
7002	12-Nov-07	39.8	Stock
7002	20-Feb-08	91.4	Stock
7002	29-May-08	29.5	Stock

5.3 Surface Water

The Upper Cheyenne River basin extends through three states – Wyoming, Nebraska, and southwestern South Dakota (HUC No. 10120106, 10120107, 10120108). Within these states the Cheyenne River basin, above Angostura Reservoir in South Dakota, drains an area of approximately 8,996 square miles (mi^2) (Beauvais, 2000). The northern and central portions of the watershed are in the Black Hills division of the Great Plains and the southern portion is in the Pierre Hills division of the Great Plains (Kalvels, 1982 and Ensz, 1990). Land elevation ranges from about 3,160 feet (963 meters [m]) to 7,015 feet (2,138 m) above mean sea level.

5.3.1 Drainage Basins

The PAA lies primarily within the Beaver Creek Basin and is drained by both Beaver Creek and Pass Creek. The Pass Creek watershed is a sub-basin within the Beaver Creek basin, but the two watersheds were characterized as separate basins. The Beaver Creek system flows through the northwestern section of the PAA from the northwest to the southeast. The Pass Creek system flows south through the central portion of the PAA and joins Beaver Creek southwest of the PAA. Three miles south of this confluence, Beaver Creek converges with the Cheyenne River (Figure 5.3-1) which eventually flows into the Missouri River.

The nearest discharge gage on the Cheyenne River upstream of its confluence with Beaver Creek is USGS gage 06386500 near Spencer, WY. The nearest discharge gage downstream of the confluence of Beaver Creek and the Cheyenne River is USGS gage 06395000 at Edgemont, SD. This gage captures the contribution of flow to the Cheyenne River from Beaver Creek and Pass Creek between Spencer, WY and Edgemont, SD. Figure 5.3-2 shows an annual hydrograph for gage 06386500 from 1948 to 2008, and Figure 5.3-3 shows an annual hydrograph for gage 06395000 from 1903 to 2008. The lines in Figures 5.3-2 and 5.3-3 indicate the upper bound flow values for the 25th, 50th, and 95th flow percentiles for each of the 365 days per year. For example (in Figure 5.3-3), ased on all of the January 1st flow values during 1903 to 2008 (106 data points), the flow was less than 1 cfs on 25 percent of those days (26 days), less than 4 cfs on 50 percent of those days (53 days) and less than 30 cfs on 95 percent of those days (101 days). Therefore, the graph indicates how variable the stream flow tends to be at various times during the year (e.g., more variable during a typical July than a typical November).

![Powertech (USA) Inc. logo]

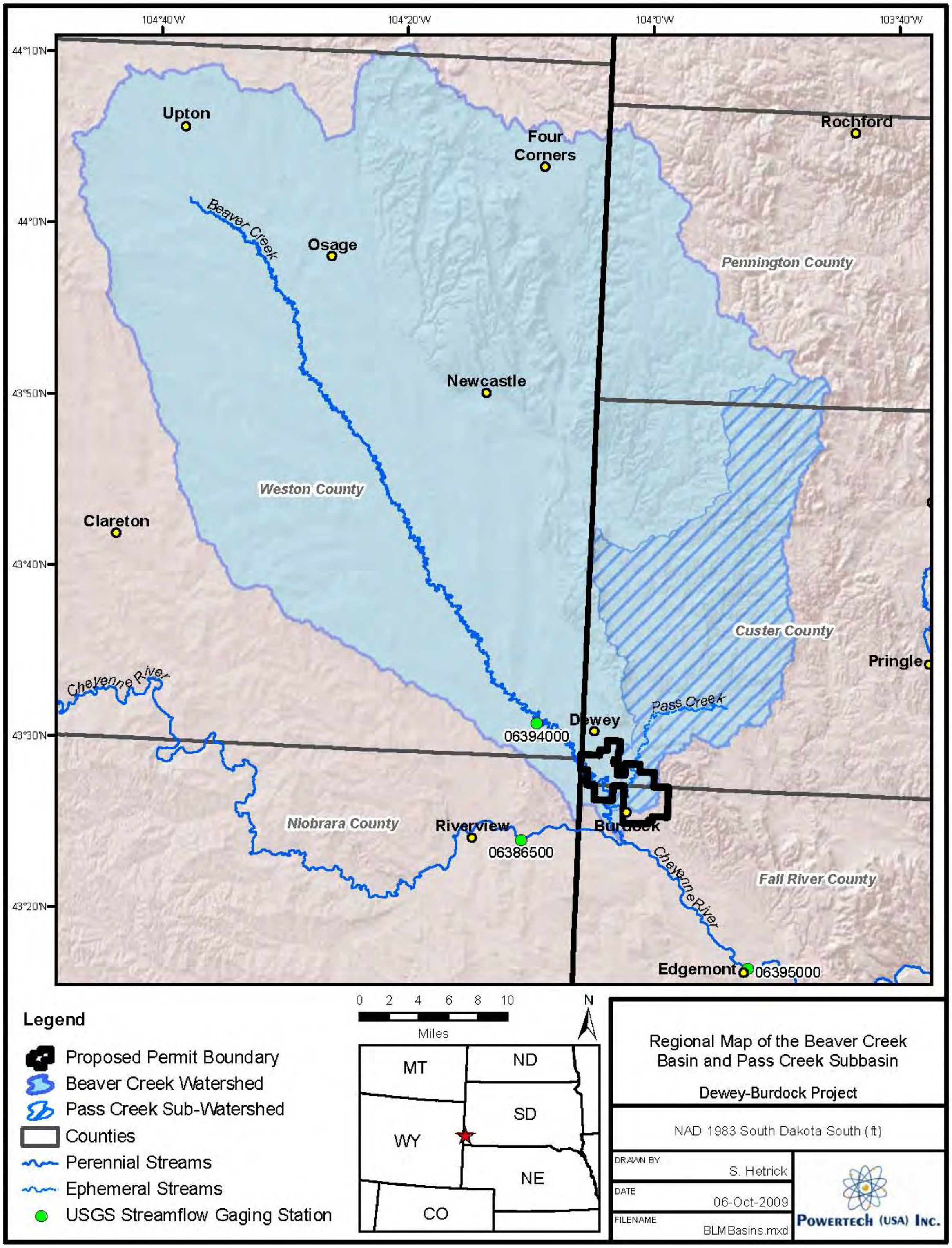

Figure 5.3-1 Regional Map of the Beaver Creek and Pass Creek Basins

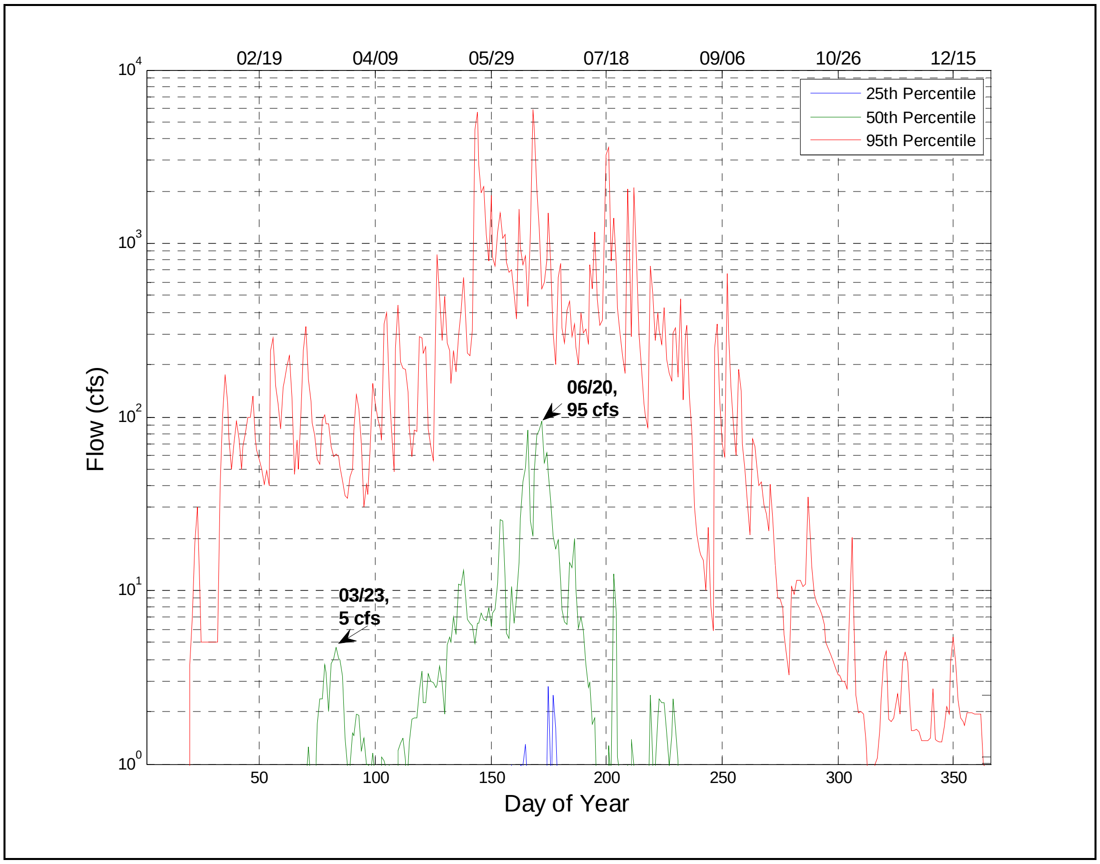

Figure 5.3-2 Annual Hydrograph for USGS Gage 06386500 on the Cheyenne River near Spencer, WY from 1948 to 2008

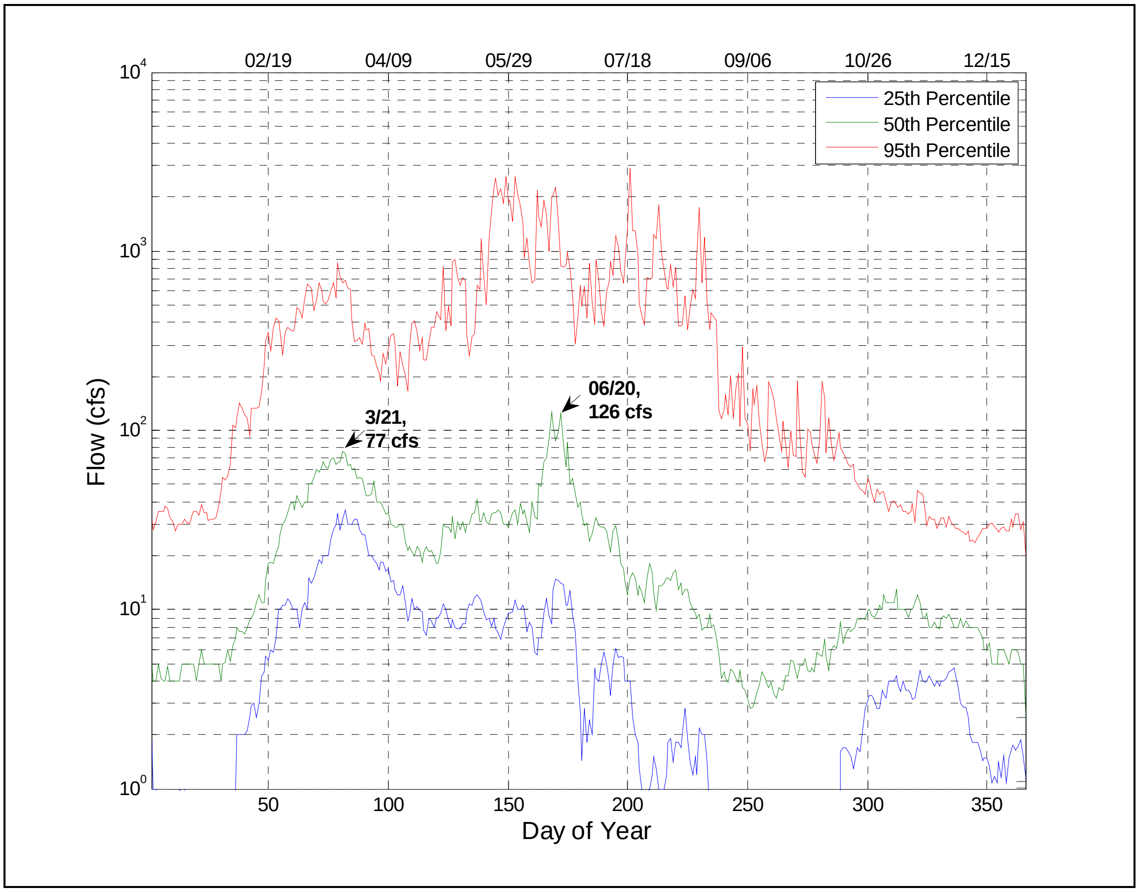

Figure 5.3-3 Annual Hydrograph for USGS Gage 06395000 on the Cheyenne River at Edgemont, SD from 1903 to 2008

5.3.2 Beaver Creek Basin

The Beaver Creek Basin is 1360 mi2, excluding the Pass Creek sub-basin. It extends from a few miles northwest of Upton, WY to about eight miles southeast of Dewey, SD and lies within Weston, Niobrara and Crook Counties in Wyoming, and within Pennington, Custer and Fall River Counties in South Dakota. Beaver Creek is a perennial stream with ephemeral tributaries. Discharge data for Beaver Creek is collected at USGS gage 06394000 near Newcastle, WY (Figure 5.3-1). Figure 5.3-4 shows an annual hydrograph with the 25th, 50th and 95th flow percentiles for this gage from 1944 to 1998. Figure 5.3-5 shows monthly average flow data for this gage from 1944 to 1998.

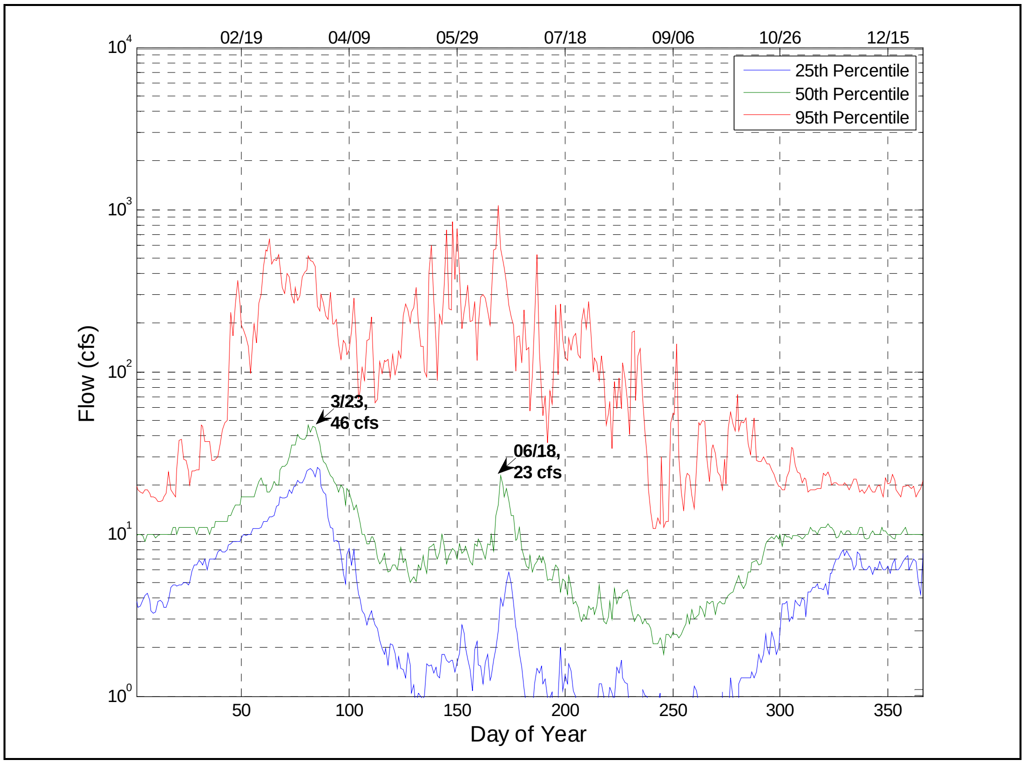

Figure 5.3-4 Annual Hydrograph for USGS Gage 06394000 on Beaver Creek near Newcastle, WY from 1944 to 1998

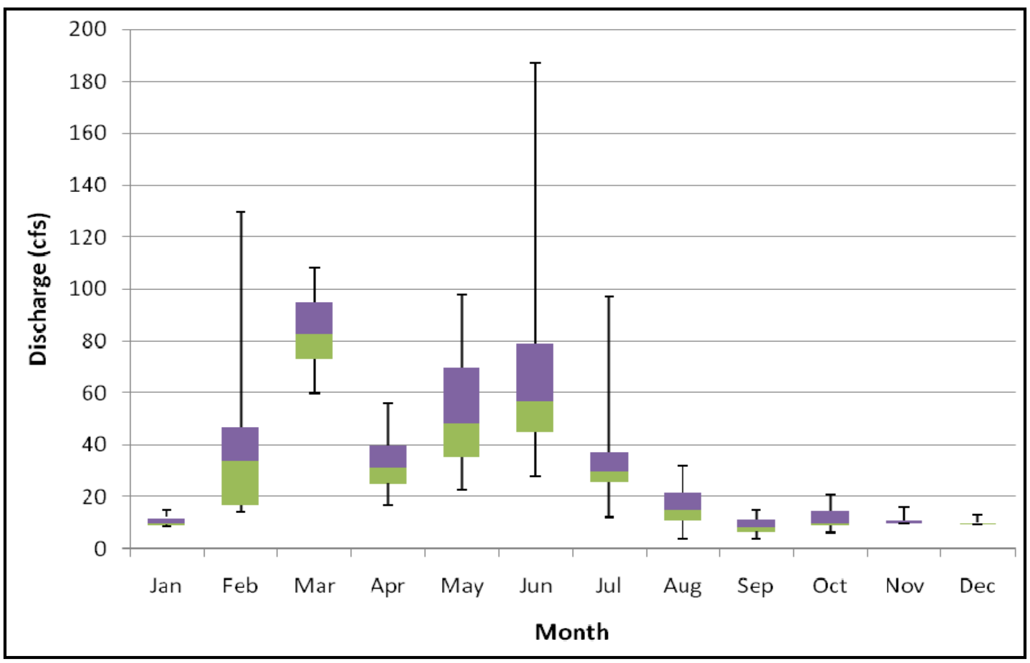

Figure 5.3-5 Monthly average flows at USGS gage 06394000 on Beaver Creek near Newcastle, WY from 1944 to 1998

5.3.3 Pass Creek Watershed

The Pass Creek watershed, characterized as a subbasin of the larger Beaver Creek Basin, comprises most of the east-southeast portion of the Beaver Creek Basin and is almost fully contained in South Dakota. The Pass Creek watershed is 230 mi^2 and is located in Custer, Fall River, and Pennington Counties in South Dakota and a very small portion of Weston County in Wyoming. Pass Creek is dry except for brief periods of runoff following major storms. There is no permanent stream flow gage stationed along Pass Creek.

5.3.4 Surface Water Quality

The proposed PAA is drained by the Cheyenne River and its tributaries (Figure 5.3-1). Beaver Creek and Pass Creek drain the proposed permit area and discharges into the Cheyenne River downstream of the proposed permit area. Beaver Creek drains the southeastern portion of Weston County in Wyoming before entering Custer County in South Dakota and discharging to the Cheyenne River south of Burdock in Fall River County. Beaver Creek drains approximately 1670 mi^2 (1,069,000 acres); 71 percent of the watershed is in Wyoming and 29 percent is in South Dakota. The Pass Creek watershed, characterized as a sub basin of the larger Beaver Creek basin, comprises most of the east-southeast portion of the Beaver Creek basin and is almost fully contained in South Dakota. The Pass Creek watershed is 230 mi^2 and is located in Custer, Fall River, and Pennington Counties in South Dakota and a very small portion of Weston County in Wyoming. Several smaller ephemeral tributaries are also located within or adjacent to the proposed permit area. These streams, including the Cheyenne River, often experience extended periods of no flow. Water quality varies considerably and is dependent on the flow regime. Relatively high amounts of sediment and low dissolved solids occur during periods of high flows, while less turbid waters with higher dissolved solids occur during periods of low flows (Krantz, 2006).

All surface waters in the State of South Dakota are classified into one or more of the following beneficial uses:

1. Domestic water supply waters
2. Coldwater permanent fish life propagation waters
3. Coldwater marginal fish life propagation waters
4. Warm water permanent fish life propagation waters
5. Warm water semi-permanent fish life propagation waters
6. Warm water marginal fish life propagation waters
7. Immersion recreation waters
8. Limited contact recreation waters
9. Fish and wildlife propagation, recreation, and stock watering waters
10. Irrigation waters
11. Commerce and industry waters

Table 5.3-1 gives State of South Dakota assigned beneficial uses for Beaver Creek, Cheyenne River, and Pass Creek. Water quality standards associated with beneficial uses of Cheyenne River, Beaver Creek, and Pass Creek are given in Table 5.3-2.

Table 5.3-1 Beneficial uses of Streams in and near the Dewey-Burdock Permit Area

Water body	Uses
Beaver Creek	3, 8, 9, 10
Cheyenne River (from Wyoming border to Angostura Reservoir)	5, 8, 9, 10
Pass Creek	9, 10

Table 5.3-2 Beneficial Use Numeric Criteria

Parameters (mg/L) except where noted	(3) Coldwater marginal fish life propagation BC	(5) Warm water semi-permanent fish life propagation CR	(8) Limited contact recreation BC, CR	(9) Fish, wildlife propagation, recreation, stock watering ALL	(10) Irrigation ALL
alkalinity (CaCO3)				≤750[1] ≤1,313[2]	
Chlorine, total residual	≤0.019 (acute); ≤0.011 (chronic)	≤0.019 (acute); ≤0.011 (chronic)			
Coliform, fecal (cfu per 100 mL)			≤1,000 (mean); ≤2,000 (single sample)		
Conductivity (µmhos/cm @ 25°C)				≤4,000[1] ≤7,000[2]	≤2,500[1] ≤4375[2]
Hydrogen sulfide, undisassociated	≤0.002	≤0.002			
Nitrogen, unionized ammonia as N	Calculation[3]	Calculation[3]			
Nitrogen, nitrates as N				≤50[1] ≤88[2]	
Oxygen, dissolved	≥5.0	≥5.0			
pH (standard units)	6.5 – 8.8	6.5 – 9.0		6.0 – 9.5	
Sodium Adsorption Ratio					≥10
Solids, suspended	≤90[1] ≤158[2]	≤90[1] ≤158[2]			
Solids, total dissolved				≤2,500[1] ≤4,375[2]	
Temperature (°F)	≤75	≤90			
Total Petroleum Hydrocarbons				≤ 10.0	
Oil and Grease				≤ 10.0	

[1] Thirty-day average
[2] Daily maximum
[3] Calculation based on temperature and pH

Cheyenne River in South Dakota upstream and downstream of the proposed permit boundary is classified as having beneficial uses 5, 8, 9, and 10. According to the State of South Dakota 2006 303(d) list, the Cheyenne River from the Wyoming border to Beaver Creek is impaired with respect to beneficial uses fish and wildlife propagation, recreation, and stock watering (9), and irrigation (10) due to high levels of total dissolved solids (TDS), sodium adsorption ratio (SAR), and conductivity. The rivers support status related to warm water semi-permanent fish life propagation (5) and limited contact recreation (8) is listed as "insufficient info" (SD DENR, 2006). The Cheyenne River from Beaver Creek to Angostura Reservoir is listed as supporting the beneficial use of limited contact recreation (8), but is impaired for the other three uses (5, 9, 10) due to high levels of TDS, SAR, conductivity, and total suspended solids (TSS).

Beaver Creek in South Dakota has been classified as being suitable for the same uses as the Cheyenne River except that this stream has been classified as being suitable for cold water marginal fish life propagation rather than warm water semi-permanent fish life propagation. The State of Wyoming has classified Beaver Creek in the PAA vicinity as presently supporting game fish or having the potential to support game fish. Beaver Creek has also been classified by Wyoming as a warm water fishery. Beaver Creek is listed as impaired from the Wyoming border to the confluence with the Cheyenne River with respect to all assigned beneficial uses due to high conductivity, TDS, TSS, fecal coliform, SAR, and temperature.

Pass Creek is classified by the State of South Dakota as having the beneficial uses of fish and wildlife propagation, recreation, and stock watering (9), and irrigation (10). Pass Creek is listed as being in full support of assigned beneficial uses.

Surface Water Management

All of the Dewey-Burdock facilities are located outside of the FEMA 100-year flood plain. For well fields and non-CPP/SF areas, stormwater management will include general grading of roads and building pads to promote positive drainage toward existing water courses. Best management practices (BMPs) for sediment control during construction and operations will be provided until vegetative cover on disturbed ground has been restored. Such practices will include, but not be limited to, use of silt fences and hay bales downstream of disturbed areas, and as necessary, long-term erosion protection using stream channel armoring such as rip rap, gabions, and/or geotextiles.

For the CPP site area, SF site, and contiguous impervious services, excess runoff above pre-existing conditions will be temporarily detained to assure that peak runoff flow following construction does not exceed peak runoff flow prior to construction. BMPs will include construction of bermed parking lots with controlled outlet structures, routing flow into stormwater detention ponds with controlled outlet structures, or some combination thereof. In addition, sediment control during construction will be accomplished using similar BMPs.

Surface water/groundwater interactions and potential impacts to these media from site activities are discussed in Section 7.8.1.9 and 7.9.9 of this application.

5.4 Ecological Resources

5.4.1 Introduction

This section provides a general discussion of the affected environment and environmental consequences to vegetative resources, vertebrate terrestrial wildlife, and aquatic species (vertebrates and macro-invertebrates). The subsequent sub-sections address the potential impacts to vegetative communities and specific groups of wildlife species (hereafter, includes both terrestrial and aquatic species unless specified). As no underground or open pit mining would occur as part of the Proposed Action, the impact analysis in this document is limited to the Proposed Action (ISL of uranium resources) and No Action alternatives.

Ecological baseline studies for flora and fauna were collected to fulfill the objectives specified in U.S. Nuclear Regulatory Commission (NRC) NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*. Ecological surveys were also conducted in accordance with applicable SD DENR, SDGFP, and U.S. Fish and Wildlife Service (USFWS) guidelines. These agencies were consulted prior to initiating field surveys to ensure that adequate objectives, survey methodologies, and data collection techniques were employed.

5.4.2 Regional Setting

The PAA (license area) spans approximately 10,580 acres in Townships (T) 6-7 South (S), Range (R) 1 East (E). Approximately 2,488 acres (23 percent) are expected to be disturbed by ISL operations associated with this project. The PAA is comprised primarily of private lands small portions of BLM lands and lies adjacent to parcels of USFS land. The current principal land use in the region is cattle grazing.

The PAA is within the mixed grass eco-region of the Northern Great Plains (EPA 1993), near the southwestern extension of the Black Hills. The elevation within the PAA ranges from approximately 3,600 feet to 3,900 feet above mean sea level, with the highest elevations along the pine breaks that overlap its eastern boundary. Topography in the PAA and surrounding lands is primarily gently rolling in the western quarter, with more varied terrain in the pine breaks and dissected hills that comprise the rest of the area.

The PAA is comprised of five main vegetative communities, in descending order: Ponderosa Pine Woodland, Big Sagebrush Shrubland, Greasewood Shrubland, Upland Grassland, and Cottonwood Gallery. Despite the overall ranking, Upland Grassland was present in the largest individual parcels. Interspersed among those primary habitats are smaller inclusions of Silver Sagebrush Shrubland, Agricultural Land, creek channels, and numerous ephemeral draws.

The overall PAA (license area and surrounding perimeter) is located within the Cheyenne River watershed. Two main stream channels pass through the PAA: Beaver Creek (perennial) and Pass Creek (intermittent). Both flow south into the Cheyenne River, which runs from west to east approximately 2.5 miles south of the PAA boundary. A few small stock reservoirs are scattered throughout the area, though they may not retain water year-round.

Trees are present along the riparian corridors of both primary creeks, and on the higher elevation hilltops in the PAA. The plains cottonwood (*Populus deltoides*) was the only tree present along the creek channels, and was more prevalent in the Pass Creek corridor. Ponderosa pine (*Pinus ponderosa*) dominates the higher elevation hilltops and breaks in the central and eastern portions of the PAA, with Rocky Mountain juniper (*Juniperus scopulorum*) present as individual trees or small inclusions in some of the dry drainages.

The PAA is characterized as semi-arid continental or steppe with a dry winter season. The area commonly experiences low precipitation levels, high evaporation rates, low relative humidity, and plentiful sunshine. Temperatures are moderate, with large diurnal and annual variations, and extremes ranging from approximately -37 degrees Fahrenheit (°F) in the winter to 114 °F in the summer. The first freeze typically occurs in mid- to late September, with the last freeze often recorded during late May.

Yearly precipitation totals average about 14 inches. Approximately one-half of the annual precipitation falls during the months of May, June, and July. As expected, most of the winter precipitation occurs as snow, with an annual average of 37 inches. Thunderstorms are relatively frequent in the PAA during the summer months, averaging 40-45 days per year. Much of the annual rainfall is associated with these events.

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Windy conditions are fairly common in the PAA and generally average about 10 miles per hour (mph). Prevailing winds come from the west-northwest during much of the year, though east-southeast winds are also common.

5.4.2.1 Climate General

The PAA is characterized as semi-arid continental or steppe with a dry winter season. The area commonly experiences low precipitation levels, high evaporation rates, low relative humidity, and plentiful sunshine. Temperatures are moderate, with large diurnal and annual variations, and extremes ranging from approximately -37 degrees F in the winter to 114 degrees F in the summer. The first freeze typically occurs in mid- to late September, with the last freeze often recorded during late May.

Yearly precipitation totals average about 14 inches. Approximately one-half of the annual precipitation falls during the months of May, June, and July. As expected, most of the winter precipitation occurs as snow, with an annual average of 37 inches. Thunderstorms are relatively frequent in the PAA during the summer months, averaging 40-45 days per year. Much of the annual rainfall is associated with these events.

Windy conditions are fairly common in the PAA, generally averaging 10 mph. Prevailing winds come from the west-northwest during much of the year, though east-southeast winds are also common.

5.4.3 Baseline Data

Ecological baseline studies for flora and fauna were collected to fulfill the objectives specified in U.S. NRC NUREG-1569, *Standard Review Plan for ISL Leach Uranium Extraction License Applications*. Ecological surveys were also conducted in accordance with applicable SD DENR, SDGFP, and USFWS established guidelines. These agencies were consulted prior to initiating field surveys to ensure that adequate objectives, survey methodologies, and data collection techniques were employed.

Vegetation sampling was conducted by BKS Environmental Associates, Inc. (BKS) of Gillette, Wyoming. Initial surveys were conducted during July 2007, with supplemental sampling performed to adjust to subsequent changes in the PAA boundary. Wildlife and aquatics sampling were conducted by ICF Jones & Stokes (formerly Thunderbird-Jones & Stokes), of Gillette, Wyoming from July 2007 through early August 2008 to meet agency requirements of one year of baseline data, and to accommodate changes to the PAA boundary during that period.

The following sections were generated from the final survey reports completed by BKS and Jones & Stokes for this project.

5.4.4 Terrestrial Ecology

Powertech (USA) conducted terrestrial ecological baseline field surveys including vegetation, wetlands, wildlife. The methodology and results are discussed in the following sections.

5.4.4.1 Vegetation

5.4.4.1.1 Survey Methodology

General

All sampling procedures and methodologies are consistent with standard industry practices utilized in applications for AEA licenses including those for: Smith Ranch, Nichols Ranch, Moore Ranch and Highlands Ranch. Refer to Appendix 5.4-A for the submitted methodology.

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Mapping
Seven different plant communities were identified for the PAA, i.e., Big Sagebrush Shrubland (BS), Greasewood Shrubland (GW), Ponderosa Pine Woodland (PP), Upland Grassland (UG), Cottonwood Gallery (CG), Silver Sagebrush Shrubland (SS), and Agricultural Land (AG), using 2001 color infra-red (CIR) aerial photography, which was verified by field survey. The Agricultural Land was not sampled as it was actively being used for crop production. The Silver Sagebrush Shrubland will be described as an inclusion of the Greasewood Shrubland Community.

Transect Origin Selection
Transects were randomly located in the field within each sampled vegetation community. Each transect was at least 150 feet from the previous transect. Random numbers between 1 and 360 were generated to determine cover transect direction, and compasses were utilized to orient transects to the nearest 1/8 of 360 degrees in the field. Each sample site was marked with hand-held Garmin Global Positioning System (GPS), and these points were later plotted on the final vegetation survey map (Exhibit 5.4-1).

Cover
A sample size of 37 50-m point-intercept cover transects were sampled within the Ponderosa Pine Woodland and Greasewood Shrubland communities, while 27 samples were taken in the Big Sagebrush Shrubland, 26 samples for the Cottonwood Gallery and 30 samples for the Upland Grassland community for a total of 157 cover points in the PAA.

In the vegetation communities, each 50-m transect represented a single sample point. Percent cover measurements were taken from point-intercepts at 1-m intervals along a 50-m transect. Transects that exceeded the boundaries of the vegetation community being sampled were redirected back into its vegetation community at a 90 degree angle from the original transect direction at the point of intercept. In instances where a 90 degree angle of reflection did not place the transect within the sampled community, a 45 degree angle of reflection was used. Each point-intercept represents 2 percent towards cover measurements.

Percent cover measurements record “first-hit” point-intercepts by live foliar vegetation species, litter, rock, or bare ground. Multiple hits on vegetation were recorded, but used only for the purpose of constructing a plant species list for each plant community (Appendix 5.4-B).

Total Vegetation Cover
Vegetation data cover was recorded by species, using first hit data. All point intercepts of living vegetation and growth produced during the current growing season was counted toward total vegetation cover. Total vegetation cover measurements were expressed in absolute percentages for each sample point. Percent vegetation cover is the vertical projection of the general outline of plants to the ground surface. Cover summaries for each vegetation community are contained in Appendix 5.4-C.

Total Ground Cover
Total ground cover data was recorded by live vegetation, litter, or rock, minus bare ground. Litter includes all organic material that is dead including manure. Rock fragments were recorded when equal to or greater than two cm in size (i.e., sheet flow, minimum non-erodible particle size). Total ground cover measurements were expressed in absolute percentages for each sample point. Total ground cover equals the sum of cover values for percent vegetation, percent litter, and percent rock.

Shrub Density
This data was taken at the time of cover sampling to ensure adequate use of field time. Summarization of that data can be found in Appendix 5.4-C.

Shrub density data was collected in conjunction with randomly selected cover transects, wherever possible. All shrubs, full, half, or sub, were counted within 50 cm on either side of the 50-m cover transect (1 m x 50 m belt transect), yielding a 100 square meters (m^2) belt transect. Sample adequacy was not calculated for shrub density. The number of belt transects equaled the number of cover transects for a given vegetation type.

Tree Density
This data was taken at the time of cover sampling to ensure adequate use of field time. Summarization of that data can be found in Appendix 5.4-D..

Tree density data was collected in the Ponderosa Pine Woodland vegetation community in conjunction with randomly selected cover transects, wherever possible. Tree density in this community was determined using the point-center quarter method. Trees within the Cottonwood Gallery or Riparian areas were directly counted on an aerial photograph. Within other vegetation communities, individual *Pinus ponderosa* (Ponderosa Pine) or other tree species found were directly counted for numbers. Sample adequacy was not calculated on the point-center quarter plots.

Species Composition
A list of plant species encountered during 2007 quantitative sampling is compiled in Appendix 5.4-B by vegetation community type for each of the five vegetation communities. The species list includes plant species sampled in cover transects as well as plant species observed along the belt transect. Plant names in the Rocky Mountain Vascular Plants of Wyoming (Dorn 2001, 3rd Edition) were utilized. Plant identification was confirmed by Robert Dorn, when necessary. Scientific nomenclature followed that in use at the Rocky Mountain Herbarium in Laramie, Wyoming, during 2007.

Sample Adequacy
A minimum of 20 cover transects per vegetation type was sampled in five vegetation communities. Sample adequacy was calculated and an incremental number of cover transects was sampled up the maximum of 50.

The following sample adequacy formula was utilized to determine the minimum required size of the sample population.

$$n_{min} \geq \frac{2(sz)^2}{(dx)^2}$$

Where n_{min}= minimum number of sampled line transects needed to adequately represent native vegetation types

s= sample standard deviation
z= the z statistic
d= the amount of reduction desired
x= sample mean for cover

This sample adequacy formula is used by the WDEQ. The 2 in the numerator makes this a very conservative test. The term "grassland" indicates that a community has less than or equal to 20 percent relative cover by shrub species while a "shrubland" is greater than or equal to 20 percent relative cover by shrub species according to the WDEQ.

The five vegetation communities have been identified as “grassland”, or “shrubland”. Upland Grassland is identified as grassland while the Ponderosa Pine Woodland, Big Sagebrush Shrubland, Greasewood Shrubland, and Cottonwood Gallery communities are identified as shrublands. The constant values to be used in statistical tests for cover are: “z”=1.28 and “d” = 0.1 for grasslands and shrublands. All sampled vegetation was included in the sample adequacy test (i.e., “undesirable” species were not eliminated from the equation). Also as adjustments were made to the permit boundary, the samples that fell outside of the boundary were not excluded as they were initially part of the boundary at the time of survey.

Extended Reference Area
The Extended Reference Area (EXREFA) is a native land unit used to evaluate revegetation success on portions of the same native plant community that could be affected by the Proposed Action. This study shows the Proposed Action will affect five plant communities, Big Sagebrush Shrubland, Cottonwood Gallery, Greasewood Shrubland, Ponderosa Pine Woodland, and Upland Grassland. All areas of these communities not affected by the Proposed Action may serve as the EXREFA.

5.4.4.1.2 Vegetation Survey Results

Mapping
Approximately 10,557 acres of the PAA was surveyed. Of these acres, Big Sagebrush Shrubland was 2,501.74 acres (23.70 percent), Greasewood Shrubland was 2,190.45 acres (20.75 percent), Ponderosa Pine Woodland was 2,183.76 acres (20.69 percent), Upland Grassland was 2,187.56 acres (20.72 percent), Agricultural Land was 780.79 acres (7.40 percent), Disturbed areas were 14.7 acres (0.14 percent), existing mine pits were 326.99 acres (3.10 percent), Cottonwood Gallery was 240.6 acres (2.28 percent), Silver Sagebrush Shrubland was 119.49 acres (1.13 percent), water was 8.94 acres (0.08 percent), and Shale Outcrop was 2.19 acres (0.02 percent). Refer to Table 5.4-1 for acreage of each vegetation community by permit acreage, and ½-mile buffer acreage.

Table 5.4-1 Acreage and Percent of Total Area for Each of the Map Units

Map Unit	Permit area	% of Area	1/2 Mile Buffer Area	% of Area
Sampled Vegetation Communities				
Big Sagebrush Shrubland	2,501.56	23.70	2,639.45	31.75
Greasewood Shrubland	2,190.45	20.75	837.66	10.07
Ponderosa Pine Woodland	2,183.76	20.69	2,036.58	24.49
Upland Grassland	2,187.56	20.72	2,027.18	24.38
Cottonwood Gallery	240.6	2.28	103.13	1.24
Described Vegetation Communities				
Agricultural Land	780.79	7.40	604.19	7.27
Disturbed	14.7	0.14	--	--
Existing Mine Permit	326.99	3.10	--	--
Silver Sagebrush Shrubland	119.49	1.13	53.65	0.65
Shale Outcrop	2.19	0.02	--	--
Water	8.94	0.08	12.6	0.15
TOTAL	**10,557.03**	**100.00**	**8,314.44**	**100.00**

General
The EXREFA will remain unaffected over the course of the proposed the Proposed Action and will be used to evaluate revegetation success. The EXREFA will include portions of the same native plant communities that area affected by the Proposed Action but located outside those disturbed areas and within PAA.

5.4.4.1.3 Big Sagebrush Shrubland

Cover
The Big Sagebrush Shrubland community comprised 2,501.56 of the 10,557.03 acres of the PAA (23.70 percent). Twenty-seven cover transects were sampled for this community. Absolute total vegetation cover was 45.89 percent. Absolute bare soil and litter/rock percentages were 14.07 percent and 38.52 percent, respectively. Absolute total ground cover was 85.78 percent. *Bouteloua gracilis* (blue grama), provided the highest relative vegetation cover at 24.38 percent, while *Buchloe dactyloides* (buffalograss) provided the next highest relative vegetation cover at 20.98 percent. Refer to Table 5.4-2 for the absolute cover values.

Table 5.4-2 2007 Absolute Cover for the Big Sagebrush Shrubland Vegetation Community

Vegetation Parameter
Absolute Total Vegetation Cover (45.89%)
Absolute Total Cover (85.78%)

Sample Adequacy
There were 27 samples taken in the Big Sagebrush Shrubland plant community. The sample adequacy formula outlined earlier was utilized to determine the minimum required size of the sample population. Big Sagebrush Shrubland met sample adequacy
Refer to Table 5.4-3 below for sample adequacy values.

Table 5.4-3 Summary of Sample Adequacy Calculations for Percent Vegetation Cover in the Big Sagebrush Shrubland

Map Unit	Mean	Standard Deviation	Sample Adequacy	Actual Sample #	Z-Value	Confidence Level Achieved
Big Sagebrush Shrubland						
Total Vegetation Cover	22.75	6.52	26.91	27.00	2.56	99.48
Total Ground Cover	42.64	3.49	2.20	27.00	8.98	NA

Shrub Density
Big Sagebrush Shrubland supported an average of 3,661.46 shrubs per acre or 0.90 shrubs/m^2. The following full and half/sub-shrub species were found: *Artemisia tridentata* (big sagebrush), *Artemisia frigida* (fringed sagewort), and *Gutierrezia sarothrae* (broom snakeweed). Refer to Appendix 5.4-D for a complete Big Sagebrush Shrubland density summary.

Species Composition
Species composition for the Big Sagebrush Shrubland community was dominated by warm season perennial grasses with 46.33 percent relative vegetation cover, followed by cool season perennial grasses with 20.33 percent relative vegetation cover. Perennial shrubs had 15.82 percent relative vegetation cover, while annual grasses had 10.15 percent relative vegetation cover. Annual forbs had 1.90 percent relative vegetation cover. Perennial forbs had 1.11 percent relative vegetation cover; sub-shrubs had a total of 2.59 percent relative vegetation cover. Succulents had 1.77 percent relative vegetation cover. The cool season perennial grasses were mainly *Elymus smithii* (western wheatgrass), *Carex filifolia* (threadleaf sedge), and *Poa secunda* (Sandberg bluegrass). The warm season perennial grasses were mainly blue grama, buffalograss, and *Bouteloua curtipendula* (sideoats grama). Annual grasses were *Bromus japonicus* (Japanese brome) and *Bromus tectorum* (cheatgrass). Perennial forbs were dominated by *Calochortus nuttallii* (sego lily), *Phlox spp.* (phlox), and *Sphaeralcea coccinea* (scarlet globemallow). Annual forbs included *Alyssum desertorum* (desert alyssum) and *Lepidium densiflorum* (prairie peppergrass). Present shrubs/sub-shrubs was big sagebrush, fringed sagewort, and broom snakeweed. Also present was the succulent *Opuntia polyacantha* (plains prickly pear). Refer to Table 5.4-4 for relative Big Sagebrush Shrubland cover summary and Appendix 5.4-C for a complete Big Sagebrush Shrubland cover summary.

Table 5.4-4 Vegetation Cover Sampling Data Summary of Species by Lifeform for the Big Sagebrush Shrubland Community

	Vegetation Cover	
	Absolute	Relative (%)
Cool Season Perennial Grasses	9.33	20.33
Warm Season Perennial Grasses	21.26	46.33
Annual Grasses	4.66	10.15
Annual Forbs	0.87	1.90
Perennial Forbs	0.51	1.11
Perennial Shrubs	7.26	15.82
Perennial Sub-Shrubs	1.19	2.59
Succulents	0.81	1.77

5.4.4.1.4 Greasewood Shrubland

Cover

The Greasewood Shrubland community comprised 2,190.45 of the 10,557.03 acres of the PAA (20.75 percent). Thirty-seven cover transects were sampled for this community. Absolute total vegetation cover was 37.11 percent. Absolute bare soil and litter/rock percentages were 18.70 percent and 42.54 percent, respectively. Absolute total ground cover was 81.41 percent. Western wheatgrass provided the highest relative vegetation cover at 23.31 percent. *Sarcobatus vermiculatus* (greasewood), provided the next highest cover at 22.88 percent. Refer to Table 5.4-5 for the absolute cover values.

Table 5.4-5 2007 Absolute Cover for the Greasewood Shrubland Vegetation Community

Vegetation Parameter	Mean
Absolute Vegetation Cover (%)	37.11
Absolute Total Cover (%)	81.41

Sample Adequacy

There were 37 samples taken in the Greasewood Shrubland community. The sample adequacy formula outlined earlier was utilized to determine the minimum required size of the sample population. Greasewood Shrubland met sample adequacy. Refer to Table 5.4-6 for sample adequacy values.

Table 5.4-6 Summary of Sample Adequacy Calculations for Percent Vegetation Cover in the Greasewood Shrubland

Map Unit	Mean	Standard Deviation	Sample Adequacy	Actual Sample #	Z-Value	Confidence Level Achieved
Greasewood Shrubland						
Total Vegetation Cover	18.84	5.80	31.06	37.00	2.79	99.74
Total Ground Cover	40.70	6.74	8.99	37.00	5.19	NA

Shrub Density

Greasewood Shrubland supported an average of 2,589.42 shrubs per acre or 0.64 shrubs/m^2. The following full and half/sub-shrub species were found: greasewood, big sagebrush and *Artemisia cana* (silver sagebrush), *Ericameria nauseosa* (rubber rabbitbrush), and fringed sagewort. Refer to Appendix 5.4-D for a complete Greasewood Shrubland density summary

Species Composition

Species composition for the Greasewood Shrubland community was dominated by perennial shrubs with 28.70 percent relative vegetation cover, followed by cool season perennial grasses with 27.67 percent relative vegetation cover. Warm season perennial grasses had 24.31 percent relative vegetation cover. Annual grasses had 4.96 percent relative vegetation cover while annual forbs had 10.32 percent relative vegetation cover. Perennial forbs had 0.40 percent relative vegetation cover. Succulents had 3.64 percent relative vegetation cover. The cool season perennial grasses were mainly western wheatgrass, *Agropyron cristatum* (crested wheatgrass), threadleaf sedge, *Bromus inermis* (smooth brome), and *Elymus lanceolatus* (thickspike wheatgrass). Warm season perennial grasses were mainly blue grama, buffalograss, *Distichlis stricta* (inland saltgrass), and *Sporobolus airoides* (alkali sacaton). Annual grasses were dominated by Japanese brome and cheatgrass. Perennial forbs were dominated by scarlet globemallow, *Ambrosia psilostachya* (western ragweed), and *Convolvulus arvensis* (field bindweed). Annual forbs included *Bassia sieversiana* (summer cypress), *Plantago patagonica* (Pursh's plantain), and *Monolepis nuttalliana* (Nuttall's povertyweed). Shrubs included greasewood, big sagebrush and silver sagebrush. Plains prickly pear was also present. An area dominated by silver sagebrush was present within this community. This area was wetter than the typical greasewood community. The species composition was likely similar except for the dominance of silver sagebrush in the shrub component which is due to the increased moisture present within this area. Refer to Table 5.4-7 for relative Greasewood Shrubland cover summary and Appendix 5.4-C for a complete Greasewood Shrubland cover summary.

Table 5.4-7 Vegetation Cover Sampling Data Summary of Species by Lifeform for the Greasewood Shrubland Community

	Vegetation Cover	
	Absolute	**Relative (%)**
Cool Season Perennial Grasses	10.27	27.67
Warm Season Perennial Grasses	9.02	24.31
Annual Grasses	1.84	4.96
Annual Forbs	3.83	10.32
Perennial Forbs	0.15	0.40
Perennial Shrubs	10.65	28.70
Succulents	1.35	3.64

5.4.4.1.5 Ponderosa Pine Woodland

Cover

The Ponderosa Pine Woodland community comprised approximately 2,188.76 of the 10,557.03 acres of the PAA (20.69 percent). Thirty-seven cover transects were sampled for this community. Absolute total vegetation cover was 34.33 percent. Absolute bare soil and litter/rock percentages were 10.54 and 53.57, respectively. Absolute total ground cover was 88.92 percent. *Pinus ponderosa* (ponderosa pine) provided the highest relative vegetation cover at 45.03 percent, while *Carex geyeri* (Geyer's sedge) provided the next highest relative vegetation cover at 13.37 percent. Refer to Table 5.4-8 for the absolute cover values.

Table 5.4-8 2007 Absolute Cover for the Ponderosa Pine Woodland Vegetation Community

Vegetation Parameter	Mean
Absolute Total Vegetation Cover (%)	34.33
Absolute Total Cover (%)	88.92

Sample Adequacy
There were 37 samples taken in the Ponderosa Pine Woodland community. The sample adequacy formula outlined earlier was utilized to determine the minimum required size of the sample population. Ponderosa Pine Woodland met sample adequacy. Refer to Table 5.4-9 below for sample adequacy values.

Table 5.4-9 Summary of Sample Adequacy Calculations for Percent Vegetation Cover in the Ponderosa Pine Woodland

Map Unit	Mean	Standard Deviation	Sample Adequacy	Actual Sample #	Z-Value	Confidence Level Achieved
Ponderosa Pine Woodland						
Total Vegetation Cover	17.19	5.25	30.56	37.00	2.82	97.67
Total Ground Cover	44.19	3.86	2.50	37.00	3.80	NA

Shrub Density
Ponderosa Pine Woodland supported an average of 1,224.27 shrubs per acre or 0.30 shrubs/m^2. The following full and half/sub-shrub species were found: big sagebrush, silver sagebrush, rubber rabbitbrush, *Chrysothamnus viscidflorus* (Douglas rabbitbrush), fringed sagewort, broom snakeweed, *Rosa arkansana* (prairie rose), and *Yucca glauca* (yucca or small soapweed). Refer to Appendix 5.4-D for a complete Ponderosa Pine Woodland density summary.

Tree Density
Ponderosa Pine Woodland supported an average of 75.88 ponderosa pine trees per acre or 0.019 trees/m^2. *Juniperus scopulorum* (Rocky Mountain juniper) was also observed within this community; however no quantitative evaluations were made for this species. Refer to Appendix 5.4-E for a complete tree density summary for the Ponderosa Pine Woodland community.

Species Composition
Species composition for the Ponderosa Pine Woodland community was dominated by trees with 52.58 percent relative vegetation cover, followed by warm season perennial grasses with 22.34 percent relative vegetation cover. Cool season perennial grasses had 19.34 percent relative vegetation cover. Annual grasses had 0.79 percent relative vegetation cover while annual forbs had 0.44 percent relative vegetation cover. Biennial forbs had 0.15 percent relative vegetation cover, while perennial forbs had 1.22 percent relative vegetation cover. Succulents had 0.47 percent relative vegetation cover while perennial shrubs and sub-shrubs had 2.04 percent and 0.64 percent relative vegetation cover, respectively. The trees were dominated by ponderosa pine and *Juniperus scopulorum* (Rocky Mountain juniper). The cool season perennial grasses were mainly Geyer's sedge, western wheatgrass and *Hesperostipa comata* (needleandthread). Warm season perennial grasses were mainly blue grama, sideoats grama, *Schizachyrium scoparium* (little bluestem), and *Aristida purpurea var. fendleriana* (Fendler's threeawn). Annual grasses were dominated by Japanese brome and cheatgrass. Perennial forbs were dominated by *Erigeron spp.* (fleabane), *Thermopsis rhombifolia* (prairie thermopsis), *Antennaria parvifolia* (small-leaf pussytoes), *Liatris punctata* (dotted blazing star), and *Vicia americana* (American vetch). Annual forbs included *Chenopodium berlandieri* (pitseed goosefoot), *Draba nemorosa* (yellow draba), and *Lappula redowski* (beggars-tick). Biennial forbs included *Melilotus officinalis* (yellow sweetclover). The shrubs and subshrubs present were big sagebrush, silver sagebrush, and fringed sagewort. Plains prickly pear was also present. Refer to Table 5.4-10 for relative Ponderosa Pine Woodland cover summary and Appendix 5.4-C for a complete Ponderosa Pine Woodland cover summary.

Table 5.4-10 Vegetation Cover Sampling Data Summary of Species by Life form for the Ponderosa Pine Woodland Community

	Vegetation Cover	
	Absolute	Relative (%)
Cool Season Perennial Grasses	6.64	19.34
Warm Season Perennial Grasses	7.67	22.34
Annual Grasses	0.27	0.79
Annual Forbs	0.15	0.44
Biennial Forbs	0.05	0.15
Perennial Forbs	0.42	1.22
Perennial Shrubs	0.70	2.04
Perennial Sub-Shrubs	0.22	0.64
Succulents	0.16	0.47
Trees	18.05	52.58

5.4.4.1.6 Upland Grassland

Cover

The Upland Grassland community comprised approximately 2,187.56 of the 10,557.03 acres of the PAA (20.72 percent). Thirty cover transects were sampled for the Upland Grassland community. Originally there were 31 transects sampled in this community, however, upon review transect 26 was discarded due to the fact that it was not representative of the community. Absolute total vegetation cover was 46.02 percent. Absolute bare soil and litter/rock percentages were 11.07 and 41.13, respectively. Absolute total ground cover was 88.95 percent. Buffalograss provided the highest relative vegetation cover at 27.81 percent, while blue grama provided the next highest relative vegetation cover at 27.10 percent. Refer to Table 5.4-11 for the absolute cover values.

Table 5.4-11 Absolute Cover for the Upland Grassland Vegetation Community

Vegetation Parameter	Mean
Absolute Total Vegetation Cover (%)	46.02
Absolute Total Cover (%)	88.47

Sample Adequacy

There were 30 samples taken in the Upland Grassland community. The sample adequacy formula outlined earlier was utilized to determine the minimum required size of the sample population. Upland Grassland met sample adequacy. Refer to Table 5.4-12 for sample adequacy values.

Table 5.4-12 Summary of Sample Adequacy Calculations for Percent Vegetation Cover in the Upland Grassland

Map Unit	Mean	Standard Deviation	Sample Adequacy	Actual Sample #	Z-Value	Confidence Level Achieved
Upland Grassland						
Total Vegetation Cover	23.00	6.88	29.32	30.00	1.29	90.15
Total Ground Cover	44.23	3.04	1.55	30.00	5.63	NA

Shrub Density

Upland Grassland supported an average of 51.01 shrubs per acre or 0.01 shrubs/m^2. The following full and half/sub-shrub species were found: big sagebrush, fringed sagewort, and broom snakeweed. Refer to Appendix 5.4-D for a complete Upland Grassland density summary.

Species Composition

Species composition for the Upland Grassland community was dominated by warm season perennial grasses with 54.91 percent relative vegetation cover, followed by cool season perennial grasses with 27.66 percent relative vegetation cover. Annual grasses had 9.00 percent relative vegetation cover, while annual forbs had 3.35 percent relative vegetation cover. Perennial forbs had 0.43 percent relative vegetation cover. Subshrubs had a total 0.15 percent relative vegetation cover. Succulents had 4.50 percent relative vegetation cover. The cool season perennial grasses were dominated by western wheatgrass, threadleaf sedge, and crested wheatgrass. Warm season grasses were dominated by blue grama and buffalograss. Annual grasses were dominated by Japanese brome and cheatgrass. Perennial forbs included scarlet globemallow. Annual forbs included desert alyssum, prairie peppergrass, and *Thlaspi arvense* (field pennycress). Fringed sagewort was the only sub-shrub present. Also present was plains prickly pear. Refer Table 5.4-13 for relative Upland Grassland cover summary and to Appendix 5.4-C for an Upland Grassland complete cover summary.

Table 5.4-13 Vegetation Cover Sampling Data Summary of Species by Lifeform for the Upland Grassland Community

	Vegetation Cover	
	Absolute	**Relative (%)**
Cool Season Perennial Grasses	12.73	27.66
Warm Season Perennial Grasses	25.27	54.91
Annual Grasses	4.14	9.00
Annual Forbs	1.54	3.35
Perennial Forbs	0.20	0.43
Perennial Sub-Shrubs	0.07	0.15
Succulents	2.07	4.50

5.4.4.1.7 Cottonwood Gallery

Cover

The Cottonwood Gallery community comprised approximately 240.60 of the 10,557.03 acres of the PAA (2.28 percent). Twenty-six cover transects were sampled for the Cottonwood Gallery community. Absolute total vegetation cover was 62.61 percent. Absolute bare soil and litter/rock percentages were 1.19 and 17.50, respectively. Absolute total ground cover was 97.62 percent. Smooth brome provided the highest relative vegetation cover at 29.12 percent, while western wheatgrass provided the next highest relative vegetation cover at 26.29 percent. Refer to Table 5.4-14 for the absolute cover values.

Table 5.4-14 2007 Absolute Cover for the Cottonwood Gallery Vegetation Community

Vegetation Parameter	Mean
Absolute Total Vegetation Cover (%)	62.61
Absolute Total Cover (%)	97.62

Sample Adequacy

There were 26 samples taken in the Cottonwood Gallery community. The sample adequacy formula outlined earlier was utilized to determine the minimum required size of the sample population. Cottonwood Gallery met sample adequacy. Refer to Table 5.4-15 for sample adequacy values.

Table 5.4-15 Summary of Sample Adequacy Calculations for Percent Vegetation Cover in the Cottonwood Gallery

Map Unit	Mean	Standard Deviation	Sample Adequacy	Actual Sample #	Z-Value	Confidence Level Achieved
Cottonwood Gallery						
Total Vegetation Cover	31.31	7.65	19.56	26.00	2.95	99.84
Total Ground Cover	48.81	2.08	0.60	26.00	16.92	NA

Shrub Density
Cottonwood Gallery supported an average of 567.60 shrubs per acre or 0.14 shrubs/m^2. The following full and half/sub-shrub species were found: big sagebrush, silver sagebrush, rubber rabbitbrush, greasewood, and *Symphoricarpos occidentalis* (western snowberry). Refer to Appendix 5.4-D for a complete Cottonwood Gallery density summary.

Tree Density
Tree species within this community were counted on an aerial photograph. Upon counting the number of plains cottonwoods within the community was 295.

Species Composition
Species composition for the Cottonwood Gallery community was dominated by cool season perennial grasses with 55.41 percent relative cover, followed by trees with 21.37 percent relative cover. Warm season perennial grasses had 0.37 percent relative cover. Annual forbs had 18.06 percent relative cover while annual grasses had 1.23 percent relative cover. Perennial forbs had 2.33 percent relative cover. Shrubs had a total 1.23 percent relative cover. The cool season perennial grasses were dominated by smooth brome and western wheatgrass. The warm season perennial grasses included inland saltgrass. Annual grasses were dominated by Japanese brome and cheatgrass. Perennial forbs were dominated by *Cirsium arvense* (Canada thistle) and *Achillea millefolium* (common yarrow). Annual forbs included summer cypress and *Chenopodium album* (lambsquarters goosefoot). Present shrubs were silver sagebrush, greasewood, and *Symphoricarpos occidentalis* (western snowberry). *Populus deltoides* (plains cottonwood) was the only tree present. Refer to Table 5.4-16 below for relative Cottonwood Gallery cover summary and to Appendix 5.4-C for a Cottonwood Gallery complete cover summary.

Table 5.4-16 Vegetation Cover Sampling Data Summary of Species by Lifeform for the Cottonwood Gallery Community

	Vegetation Cover	
	Absolute	**Relative (%)**
Cool Season Perennial Grasses	34.69	55.41
Warm Season Perennial Grasses	0.23	0.37
Annual Grasses	0.77	1.23
Annual Forbs	11.31	18.06
Perennial Forbs	1.46	2.33
Perennial Shrubs	0.77	1.23
Trees	13.38	21.37

5.4.4.1.8 Vegetation Survey Discussion

The 10,580 acre PAA consists of five vegetation communities: Big Sagebrush Shrubland, Greasewood Shrubland, Ponderosa Pine Woodland, Upland Grassland, and Cottonwood Gallery. Each community was investigated for baseline vegetation information in support of a NRC Source Materials License and SD DENR Regular Mine Permit Application.

No threatened or endangered species were encountered within the PAA. The presence of the state designated weed Canada thistle was present within the Cottonwood Gallery vegetation community. The presence of the Fall River County designated weed field bindweed was present within the Greasewood Shrubland vegetation community.

5.4.4.2 Wetlands

5.4.4.2.1 Wetland Survey Methodology

The wetland surveys were conducted in accordance with the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. All WoUS and OWUS were assessed during the surveys. The routine wetland delineation approach with on-site inspection was utilized, and the survey was conducted by pedestrian reconnaissance and review of existing maps of the PAA. Identification of potential wetlands was based on visual assessment of vegetation and hydrology indicators, as well as intrusive soil sampling to determine the presence of wetland criteria indicators. Wetland Determination Data Forms-Great Plains Region-DRAFT, were utilized for each observation point. Hydrology and soils were evaluated whenever a plant community type met hydrophytic vegetation parameters based on the Dominance Test and Prevalence Index (as defined by the Great Plains Regional Supplement), or whenever indicators suggested the potential presence of a seasonal wetland area under normal circumstances.

Figure 5.4-1 below identifies Beaver Creek, Figure 5.4-2 identifies the Cottonwood Gallery, and Figure 5.4-3 identifies the concentration of old mine pits.

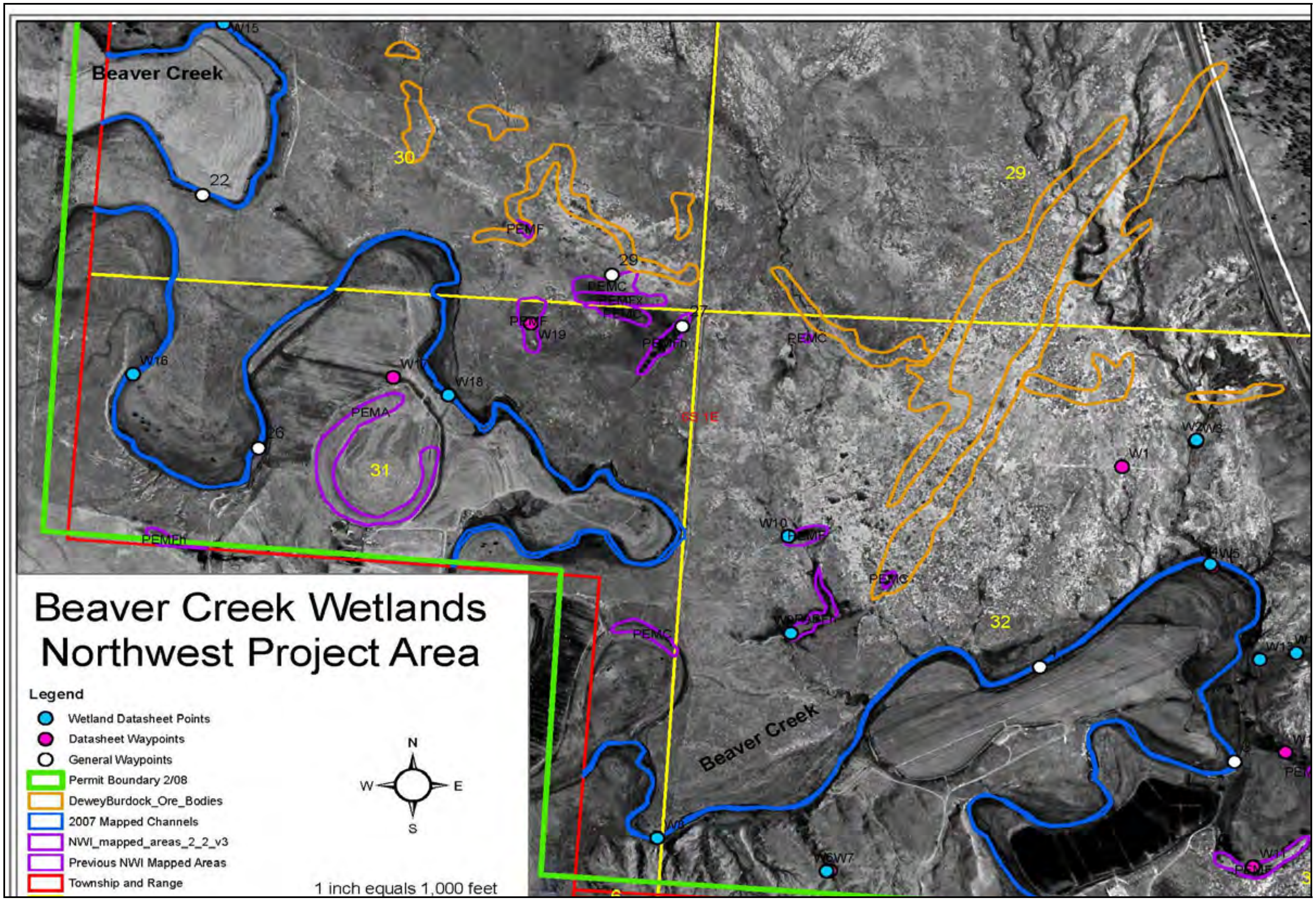

Figure 5.4-1 Beaver Creek Wetlands Northwest PAA

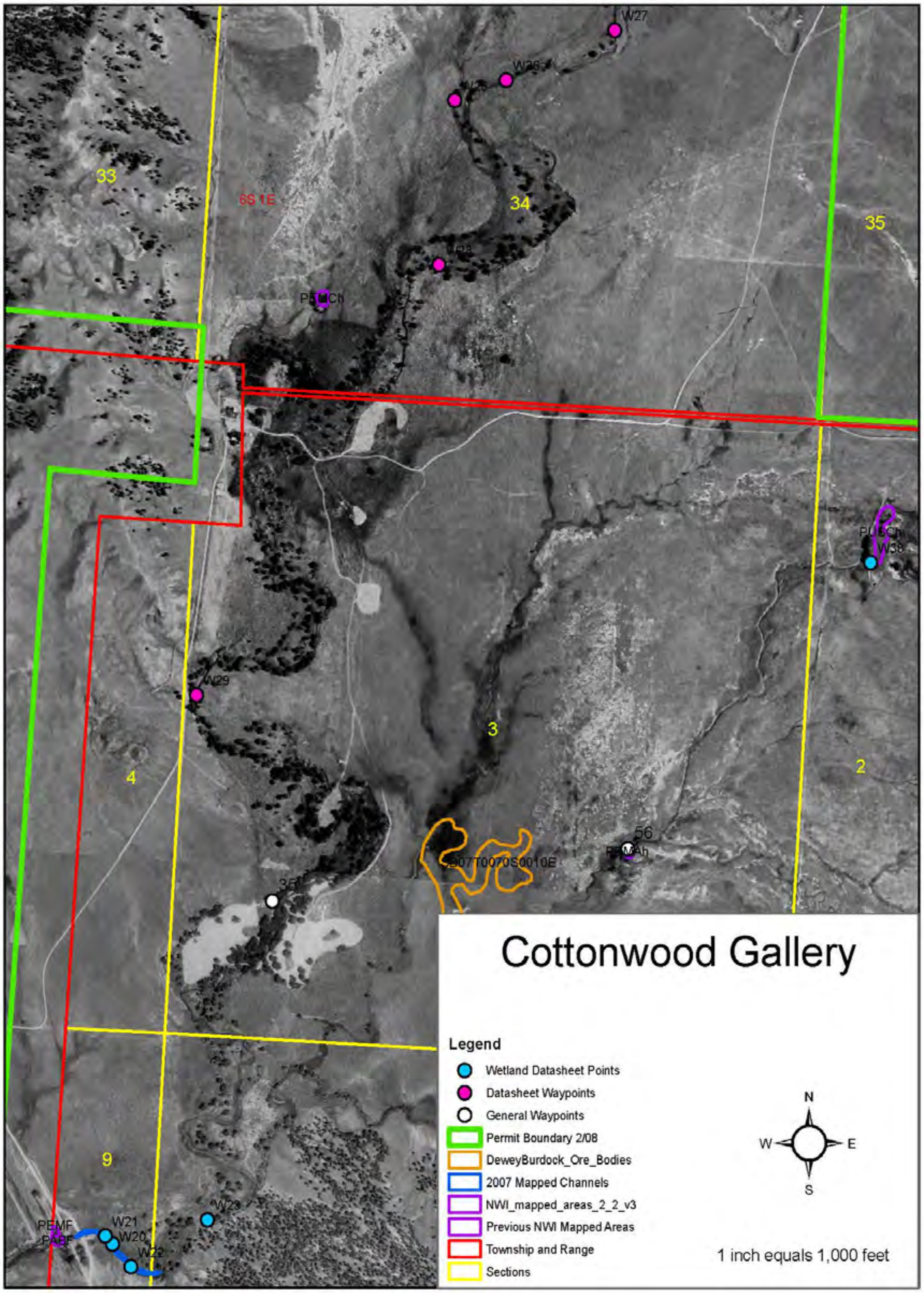

Figure 5.4-2 Cottonwood Gallery

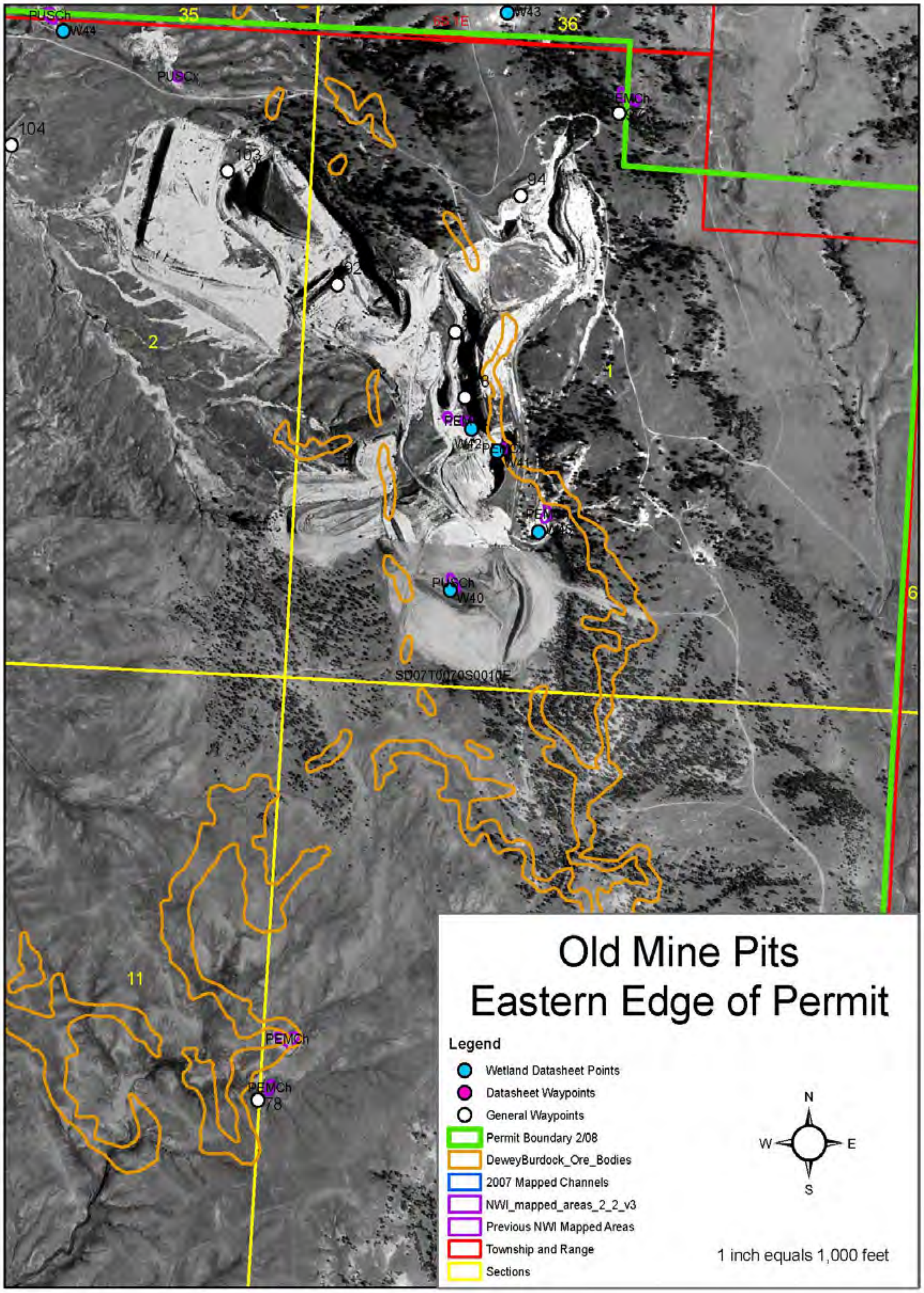

Figure 5.4-3 Old Mine Pits Eastern Edge of Permit

Natural Resources Conservation Service (NRCS) soils mapping for Custer and Fall River Counties, South Dakota, (2007) and BKS soil mapping of the PAA were reviewed for general soils information. Potential wetlands (WoUS) and OWUS were initially identified via review of area maps to include the following:

- 1977 USFWS NWI mapping for the Dewey, Burdock and 21 Quads
- Custer Quad Digital Elevation Model
- Burdock Quad Digital Elevation Model

Wetland indicator categories were identified for each dominant plant species noted through use of the National List of Vascular Plant Species that Occur in Wetlands, 1996 National Summary. Region 4 (North Plains) indicator categories were utilized for the PAA.

Field sample locations and resulting wetland boundaries were recorded with a hand-held Garmin GPS map, 60Cx Global Positioning System (GPS) unit in NAD 1983 UTM Zone 13. BKS provided drafting services for the Proposed Action.

5.4.4.2.2 Wetland Survey Results

The PAA was generally characterized by Big Sagebrush Shrubland, Greasewood Shrubland, and Ponderosa Pine Woodland with pockets of Upland Grassland and Agricultural land, mine pit, Silver Sagebrush Shrubland, Shale Outcrop, or Pass Creek. Beaver Creek had Agricultural land to the south and Greasewood Shrubland and Big Sagebrush Shrubland to the north. Agricultural land comprised 399.83 acres, Greasewood Shrubland comprised 2,252.15 acres and Big Sagebrush Shrubland comprised 2,738.85 acres. Beaver Creek had water present continuously in the drainage and wetland species near the banks. The upper banks were comprised mainly of *Artemisia tridentata* (big sagebrush), *Sarcobatus vermiculatus* (Greasewood), and *Elymus smithii* (Western wheatgrass). The wetland indicator status of these plants are UPL (upland), UPL and FACU (facultative upland) respectively. The Pass Creek comprised of the Cottonwood Gallery vegetation community comprised mainly of *Bromus inermis* (smooth brome), western wheatgrass, and *Populus deltoides* (cottonwood trees). The wetland indicator statuses of these plants are UPL, FACU, and FAC (facultative) respectively. Please refer to Section 5.4.4 for further information regarding the vegetation within the PAA.

The PAA generally occurs on uplands, with inclusions of two main drainages, Beaver Creek and Pass Creek and several depressed areas. Beaver Creek and Pass Creek were evaluated using pedestrian reconnaissance, while the remaining small drainages were evaluated based on existing mapping. Wetlands were identified throughout the Beaver Creek drainage; however Pass Creek only had wetlands present near an old open flowing well close to PAA. Wetlands were also identified in the majority of the old mine pits, as well as depressed areas throughout the PAA. The wetland classification along Beaver Creek was Riverine Lower Perennial Emergent (R2EM) and Palustrine Emergent (PEM) WoUS in Pass Creek and other small drainages. The mine pits were primarily designated as Palustrine Unconsolidated Bottom (PUB) OWUS and depressions were typically PEM or PUB designations.

The proposed project may affect a total of 35.114 acres of R2EM, R4SB7 (Riverine Intermittent Streambed vegetated), and PEM stream channel, Palustrine Aquatic Bed Intermittently Flooded Diked (PABJh), Palustrine Unconsolidated Shore Temporarily Flooded (PUSA), PEM, PUB, PUS, and PEMC (seasonally flooded) isolated ponds, and open water (OW). The acreage of OW consists of approximately 9.451 acres.

The area had previously been mined for uranium through several open pit mines; some of the mines had been filled in with water. One livestock watering tank was identified on the survey.

Soils information for the PAA was obtained by NRCS Web Soil Survey for Custer and Fall River Counties, South Dakota, (2007).
There are two main drainage basins located in the PAA; each of the drainages had different soil types. Beaver Creek had Haverson loam, 0-2 percent slopes throughout the drainage. Pass Creek had Barnum silt loam in the south half of the drainage and Barnum-Winetti complex, 0-6 percent slopes. The old mine pits were also classified as Barnum silt loam and Barnum-Winetti complex.

None of the soil map units were found on the hydric soils list for Fall River County or Custer County, South Dakota.

Table 5.4-17 is a summary list of the wetlands in the PAA along with several details about each wetland, including location, delineation designation, geomorphic setting, comments, and jurisdictional recommendations. Table 5.4-18 provides of summary of the 2007 wetland delineation results.

Table 5.4-17 Summary of Wetlands within the PAA

Map and Plot ID (no Data Form if italicized)	**Legal Description**	**Roll # Photo #**	**2007 Delineation Designation**	**Cowardin Classification**	**Acreage of Cowardin Classification**	**Geomorphic Setting**	**Comments**	**Jurisdictional Recommendation**
W1	Sec 32 T6S R1E	R1 P1	Wetland	PEMC	0.005	Depression in tributary	--	Non-jurisdictional
W2	Sec 32, T6S R1E	No photos	Wetland	R2EM	0.017	Tributary to Beaver Creek, wetland channel	--	Jurisdictional
W3	Sec 32, T6S R1E	R1 P12 R1 P13	Non-wetland	--	--	Tributary to Beaver Creek	--	--
W4	Sec. 32, T6S R1E	R1 P2 R1 P3 R1 P4	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
W5	Sec 32, T6S R1E	R1 P5	Non- wetland	--	--	Drainage	Bank of Beaver Creek	--
W6	Sec. 32, T6S R1E	R1 P16	Non-wetland	--	--	Upland tributary	--	--
W7	Sec. 32, T6S R1E	R1 P17 R1 P18	Wetland	R4SB7	0.002	Upland tributary, wetland channel	--	Non-jurisdictional
W8	Sec. 31, T6S R1E	R1 P19 R1 P20	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
W9	Sec. 32, T6S R1E	R1 P23 R1 P24	Wetland	PABJh	0.26	Depression w/ berm	Previously mapped as PABFh	Non-jurisdictional
W10	Sec. 32, T6S R1E	R2 P1 R2 P2	Wetland	PUSA	0.03	Depression	Previously mapped as PEMF	Non-jurisdictional
W11	Sec. 32 T6S R1E	R2 P3 R2 P4	Non-wetland	--	--	Drainage by berm	Previously mapped as PEMF	--
W12	Sec. 32 T6S R1E	R2 P5 R2 P6	Non-wetland	--	--	Drainage	Previously mapped as PEMF	--
W13	Sec. 32 T6S R1E	No photos	Wetland	R4US	0.036	Drainage, wetland channel	Beaver Creek	Jurisdictional
W14	Sec. 32 T6S R1E	R2 P7 R2 P8 R2 P9	Wetland	R4US	0.012	Isolated Drainage, wetland channel	Tributary	Non-jurisdictional
W15	Sec. 30 T6S R1E	R2 P12 R2 P13	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
W16	Sec. 31 T6S R1E	R2 P18 R2 P19	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
W17	Sec. 31 T6S R1E	R2 P22 R2 P23	Non-Wetland	--	--	Ditch around Agricultural area	Previously mapped as PEMA	--

Table 5.4-17 Summary of Wetlands within the PAA (cont'd)

Map and Plot ID (no Data Form if italicized)	Legal Description	Roll # Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
W18	Sec. 31 T6S R1E	R3 P1 R3 P2	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
W19	Sec. 31 T6S R1E	R3 P3 R3 P4	Non-wetland	--	--	Low area	Previously mapped as PEMF	--
W20	Sec. 9 T7S R1E	R3 P8 R3 P9	Wetland	PEM	0.503	Drainage, wetland channel	Pass Creek	Non-jurisdictional
W21	Sec. 9 T7S R1E	R3 P10 R3 P11 R3 P12	Wetland					
W22	Sec. 9 T7S R1E	R3 P13 R3 P14	Wetland					
W23	Sec. 10 T7S R1E	R3 P17 R3 P18	Wetland					
W25	Sec. 34 T6S R1E	R4 P1 R4 P2	Non-wetland	--	--	Drainage	Pass Creek	--
W26	Sec. 34 T6S R1E	R4 P3 R4 P4	Non-wetland	--	--	Drainage	Pass Creek	--
W27	Sec. 34 T6S R1E	R4 P11 R4 P12	Non-wetland	--	--	Drainage	Pass Creek	--
W28	Sec. 34 T6S R1E	R4 P13 R4 P14	Non-wetland	--	--	Drainage	Pass Creek	--
W29	Sec. 3 T7S R1E	R4 P17 R4 P18	Non-wetland	--	--	Drainage	Pass Creek	--
W30	Sec. 10 T7S R1E	R4 P19 R4 P20	Non-wetland	--	--	Depression	--	--
W31	Sec. 10 T7S R1E	R4 P21 R4 P22	Wetland	PUB	1.801	Depression	--	Non-jurisdictional
W32	Sec. 10 T7S R1E	R4 P24 R4 P25	Wetland	PUB	1.475	Depression	--	Non- jurisdictional
W33	Sec. 14 T7S R1E	R5 P1 R5 P2	Wetland	PEM	1.417	Pond	--	Non- jurisdictional
W34	Sec. 14 T7S R1E	R5 P9 R5 P10	Non-wetland	--	--	Drainage	--	--
W35	Sec. 14 T7S R1E	R5 P11 R5 P12	Wetland	PUB	1.972	Depression	--	Non-jurisdictional
W36	Sec. 10 T7S R1E	R5 P20 R5 P21	Wetland	PEM	0.253	Outfall	Drainage	Non-jurisdictional

Table 5.4-17 Summary of Wetlands within the PAA (cont'd)

Map and Plot ID (no Data Form if italicized)	Legal Description	Roll # Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
W37	Sec. 34 T6S R1E	R6 P6 R6 P7 R6 P8 R6 P9 R6 P10	Non-wetland	OW	7.635	Old Mine Pit	--	--
W38	Sec. 2 T7S R1E	R6 P13 R6 P14	Wetland	PUS	1.099	Depression	--	Non-jurisdictional
W39	Sec. 2 T7S R1E	R6 P16 R6 P17	Wetland	PUS	0.308	Depression w/ manmade berm	--	Non-jurisdictional
W40	Sec. 1 T7S R1E	R6 P18	Wetland	PEM	0.213	Pond	--	Non-jurisdictional
W41	Sec. 1 T7S R1E	R6 P19 R6 P20	Wetland	PUB	0.008	Old Mine Pit	--	Non-jurisdictional
W42	Sec. 1 T7S R1E	R6 P22 R6 P23 R6 P24	Wetland	PUB	0.167	Old Mine Pit	--	Non-jurisdictional
W43	Sec. 36 T6S R1E	Outside of PAA, deleted photographs from Appendix 5.4-F and datasheet from Appendix 5.4-G						
W44	Sec. 2 T7S R1E	R7 P24 R8 P1 R8 P2	Wetland	PEM	0.378	Depression near drainage	--	Non-jurisdictional
W45	Sec. 1 T7S R1E	R8 P4 R8 P5	Wetland	PEM	0.035	Depression	--	Non-jurisdictional
Wpt 3	Sec. 32 T6S R1E	R1 P6 R1 P7	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
Wpt 4	Sec. 32 T6S R1E	R1 P8 R1 P9	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
Wpt 22	Sec. 30 T6S R1E	R2 P14 R2 P15	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
Wpt 26	Sec. 31 T6S R1E	R2 P24	Wetland	R2EM	13.376 total	Drainage, wetland channel	Beaver Creek	Jurisdictional
Wpt 27	Sec. 31 T6S R1E	R3 P5	Non-wetland	--	--	Depression	Previously mapped as PEMFh, no longer present	--
Wpt 29	Sec. 30 T6S R1E	R3 P6 R3 P7	Non-wetland	--	--	Depression	Previously mapped as PEMC and PEMFx, no longer present	--

Table 5.4-17 Summary of Wetlands within the PAA (cont'd)

Map and Plot ID (no Data Form if italicized)	Legal Description	Roll # Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Wpt. 35	Sec. 3 T7S R1E	R3 P23 R3 P24	Non-wetland	--	--	Drainage	Cottonwood Drainage	--
Wpt. 56	Sec. 3 T7S R1E	R5 P3 R5 P4	Non-wetland	--	--	Depression	Previously mapped as PEMAf- not present	--
Wpt. 57	Sec. 14 T7S R1E	R5 P5	Non-wetland	--	--	Depression	--	--
Wpt. 58	Sec. 14 T7S R1E	R5 P8	Wetland	PEM	1.417	Pond	Same as W33	Non- jurisdictional
Wpt. 60 and Wpt. 61	Sec. 15 T7S R1E	R5 P13 R5 P14 R5 P15	Non-wetland	--	--	Depression	Salt Crust present	--
Wpt. 62	Sec. 10 T7S R1E	R5 P16 R5 P17	Non-wetland	--	--	Depression	Previously mapped as PEMCh, not present	
Wpt. 68	Sec. 10 T7S R1E	R5 P18 R5 P19	Wetland	PEM	0.253	Outfall	Same as W36	Non-jurisdictional
Wpt. 74	Sec. 11 T7S R1E	R6 P1 R6 P2	Non-wetland	--	--	Depression	Previously mapped as PEMCh, not present	
Wpt. 78	Sec. 12 T7S R1E	R6 P5	Non-wetland	--	--	Depression	Previously mapped as PEMCh, not present. Nor the PEMCh just north of the point.	
Wpt. 83	Sec. 2 T7S R1E	R6 P15	Wetland	PUS	0.308	Depression w/ manmade berm	Same as W39	Non-jurisdictional
Wpt. 88 and Wpt. 89	Sec. 1 T7S R1E	R7 P1 R7 P2	Non-wetland	--	--	Old Mine Pit	Dominated by rabbit brush and *Hordeum jubatum*	--
Wpt. 92	Sec. 1 T7S R1E	R7 P5 R7 P6 R7 P7	Non-wetland	OW	0.452	Old Mine Pit	Mine Pit filled with water	--
Wpt. 94	Sec. 1 T7S R1E	R7 P9	Non-wetland	--	--	Old Mine Pit	Mine pit is dry, no vegetation	--
Wpt. 97	Sec. 1 T7S R1E	R7 P14	Non-wetland	--	--	Depression	Previously mapped PEMCh not present	--

Table 5.4-17 Summary of Wetlands within the PAA (concl'd)

Map and Plot ID (no Data Form if italicized)	**Legal Description**	**Roll # Photo #**	**2007 Delineation Designation**	**Cowardin Classification**	**Acreage of Cowardin Classification**	**Geomorphic Setting**	**Comments**	**Jurisdictional Recommendation**
Wpt 103	Sec. 2 T7S R1E	R7 P20	Wetland	PEM and OW	2.364	Old Mine Pit	--	Non-jurisdictional
Wpt 104	Sec. 2 T7S R1E	R7 P21 R7 P22 R7 P23	Wetland	PUS	1.299	Depression	--	Non-jurisdictional

Table 5.4-18 Summary of 2007 Wetland Delineation Results

Summary		
Number of Features	**Name**	**Acres**
2	Wetland Channel (PEM)	0.756
2	Wetland Channel (R2EM)	13.393
1	Wetland Channel (R4SB7)	0.002
2	Wetland Channel (R4US)	0.048
4	PEM Isolated Ponds	2.043
1	PEMC Isolated Pond	0.005
1	PABJh Isolated Ponds	0.260
1	PUSA Isolated Ponds	0.030
3	PUB Isolated Depression	5.248
3	PUS Isolated Depression	2.706
5	Mine Pits PUB, PEM, OW	10.626
	Total	**35.114**
	Wetland Channel (PEM)	1,842.05 Linear Feet (0.35 mi)
	Wetland Channel (R2EM)	34,079.65 Linear Feet (6.45 mi)

5.4.4.2.3 Results

Beaver Creek

Beaver Creek is located in the northwest of the PAA in Sections 30, 31, and 32 in T6S, R1E. The entire stretch of Beaver Creek within PAA is designated as a R2EM wetland, for a total of 13.376 acres. Seven data forms were filled out for the variety of lengths in the drainage as well as four photo waypoints. The most common vegetation that was identified along the drainage was Spartina pectinata (prairie cordgrass), Juncus balticus (Baltic rush), and Schoenoplectus pungens (common three-square). These plants have an indicator status of FACW (facultative wet), FACW, and OBL (obligate) respectively.

Pass Creek

Pass Creek is centrally located within the PAA in T7S, R1E in Sections 3, 9, and 10, and T6S, R1E in Section 34. Pass Creek only had wetlands present in Section 9, primarily due to an old open flowing well on the other side of the road outside PAA. The wetland totaled 0.503 acres of PEM, a total of four datasheets were filled out. The common vegetation found within the wetland was prairie cordgrass and common three-square. The remaining drainage was walked and delineated, however no other wetlands were present. Five non-wetland datasheets were filled out and photo points were taken. Refer to Table 5.4-17, Summary of Wetlands within the PAA for more details.

Previously Mapped Wetlands Confirmed as a Non-Wetland

There were several National Wetlands Inventory 1977 previously mapped wetlands that were confirmed as non-wetland or not present during the 2007 field survey. The areas generally lacked hydrophytic vegetation, hydric soils, and hydrology. Most areas had geomorphic position but often lacked another secondary indicator. Datasheets were filled out to confirm no presence of these wetlands and can be found in Table 5.4-17, Summary of Wetlands within the PAA for more details. Previously mapped wetlands that are no longer present do not appear on the map (Exhibit 5.4-2).

Old Mine Pits
There are seven old uranium open pits present within the PAA. Four of the mine pits were classified as non-wetland primarily due to lack of hydrophytic vegetation and/or hydrology presence. Two mine pits located in T7S, R1E in Section 1 were classified as PUB wetlands. The only mine pit in Section 2 was classified as both a PEM and Open Water (OW). The PEM is located along the bank of the pit and OW throughout the rest of the pit. The mine pit in Section 34 T6S R1E was classified as OW and totaled 7.635 acres another small mine pit located at waypoint 92 is Section 1 T7S R1E was classified as OW at 0.452 acres. There were approximately 1.172 acres of wetlands and 9.451 acres of open water within old mine pits in the PAA. Refer to Table 5.4-17, Summary of Wetlands within the PAA for more details.

Depressional Areas and Ponded Areas Identified as Wetlands
All the depressional areas identified as wetlands in 2007 were also previously identified during the 1977 NWI mapping. All of these wetlands are recommended to be non-jurisdictional based on the isolated nature of the wetlands. The wetlands were primarily classified as PEM, PEMC, PABJh, PUS, PUSA and PUB wetlands based primarily on the hydrology conditions of each waypoint. There were approximately 10.292 acres of wetland depressions and ponds present within the PAA. Refer to Table 5.4-17, Summary of Wetlands within the PAA for more details.

Beaver Creek Update
Beaver Creek is likely to have wetlands throughout the entire PAA as it is a major drainage and had a good flow of water when the surveys were conducted in 2007. The boundary change took out 1.956 acres of R2EM wetlands along Beaver Creek in the NW1/4 of Section 31 T6S R1E. The boundary change also added 4.81 acres of R2EM wetlands along Beaver Creek in the SE1/4 of Section 31 T6S R1E and E1/2 of Section 5, the SW1/4 of Section 4 of T7S R1E. The total acreage addition to the wetlands along Beaver Creek was 2.86 acres of R2EM.

Small PEM and PUB isolated wetlands may be found SW of the Beaver Creek Drainage is Section 5, T7S R1E; however accessibility to the area was not present to confirm. There are two depressions that can be seen on the map and based on the 2007 surveys of the PAA the likelihood of the depressions being classified as a wetland is rare.

Pass Creek Update
In 2007, Pass Creek had 0.503 acres of PEM wetlands surveyed along its stretch; however due to the recent boundary change there are now only 0.05 acres of wetlands present on Pass Creek. The boundary change moved the boundary east of W22, and now excludes the three wetland points of W20, W21, and W22. The wetlands present on Pass Creek are primarily due to an old open flowing well on the other side of the road outside PAA.

In 2007, Pass Creek was surveyed from the southern project boundary to the old mine pit and no wetlands were identified except near the spring. No surveys were conducted on Pass Creek in 2008 as the map indicated that the area is likely dry.

Old Mine Pits
No changes to the acreages on the 2007 identified old mine pits wetland occurrences.

Depressional Areas and Ponded Areas Identified as Wetlands
No changes to the acreages on the 2007 depressional areas and ponded areas identified as wetlands. As noted above there may be some isolated PUB or PEM depressional areas SW of Beaver Creek, but accessibility to the area was not present during the 2008 surveys. However, it is unlikely that the areas indicated contain wetlands as the 2007 surveys proved that many of the potential wetlands indicated on the map and NWI no longer existed.

Approved Jurisdictional Determination

A summary the Approved Jurisdictional Determinations from the Department of the U.S. Army, Corps of Engineers (USACOE), Omaha District for 20 sites identified as wetlands associated with the Dewey-Burdock Project is provided in Appendix 5.4-H. Of the 20 sites identified, only four were deemed jurisdictional. They were Beaver Creek, Pass Creek and an ephemeral tributary to each. While it is not anticipated that the PA would require work in any of the jurisdictional waterbodies identified in the JDs, or any other waters of the United States, Powertech (USA) will seek authorization from the USACOE prior to conducting the work.

5.4.4.3 Wildlife

5.4.4.3.1 General Setting

Wildlife and aquatics sampling were conducted by ICF Jones & Stokes, of Gillette, Wyoming from July 2007 through early August 2008 to meet agency requirements of one year of baseline data, and to accommodate changes to the PAA boundary during that period.

Background information on terrestrial vertebrate wildlife species, and aquatic vertebrates and invertebrates in the vicinity of the Proposed Action was obtained from several sources, including records from SDGFP, BLM, USFWS, U.S. Forest Service (USFS), and the original DES prepared by the TVA in 1979. Previous site-specific data for the PA and surrounding perimeter were obtained from those same sources, with current data collected during regular site visits and targeted surveys conducted from July 2007 through early August 2008.

Current baseline wildlife information was collected for the PA from July 2007 through early August 2008. The survey area included the entire PAA (current as of September 2008), with additional surveys conducted on adjacent lands and in nearby riparian areas for certain species of concern. Due to changes in the PAA boundary after completion of the field surveys, a small portion of the northern-most perimeter was not included in the baseline surveys (refer to wildlife map). However, because those surveys were conducted in representative habitats throughout the PAA, and no new habitat types were included in expanded perimeter, it is the professional opinion of ICF Jones & Stokes that no information was lost for any unique or critical data by not having conducted certain surveys in the limited excluded portion of the one-mile perimeter. That area can be included in any future monitoring required by the SDGFP as a condition of future permitting actions, at their discretion.

Survey protocols and timing were developed collaboratively with SDGFP to meet species-specific requirements. The survey area included the PAA and one-mile perimeter for threatened and endangered (T and E) species, bald eagle winter roosts, all nesting raptors, upland game bird leks, and big game. Surveys conducted only in the PAA included other vertebrate species of concern tracked by the SDNHP, as well as bats, small mammals, lagomorphs, prairie dog (Cynomys spp.) colonies, breeding birds, predators, and herptiles (reptiles and amphibians). Aquatic sampling occurred at water gauge stations located in Beaver Creek upstream of the PAA, and in Beaver Creek and the Cheyenne River downstream of the area. In addition to these targeted efforts, incidental observations of all vertebrate wildlife species seen within the PAA were recorded during each site visit during the year-long baseline survey period. Surveys for black-footed ferrets (Mustela nigripes) were not required for this project due to a block clearance issued by the USFWS that includes the entire PAA and vicinity.

All surveys were conducted by qualified biologists using standard field equipment and appropriate field guides. Most observations were recorded from vantage points during pedestrian or vehicular surveys to avoid disturbing wildlife; exceptions included small mammal trapping and aquatic species sampling. Raptor nests, prairie dog colonies, and other features or observation points of special interest were mapped in the field using a hand-held GPS receiver to record the Universal Transverse Mercator (UTM, NAD27) coordinates.

5.4.4.3.2 Big Game

No crucial big game habitats or migration corridors are recognized by the SDGFP in the PAA or surrounding one-mile perimeter. Crucial range is defined as any particular seasonal range or habitat component that has been documented as the determining factor in a population's ability to maintain and reproduce itself at a certain level.

Pronghorn (Antilocapra americana) and mule deer (Odocoileus hemionus) are the only two big game species that regularly occur in the PAA, and both are considered year-round residents. Elk (Cervus elaphus) and white-tailed deer (O. virginianus) are also present in the survey area, but only in small herds. The latter two species can also be seen in the survey area year-round, but may be more common during different times of the year.

The pronghorn is the most common big game species in the Proposed Action survey area, though no species is prevalent. The pronghorn is a browse species and sagebrush-obligate, using shrubs for both forage and cover (Fitzgerald et al. 1994). Pronghorn herds were most often observed in sagebrush stands just beyond the north-central boundary of the PAA during winter 2007-2008. Conversely, herds were widely distributed throughout grassland habitats in the northwestern and southeastern portions of the survey area during spring, summer, and early fall 2008. In June, after the ground and water pools had dried up, water availability became a limiting factor and pronghorn began to move to, and concentrate around, more dependable water sources such as Beaver Creek and livestock tanks, and to draws with more succulent forage.

Mule deer use nearly all habitats, but prefer sagebrush-grassland, rough breaks, and riparian bottomland (Jones et al. 1983). Browse is an important component of the mule deer's diet throughout the year, comprising as much as 60 percent of total intake during autumn, while forbs and grasses typically make up the rest of their diet (Fitzgerald et al. 1994). In the Proposed Action survey area, mule deer were observed as individuals or in small herds in ponderosa pine and cottonwood riparian habitats along Beaver and Pass Creeks, and in the pine breaks along the eastern edge of the PAA. They are considered year-round residents in the survey area.

By nature, elk are shy animals that are less accepting of human disturbance than pronghorn (Fitzgerald et al. 1994) or deer. Elk in the Proposed Action survey area share their range with pronghorn and domestic cattle from spring through fall. Because elk prefer grass to shrubs, the resident herd competes more directly with domestic cattle and wild horses than with pronghorn in the spring and summer months. A herd of six bull elk was observed in the survey area in ponderosa pine habitat on one occasion (June 2008) during the baseline survey period, but local residents report that elk are frequently seen in the pine stands, especially during fall and winter.

White-tailed deer are typically associated with forests, woodlands, and treed galleries along streams (Fitzgerald et al. 1994). Small numbers of white-tailed deer were observed in the Proposed Action survey area during the baseline survey period, predominantly in the cottonwood corridor along Pass Creek in the central portion of the PAA. Most sightings of white-tailed deer were actually in the cottonwood corridor along the Cheyenne River, approximately 2-2.5 miles south of the PAA. This species is considered an uncommon year-round resident in the survey area itself.

5.4.4.3.3 Other Mammals

A variety of small and medium-sized mammalian species have the potential to occur in the Proposed Action survey area, although not all were observed in the PAA itself during the baseline wildlife surveys. These potential species include a variety of predators and furbearers such as the coyote (Canis latrans), red fox (Vulpes vulpes), raccoon (Procyon lotor), bobcat (Lynx rufus), badger (Taxidea taxus), beaver (Castor canadensis), and muskrat (Ondatra zibethicus).

Numerous prey species, including rodents (e.g., mice, rats, voles, gophers, ground squirrels, chipmunks, prairie dogs, etc.), jackrabbits (Lepus spp.), and cottontails (Sylvilagus spp.) can also be found in the Proposed Action survey area. These species are cyclically common and widespread throughout the region, and are important food sources for raptors and other predators. Each of these prey species, with the exception of chipmunks and rats, were either directly observed during the field surveys, or were known to exist through burrow formation or scat. Jackrabbit sightings were uncommon and cottontail sightings were below normal, suggesting these species are currently in a local downward trend. Observations of small mammals occurred most often near Beaver and Pass Creeks, in the northwestern and central portions of the survey area, respectively.

One black-tailed prairie dog (Cynomys ludovicianus) colony is located in the northwestern corner of the PAA, and two others are present in the southwestern portion of the one-mile perimeter. Local ranchers use shooting and other control methods to reduce and/or eradicate prairie dogs from the PAA (private surface) and surrounding private lands.

Other mammal species such as the striped skunk (Mephitis mephitis), porcupine (Erethizon dorsatum), and various weasels (Mustela spp.) inhabit sage-steppe communities, but no sightings or confirmed scat were recorded for these species during the surveys. Infrequent, incidental bat sightings (species unknown) occurred during nocturnal amphibian surveys and spotlighting efforts at targeted ponds in the PAA during the baseline period.

Small mammal trapping was conducted during fall 2007 as part of the baseline survey requirements for the Proposed Action. Trapping occurred in nine transects spread among six habitat types: Upland Grassland, Ponderosa Pine, Greasewood, Cottonwood Gallery, Clay Breaks, and Pine/Sage Edge. Grassland habitats occupy the largest parcels throughout the area, and held four transects; the remaining habitats held one transect each. Each transect included a combination of 20 live traps, 10 snap traps, and 5 pitfall traps. All traps were baited daily, with cotton balls placed in the live and pitfall traps for nesting material. Each transect was run for three consecutive days and nights (per SDGFP). Total trap nights per habitat ranged from 105 to 420 (upland grassland only), with a total of 945 trap nights across all habitats.

The deer mouse (Peromyscus maniculatus) dominated the captures, with only six individuals of other species recorded (Table 5.4-19). Deer mice are known for their ubiquitous presence and generalized habitat use, and these survey results are similar to those from other recent trapping efforts in northwest South Dakota and northeastern Wyoming.

Lagomorph (hares and rabbits) surveys are also a common component of baseline wildlife inventories. Spotlight lagomorph counts were conducted on two consecutive nights in fall 2007. Cottontail abundance was twice that of jackrabbits, though neither count was especially high (Table 5.4-20). Results from lagomorph surveys conducted in northeast Wyoming annually since 1984 indicate that the regional lagomorph population is experiencing a downward trend in its regular cyclic pattern. Although no data is available from the PAA prior to 2007, its proximity to the annual survey area in Wyoming suggests that the population trend is similar in southwestern South Dakota.

Table 5.4-19 Small Mammal Abundance during Trapping within the PAA in September 2007

	Captures per 100 trap-nights*						
Species	**UG**	**PP**	**GW**	**CG**	**CB**	**P/S**	**Total**
Deer mouse *Peromyscus maniculatus*	6.67	22.86	5.71	16.19	17.14	15.24	11.53
Olive-backed pocket mouse *Perognathus fasciatus*	0.71	--	--	--	--	--	0.32
Northern grasshopper mouse *Onychomys leucogaster*	0.24	--	--	--	--	--	0.11
Western harvest mouse (*Reithrodontomys megalotis*)	0.24	--	0.95	--	--	--	0.21
Total Abundance	7.86	22.86	6.67	16.19	17.14	15.24	12.17
Total No. of Species	4	1	2	1	1	1	4

* Excludes recaptures.

CB = Clay Breaks
CG = Cottonwood Gallery
GW = Greasewood
PP = Ponderosa Pine
P/S = Pine/Sage Edge
UG = Upland Grassland

Table 5.4-20 Total Lagomorphs Observed During Spotlight Surveys and Abundance Indices within the PAA in September 2007

	Species		
	White-tailed jackrabbit	**Cottontail**	**Totals**
Total Count	12	28	40
Lagomorphs/Survey Mile	1.5	3.4	4.9

[1] Survey route totaled 8.2 miles.
[2] Number given is highest count per species from two survey nights.

5.4.4.3.4 Raptors

Raptor species observed during the Proposed Action baseline wildlife surveys included the bald eagle, red-tailed hawk (Buteo jamaicensis), golden eagle (Aquila chrysaetos), ferruginous hawk (Buteo regalis), northern harrier (Circus cyaneus), American kestrel (Falco sparverius), turkey vulture (Cathartes aura), Cooper's hawk (Accipiter cooperii), rough-legged hawk (Buteo lagopus), merlin (Falco columbarius), great horned owl (Bubo virginianus), and long-eared owl (Asio otus). Other raptor species could also occur in the survey area, particularly as seasonal migrants, but were not seen during the 2007 and 2008 inventories.

Raptor sightings were recorded frequently throughout the Proposed Action survey area during 2007 and 2008 in ponderosa pine, cottonwood riparian, and grassland habitats. Observations were most concentrated in proximity to Beaver Creek and Pass Creek, perhaps because of prey availability due to the presence of water and better vegetative cover along those drainages. Raptors were observed hunting, perching on nest trees, power poles, and topographic features, nest tending, incubating, and exhibiting nest defense. The bald eagle, red-tailed hawk, American kestrel, and northern harrier were the most commonly seen raptor species in the area. Raptor sightings for those species were recorded with regularity during all four seasons during the baseline survey period, though some of those species may leave the area under harsher winter conditions.

Biologists watched for active raptor nests and breeding behavior (territory defense, courtship flights, prey deliveries, etc.) during all site visits within the breeding season. Additional nest searches were conducted concurrent with other surveys completed during the non-breeding season. Nests were monitored from a distance using binoculars and a spotting scope early in the nesting season to avoid impacting active nests. All active nests were monitored throughout the breeding season to determine their success and production level.

Five confirmed, intact (i.e., material present) raptor nests and one potential nest site were documented in the PAA during the 2007-2008 baseline survey period; two additional nests were recorded in the one-mile survey perimeter (see Wildlife Features map). All eight nests are listed in Table 5.4-21, including their locations, and their status and productivity in 2008. Three raptor species tracked by the SDNHP nested in the PAA. The bald eagle and long-eared owl (*Asio otus*) successfully nested within the PAA. A merlin (*Falco columbarius*) was recorded at a potential nest site in the pine breaks east of the current License boundary. The bird exhibited defensive behavior near the nest site, but no young or signs of active use (e.g., droppings, prey remains, egg shells, etc.) were recorded there.

Table 5.4-21 Raptor Nest Locations and Activity in and Within One Mile of the PAA during Baseline Wildlife Surveys from mid-July 2007 through early August 2008

Species[1,2]	¼ Section	Township/Range	Habitat	Status	Location
LEOW	**SESW 35**	**6 South/1 East**	**Ponderosa Pine**	**1+ owl fledged**	**Permit area**
RTHA (2 nests)	SENE 29	6 South/1 East	Ponderosa Pine	1 hawk fledged	Permit area
RTHA	SESW34	6 South/1 East	Cottonwood-riparian	2 hawks fledged	Permit area
BAEA	**Mid-SW 30**	**6 South/1 East**	**Cottonwood-riparian**	**1 eagle fledged**	**Permit area**
MERL	**NWSW 36**	**6 South/1 East**	**Ponderosa Pine**	**Nest defense but no confirmed young**	**1-mile perimeter**
GHOW	SWNE 5	7 South/1 East	Lone, live cottonwood tree	Status unknown[3]	Permit area
Unk Buteo	NESW 28	41 North/60 West (Wyoming)	Lone, dead cottonwood tree	Inactive	1-mile perimeter

[1] **Bold** species are tracked by the South Dakota Natural Heritage Program – South Dakota Department of Game, Fish and Parks (SDGFP web page, last updated September 2, 2008).
[2] Species Codes:
BAEA = Bald eagle
GHOW = Great horned owl
LEOW = Long-eared owl
MERL = Merlin
RTHA = Red-tailed hawk
Unk Buteo = Unknown *Buteo* (soaring hawks) species
[3] One adult GHOW was observed in the nest tree, but no chicks, feathers, droppings, or prey items were observed in or on the nest, or on the ground under the nest.

5.4.4.3.5 Upland Game Birds

The wild turkey (*Meleagris gallopavo*) and mourning dove (*Zenaida macroura*) were the only upland game bird species observed in the Proposed Action survey area during baseline inventories conducted from July 2007 to August 2008. Both species are relatively common and occur in a variety of woodland and open habitats in the PAA.

Three grouse species could potentially occur in the PAA (license area and one-mile perimeter): the greater sage-grouse (*Centrocercus urophasianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and ruffed grouse (*Bonasa umbellus*). The greater sage-grouse is a species of great concern throughout the west, and is considered a “landscape species” due to its use of wide expanses of sagebrush as primary habitat during each phase of its life cycle. Searches for grouse leks were completed between April 7 and May 12, 2008. Surveys were conducted between first light and approximately one hour after sunrise. Biologists searched for displaying grouse by driving through the PAA and one-mile perimeter, and making frequent stops at vantage points to scan and listen for displaying birds. Although sage-grouse were historically recorded in the general vicinity (TVA DES 1979), no leks have been documented by agency biologists within 6 miles of the PAA in recent years. No grouse were observed during the entire year-long baseline survey period for this project. Potential habitat for sage-grouse is present, but only in small stands of sage surrounded by grasslands and pine breaks; such habitat is not conducive to supporting a population of sage-grouse.

5.4.4.3.6 Other Birds

Lists of avian species tracked by the SDNHP were obtained from Mr. S. Michals (SDGFP) in July 2007 and the SDGFP website in September 2008. Biologists watched for all vertebrate species of concern during each site visit to the PAA during the year-long baseline survey period. All observations were recorded, including notes on species, number of individuals, age and sex (when possible), location, habitat, and activity. Three species of special interest (i.e., tracked by the SDNHP) were observed while conducting other surveys during the baseline inventory period: the Cooper’s hawk (*Accipiter cooperii*), golden eagle (*Aquila chrysaetos*), and Clark’s nutcracker (*Nucifraga columbiana*). All three species were briefly observed flying over the PAA, but no known nesting or other targeted use was recorded by these species.

In addition to those incidental observations, targeted surveys for breeding birds (primarily passerines) were conducted in the same habitats and along the same general transects within the PAA as the small mammal trapping. Four transects were surveyed in Upland Grassland, and one each in the remaining five habitat types. Breeding bird surveys were conducted using belt transects measuring 100 m wide by 1,000 m long. Transects were surveyed by slowly walking through the center of each line and stopping at least every 50 m to watch and listen for birds. Individuals observed while walking were also recorded, with efforts made to avoid double counting birds. Each transect was surveyed on three consecutive mornings in June 2008. To reduce bias, surveys started in a different habitat type each morning. Surveys began between dawn and sunrise, and were completed within four hours. All birds were identified to species. Flyovers and birds seen and heard beyond the transect boundaries were recorded as incidentals, but were not included in the analysis. Surveys were not conducted during inclement weather (precipitation, moderate to heavy winds, etc.).

Weather conditions during all surveys were mostly calm and clear, with a light breeze and approximately 25 percent high, thin cloud cover. Thirty-six species were observed within the breeding bird transects during spring 2008, with two additional unknown species logged (Table 5.4-22). The western meadowlark (*Sturnella neglecta*) was the most common species, followed by the mourning dove. The dove was the only species recorded in all six habitat types. The long-billed curlew (*Numenius americanus*) was the only species of the 36 observed that is tracked by the SDNHP. As expected, several species were associated with specific habitat types. For example, the curlew was only seen in the grassland transects (Table 5.4-22). Likewise, several species typically associated with trees were only observed in or immediately adjacent to the Cottonwood Gallery or Ponderosa Pine transects: the chipping sparrow (*Spizella passerina*), mountain bluebird (*Sialia currucoides*), black-capped chickadee (*Poecile atricapillus*), and yellow-rumped warbler (*Dendroica coronata*), among others. Similar associations were noted between other species and habitats.

Table 5.4-22 Breeding Bird Species Richness and Relative Abundance in Six Habitat Types within the PAA in June 2008

	Average Number of Birds per Habitat Type[1]						
Species[2]	**BB**	**COT GAL**	**G**	**GW**	**P-SB Edge**	**PP**	**AVG #/PLOT**
Western meadowlark (*Sturnella neglecta*)	3.0	1.7	2.9	7.0	2.0	---	2.8
Mourning dove (*Zenaida macroura*)	5.0	1.7	1.9	0.7	0.3	2.0	1.9
Long-billed curlew (*Numenius americanus*)	**---**	**---**	**1.9**	**---**	**---**	**---**	**0.9**
Chipping sparrow (*Spizella passerina*)	---	---	---	0.3	4.0	1.6	0.6
Lark sparrow (*Chondestes grammacus*)	3.7	---	---	---	1.7	---	0.6
Grasshopper sparrow (*Ammodramus savannarum*)	---	---	0.1	4.3	---	---	0.5
Northern flicker (*Colaptes auratus*)	---	4.3	---	0.3	---	---	0.5
Mountain bluebird (*Sialia currucoides*)	---	---	---	---	2.3	2.0	0.5
Brewer's blackbird (*Euphagus cyanocephalus*)	---	3.7	---	---	---	---	0.4
Spotted towhee (*Pipilo maculatus*)	---	1.3	---	0.3	0.7	1.0	0.4
American kestrel (*Falco sparverius*)	0.3	2.3	0.2	---	---	---	0.4
Brown-headed cowbird (*Molothrus ater*)	---	0.3	---	---	2.0	1.0	0.4
House wren (*Troglodytes aedon*)	---	2.7	---	---	---	---	0.3
Yellow warbler (*Dendroica petechia*)	---	2.0	---	---	---	---	0.2
Say's phoebe (*Sayornis saya*)	---	0.3	---	---	1.3	---	0.2
Bullock's oriole (*Icterus bullockii*)	---	1.7	---	---	---	---	0.2
Unknown flycatcher	---	---	---	---	---	1.7	0.2
Eastern kingbird (*Tyrannus tyrannus*)	---	1.3	---	---	---	---	0.1
Red-tailed hawk (*Buteo jamaicensis*)	---	0.3	0.1	0.3	---	---	0.1
Black-capped chickadee (*Poecile atricapillus*)	---	0.3	---	---	---	0.7	0.1
Yellow-rumped warbler (*Dendroica coronata*)	---	0.3	---	---	---	0.7	0.1

Table 5.4-22 Breeding Bird Species Richness and Relative Abundance in Six Habitat Types within the PAA in June 2008 (concl.)

Species[2]	Average Number of Birds per Habitat Type[1]						
	BB	COT GAL	G	GW	P-SB Edge	PP	AVG #/PLOT
European starling (*Sturnus vulgaris*)	---	1.0	---	---	---	---	0.1
Great horned owl (*Bubo virginianus*)	---	1.0	---	---	---	---	0.1
Vesper sparrow (*Pooecetes gramineus*)	---	---	0.3	---	---	---	0.1
American crow (*Corvus brachyrhynchos*)	---	---	0.1	---	---	0.3	0.1
Red-headed woodpecker (*Melanerpes erythrocephalus*)	---	0.7	---	---	---	---	0.1
Rock wren (*Salpinctes obsoletus*)	0.7	---	---	---	---	---	0.1
Western kingbird (*Tyrannus verticalis*)	I	0.7	---	---	---	---	0.1
American robin (*Turdus migratorius*)	---	0.3	---	---	---	---	<0.1
Common nighthawk (*Chordeiles minor*)	---	I	---	---	---	0.3	<0.1
Indigo bunting (*Passerina cyanea*)	---	0.3	---	---	---	---	<0.1
Killdeer (*Charadrius vociferous*)	---	---	0.1	---	---	---	<0.1
Lazuli bunting (*Passerina amoena*)	---	0.3	---	---	---	---	<0.1
Western wood peewee (*Contopus sordidulus*)	---	---	---	---	0.3	---	<0.1
Yellow-breasted chat (*Icteria virens*)	---	0.3	---	---	---	---	<0.1
Red-winged blackbird (*Agelaius phoeniceus*)	---	---	I	---	---	---	I
Turkey vulture (*Carthartes aura*)	I	I	---	---	---	---	I
Average # Birds/Transect	12.3	29.0	7.7	13.3	15.3	10.7	12.4
TOTAL SPECIES	5	23	10	7	10	10	36

BB = Bentonite breaks
COT GAL = Cottonwood Gallery
G = Grassland
GW = Greasewood
P-SB = Pine-sagebrush
PP = Ponderosa pine

I = Incidental flyover during breeding bird survey (not counted in totals)
[2] **Bold** species are tracked by the South Dakota Natural Heritage Program – South Dakota Department of Game, Fish and Parks (SDGFP web page, last updated September 2, 2008).

5.4.4.3.7 Waterfowl, Shorebirds

Under natural conditions, the PAA provides limited seasonal habitat for waterfowl and shorebirds. As described previously, natural aquatic habitats in the PAA occur mainly in Beaver Creek and Pass Creek, with a few scattered stock reservoirs also present. Because of the limited precipitation in the area, such habitats are available primarily during the spring migration period, with less reliable nesting and brood-rearing habitat in the area.

Although specific surveys for waterfowl and shorebirds were not required for the uranium project, biologists recorded all birds seen during the year-long survey period. Eight species associated specifically with water and/or wetlands were observed during the baseline inventories: the American white pelican (*Pelecanus erythrorhynchos*), great blue heron (*Ardea herodias*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), American wigeon (*Anas americana*), killdeer (*Charadrius vociferus*), long-billed curlew, and upland sandpiper (*Bartramia longicauda*). The pelican, heron, and curlew are tracked by the SDNHP.

5.4.4.3.8 Reptiles and Amphibians

The aquatic resources present within the PAA and surrounding perimeter have been thoroughly described in previous sections. Water is a limiting factor throughout the survey area and surrounding lands, with only one perennial stream passing through the western extent of the PAA and all other natural flow categorized as intermittent or ephemeral. Even the perennial Beaver Creek experiences extended periods of low volume and flow in most years. The creeks are meandering streams with extended reaches of muddy soil substrates and intermittent riparian vegetation. Aquatic species are not locally common inhabitants of the PAA. The lack of deep-water habitat and multiple perennial water sources limits the presence of fish, and decreases the potential for other aquatic species to exist.

Three aquatic or semi-aquatic amphibian species and one aquatic reptile were recorded during the 2007 and 2008 surveys PAA: the boreal chorus frog (*Pseudacris triseriata*), Woodhouse's toad (*Bufo woodhousei*), great plains toad (*B. cognatus*), and western painted turtle (*Chrysemys picta*). All four species were heard and/or seen in Beaver Creek as it flows through the western portion of the PAA, or near stock reservoirs. All four species are common to the PAA, and the region as a whole. One additional aquatic reptile was recorded in the perimeter surrounding the PAA, the western spiny softshell (*Trionyx spiniferus*). That observation also occurred in Beaver Creek, during the July 2008 fisheries sampling session.

Lizards (species unknown) were often observed sunning themselves on rocks and on sandy soil in the summer months during all except the early morning hours. These sightings were widespread throughout the survey area, with observations increasing as the summer progressed and the days got hotter. The shed remains of a snake skin were found in the north central portion of the survey perimeter in early May, 2007. The skin was at the base of a rock outcrop and looked as though it may have belonged to a bullsnake (*Pituophis cantenifer*).

5.4.4.4 Threatened, Endangered, or Candidate Species and Species Tracked by SDNHP

5.4.4.4.1 Federally Listed Species

No federally listed vertebrate species were documented in the PA survey area (current PAA and one-mile perimeter) during the year-long survey period. The black-footed ferret was the only federal T&E vertebrate species that could potentially occur in the PAA (http://www.sdgfp.info/Wildlife/Diversity/RareAnimal.htm 9/25/08). The U.S. Fish and Wildlife Service issued a block-clearance for ferrets throughout the entire state of South Dakota in recent years, including the Proposed Action survey area in extreme southwestern Custer County and northwestern Fall River County (C. Bessken, USFWS Biologist-SD, personal communication to G. McKee, Jones & Stokes, July 2, 2008). The only exception to that clearance is in Custer State Park in northern Custer County. Although ferret surveys were not required for the Proposed Action, they were conducted in the general vicinity of the PAA during monitoring performed for the TVA DES in fall 1977 (TVA DES 1979). No ferrets or evidence of their presence (e.g., trenching, tracks, or scat) were observed during those historic surveys, or during the recent project survey period. As described previously, one black-tailed prairie dog colony is located in the northwestern corner of the PAA, and two others are present in the southwestern portion of the one-mile perimeter. Local ranchers use shooting and other control methods to reduce and/or eradicate prairie dogs from the PAA (private surface) and surrounding private lands.

5.4.4.4.2 State Listed Species
The State of South Dakota lists 23 vertebrate species as threatened or endangered:

- Threatened: 4 fish, 4 birds, 2 mammals, 1 snake, and 1 turtle
- Endangered: 5 fish, 4 birds, 1 mammal, and 1 snake

The current list of these state species is available on the SDGFP website: http://www.sdgfp.info/Wildlife/Diversity/TES.htm.

Only 1 of those 23 state-level T&E species was documented within the PAA or one-mile perimeter during the survey period (mid-July 2007 through early August 2008). Although the bald eagle was removed from the federal listing process in August 2007, it is still considered as a threatened species at the state level in South Dakota. Bald eagles were repeatedly observed along Beaver Creek in the western portion of the proposed permit area and perimeter during winter roost surveys conducted in late 2007 and early 2008. One active bald eagle nest is located in the northwestern portion of the revised permit area in mid-SW¼ Section 30, Township 6 South, Range 1 East. The nest is in a cottonwood tree along Beaver Creek. The nest fledged one young in 2008.

A northern river otter (*Lontra canadensis*) carcass was unexpectedly discovered at the upstream fisheries sampling point along the Wyoming reach of Beaver Creek in April 2008. The upstream Beaver Creek sampling station (BVC04) was located just east of Highway 85 where it crosses Beaver Creek south of milepost 212 south of Newcastle, Weston County, Wyoming, approximately 12 stream miles (3 linear miles) northwest of the PAA boundary. The otter may have come downstream from Wyoming or upstream from the Cheyenne River during the flooding that occurred in early April. The cause of death was not apparent. The carcass was gone by the July sampling period, presumably washed back downstream with the next flood event. Otters are listed as threatened by the State of South Dakota, and are tracked by the SDNHP.

5.4.4.4.3 Species Tracked by SDNHP
As described in previous sections, current lists of other vertebrate species of interest or concern tracked by the SDNHP were obtained from SDGFP through personal contacts (July 2007) and from the agency's website (September 2008).

Six vertebrate sensitive species or species of local concern other than the bald eagle were documented within the current (September 2008 configuration) PAA during the baseline survey period: the long-billed curlew, great blue heron, golden eagle, Cooper's hawk, American white pelican, and long-eared owl. The long-eared owl and curlew are known or are suspected to have nested in the permit area, based on evidence (young present) or persistent defensive behavior, respectively. The heron, golden eagle, Cooper's hawk, and pelican were merely observed flying over the area; those four species were recorded only once each.

These six species of special interest are considered as secure populations within their respective overall ranges, though one or more could be less common in parts of a given range, especially in the periphery. Likewise, all six are considered to be either rare and local throughout their statewide ranges, or locally abundant in restricted portions of those ranges.

Three additional vertebrate species of concern were documented at least once each in the one-mile perimeter: the merlin, Clark's nutcracker, and plains topminnow (*Fundulus sciadicus*). The birds were described in preceding sections of this document. The topminnow was captured during fisheries sampling efforts in Beaver Creek, beyond all permit boundary outlines, in July 2008. Additional information about those survey efforts and results is presented in Aquatic Resources, below.

5.4.4.5 Aquatic Resources

The fisheries sampling locations correlated with water sampling stations that were selected by a South Dakota permitting contractor for the Proposed Action and approved by SDGFP. That contractor monitored the water stations on a monthly basis for at least one year prior to this licensing application. This co-sampling effort was intended to provide information regarding stream flow and other physical characteristics relative to fish and macro-invertebrate composition.

5.4.4.5.1 Aquatic Species and Habitats

5.4.4.5.1.1 Aquatic Species and Habitats-Survey Methods

Because Beaver Creek is the only perennial stream in the PAA, and is the receiving water for drainage from the portions of the PAA identified for proposed future ISL activities, it was the focus of aquatic habitat monitoring efforts conducted for this project. Some sampling was also conducted in the Cheyenne River downstream of the PAA to obtain additional site data. Beaver Creek is listed as impaired under Section 303(d) of the federal Clean Water Act for the following constituents: oil, specific conductivity, temperature, total dissolved solids, and total suspended solids (EPA 2008).

Baseline monitoring stations were located at sites that were previously established as water quality monitoring locations on Beaver Creek and the Cheyenne River. Using these sites allows a comparison with past and ongoing water quality records. One site (BVC04) is located upstream and the other (BVC01) is downstream of the proposed ISL activities (see Figure 5.1-12). Fish sampling for species, abundance, and radiological testing was conducted at both Beaver Creek sites, and at a site on the Cheyenne River downstream of the Beaver Creek confluence (site CHR05).

Baseline sampling of aquatic habitat, benthic macro-invertebrates, and fish was conducted according to protocols developed by the South Dakota Department of Environment and Natural Resources (SDDENR 2002) and the SDPFG (S. Michals, personal communication 2008). Aquatic data collected at the two Beaver Creek sites during the baseline sampling included: stream habitat description; aquatic benthic macro-invertebrate community composition; the variety, condition, and relative abundance of fish species; and radiological analysis of fish collected. As indicated, fish sampling also occurred at CHR05, though SDGFP did not require the other aquatic sampling efforts to be conducted at that location.

Habitat, invertebrate, and fish sampling was conducted during spring (April) and summer (July) conditions in 2008 to provide a baseline for semi-annual monitoring described in NRC Guide 4.14 (NRC 1990). This timing was selected to capture seasonal differences, including high and base flow conditions. However, the late spring and early summer of 2008 were unusually wet and, as a result, the flow during both seasonal events was similar. Consequently, neither sampling effort represented the low summer flow conditions that have typically occurred at these sites in recent years (M. Hollenbeck, personal communication 2008).

The habitat description and invertebrate collection efforts followed the SDDENR protocol (SDDENR 2002). Eleven cross-section transects were established at equidistant intervals from the downstream end of each sample site. The longitudinal distance of each survey reach was established as the distance equal to 30 average channel widths as determined by 10 preliminary width measurements.

Fish sampling was accomplished by blocking and seining a 100-m survey reach downstream of each sample site, according to SDPFG guidelines (S. Michals, personal communication 2008). Due to obstacles in the stream, it was not feasible to seine an entire reach in one sweep, so three separate sweeps were made at a given sample site and fish were collected on shore at three locations within each 100-m reach. All fish captured were identified, counted, measured, and weighed. Individuals that were less than 100 millimeters (mm) in length were combined for a composite weight by species.

Numerous fish were collected for radiological testing during each of the spring and summer flow sampling events. The initial target at each sample site was six individual fish, preferably from six different species (i.e., 6 fish per sample site, 18 total fish), though fewer fish were retained if the target was not achieved. Many of the specimens collected in April 2008 contained no detectable Uranium. In an effort to improve the protocol to better represent conditions in sampled fish populations, up to five individuals of each of six species (i.e., 30 fish per sample site, 90 total fish) were collected in July (when available in the catch) and processed for radiology.

Live fish were bagged, frozen, and kept frozen until they were analyzed for the following:

- Uranium (mg/kg)
- Uranium (µCi/kg)
- Thorium-230 (µCi/kg)
- Radium-226 (µCi/kg)
- Lead-210 (µCi/kg)
- Polonium-210 (µCi/kg)

These analytes are specified in NRC Guide 4.14. Analysis was conducted by Energy Laboratories Inc., in Casper, Wyoming. Lab results are included in Appendix 5.4-I, and are summarized in Table 5.4-23.

Table 5.4-23 Beaver Creek Baseline Radiological Analysis of Whole Fish

Site	Species	No.	Length[a] mm	Sample Weight [b] - g	U mg/kg	U uCi/Kg	Po 210 uCi/Kg	Pb 210 uCi/Kg	Th 230 uCi/Kg	Ra 226 uCi/Kg
BVC01 - April	GRS	1	120	22.96	ND	ND	u	u	u	0.0003
	PLK	1	48	1.77	ND	ND	u	0.02[c]	0.0002	u
	LND	1	48	0.64	ND	ND	0.002	u	0.0001	u
	FHM	1	30-60	4	ND	ND	0.0004	u	u	u
BVC04-April	PLK	1	40-60	0.72	ND	ND	u	u	u	u
	RIC	1	111	18.79	ND	ND	0.0004	u	0.00002	u
	GRS	1	50	2.16	ND	ND	0.0006	u	0.0008	u
	FHM	1	30-70	~1.2	ND	ND	u	u	0.00001	0.0004
	CHC	1	215	72	0.05	30	0.0009	u	0.00002	u
CHR05-April	RIC	1	97	13.73	ND	ND	0.0008	u	u	u
	GRS	1	98	13.67	ND	ND	0.00008	u	0.00001	u
	SRS	1	169	55.05	ND	ND	0.0002	u	0.00002	u
	CRC	1	30-70	2.92	ND	ND	u	u	u	u
	PLK	1	32-74	1.51	ND	ND	u	u	0.0001	u
	SAS	1	30-60	1.51	ND	ND	u	u	0.001	u
BVC01-July	FHM	5	42-67	~8	0.026	0.000018	0.0004	u	u	u
	CAP	1	171	73	0.0098	0.0000067	0.00078	u	u	u
	SAS	5	46-62	7	0.031	0.000021	0.00023	u	0.000098	u
	PLK	5	57-71	9	0.035	0.000024	0.00047	u	u	u
	PLT	5	48-71	12	0.021	0.000014	0.00035	u	0.0001	u
BVC04-July	SAS	5	45-58	~6.7	0.024	0.000016	0.00054	u	0.000027	u
	FHM	5	42-61	~3.7	0.031	0.000021	0.00018	u	u	u
	CAP	1	260	237	0.014	0.0000094	0.00015	u	0.0000023	u
	PLK	5	48-68	~7.2	0.019	0.000013	u	u	0.000094	u
	SRS	1	136	130	0.0072	0.0000049	0.00017	u	u	u
CHR05-July	FHM	5	38-60	~0.7	0.024	0.000016	0.00042	u	u	u
	SAS	5	42-60	~1.5	0.04	0.000027	0.00049	u	0.00014	u
	CAP	1	135	31	0.01	0.0000069	0.00074	u	0.000017	u
	RIC	4	381-415	5150	0.031	0.000021	u	u	u	0.000008
	SRS	2	146-160	78	0.0066	0.0000044	0.00005	u	0.0000032	u
	PLK	4	46-68	~7.4	0.017	0.000012	0.00047	u	u	u
	CHC	3	181-290	265	0.017	0.000012	0.00016	u	0.000009	u

5.4.4.5.1.2 Aquatic Species and Habitat-Survey Results

5.4.4.5.1.2.1.1 Habitat

Compiled habitat data forms may be found in Appendix 5.4-J. Summaries of results by site are described below.

Site BVC04

Site BVC04 is located downstream of the Old Highway 85 bridge over Beaver Creek in Weston County, WY (see Figure 5.1-12). This site was selected as the background site as it is upstream of all proposed activity. At BVC04, Beaver Creek is a low gradient prairie stream that is deeply incised in places, is subject to large fluctuations in flow, and shows significant evidence of active erosion (bank slumping, bare soil) and sediment deposition on stream banks and in slow moving pools.

April

The preliminary average channel width at BVC04 was 7.35 m. Sample transects were located 18.5 m apart, with a total surveyed reach length of 185 m. During the April habitat survey, water temperature varied from 7.0 degrees Celsius (C) to 16.0 degrees C, indicating that stream temperature is highly variable during the day. In general, riparian vegetation is limited to herbaceous and short shrubs, with only occasional trees. With the exception of the bridge, there was no shade present in the center of the channel. As a result, the creek is subject to substantial solar heating during the day. Water was clear during the survey, although specific conductivity was high (5,109 µS/cm), indicating a high concentration of dissolved solids typical of prairie streams in this region. Discharge at BVC04 was 7.31 cfs on April 14.

Within the BVC04 survey reach, habitat included two large pools, two glides, and 3 riffles. The total length of riffles was 54.6 m.

Beaver Creek carries a heavy sediment load during high flow, resulting in a deep layer (up to 2 feet) of fine silt deposited in pools. Silt dominates the sediment composition of the reach, although sand, gravel and cobbles dominate the substrate of the faster moving riffle and glide areas. The cumulative and proportional particle distribution of sediment in the BVC04 reach during the April survey is shown in Figure 5.4-4. This distribution indicates a predominance of silt and sand, with gravel in the riffle areas. Large wood in the reach was located in riffle and glide areas and was generally comprised of small (0.1- to 0.25-m diameter) pieces in the portion of the channel between the wetted channel and the bank full elevation.

Beaver Creek is significantly incised. Bank slumpage was observed at eight transects and erosion at ten of the eleven transects in this reach. The wetted stream width during the survey was 4.2 to 10.7 m; bank-full width ranged from 5.3 to 11.3 m; and the width at the top of bank was 10.7 to 17.1 m. Bank height was up to 2.0 m. Riparian land use is rangeland with no riparian buffer, cattle have access to the stream, especially in the vicinity of the bridge. Woody vegetation has probably been sparse along Beaver Creek stream banks for many years, which may have contributed to channel down-cutting and erosion, and a general lack of large woody debris and cover in the channel. Examples of channel dimensions in pool, riffle, and run habitat types of the upstream (BVC04) site are shown in Figures 5.4-5, 5.4-6, and 5.4-7, below.

As mentioned previously, pools contained a large volume of silt. This silt reduces the depth and volume of the pools, reducing the quality and quantity of available fish habitat. Due to pool filling and lack of cover, pool quality is poor.

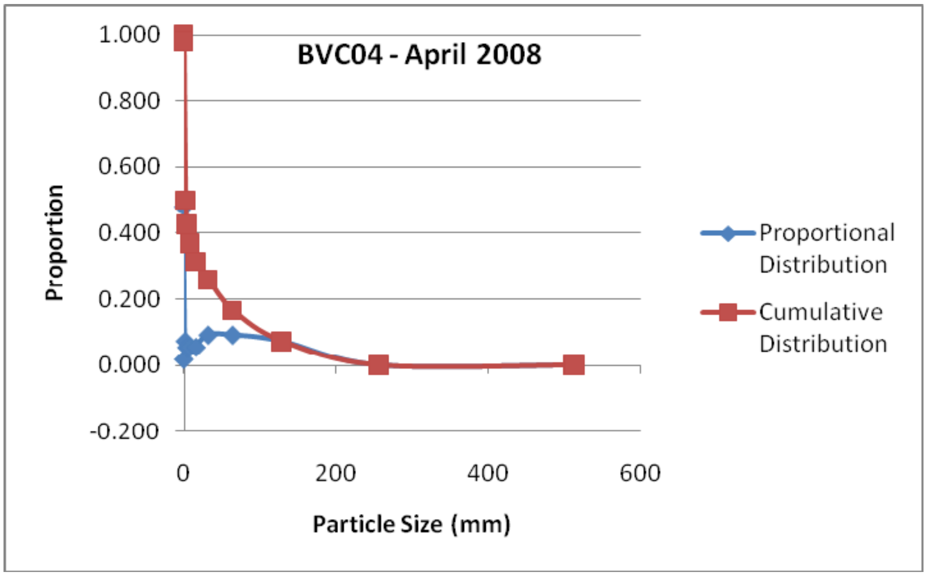

Figure 5.4-4 Cumulative and Proportional Sediment Particle Distribution at Site BVC04, Transects 1 through 11 Combined, April 2008

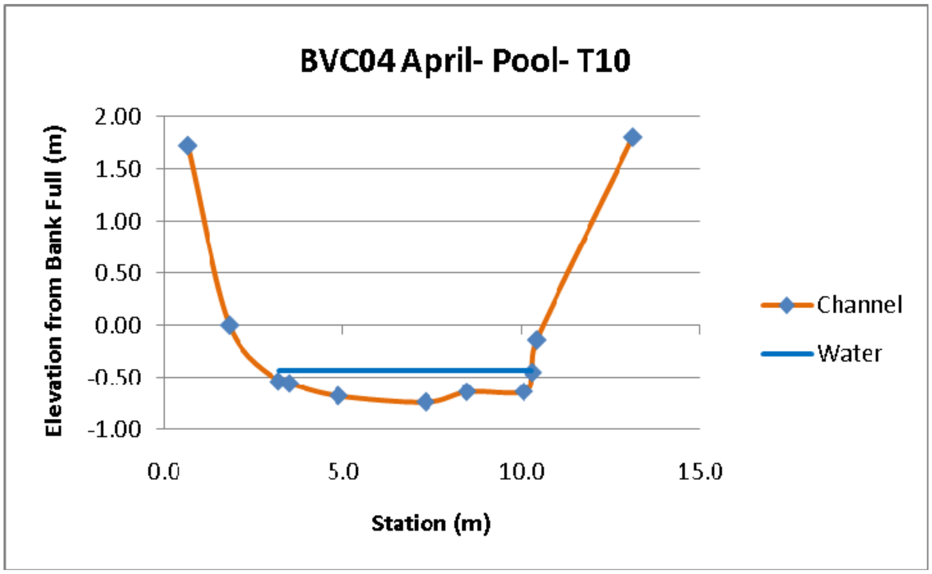

Figure 5.4-5 Channel Dimensions in Pool Habitat, Transect 10

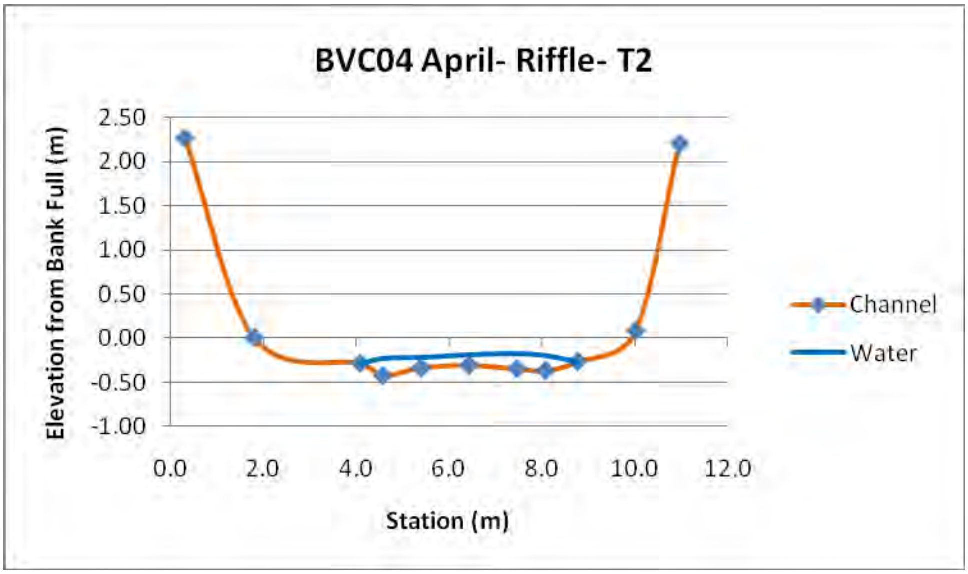

Figure 5.4-6 Channel Dimensions in Riffle Habitat, Transect 2

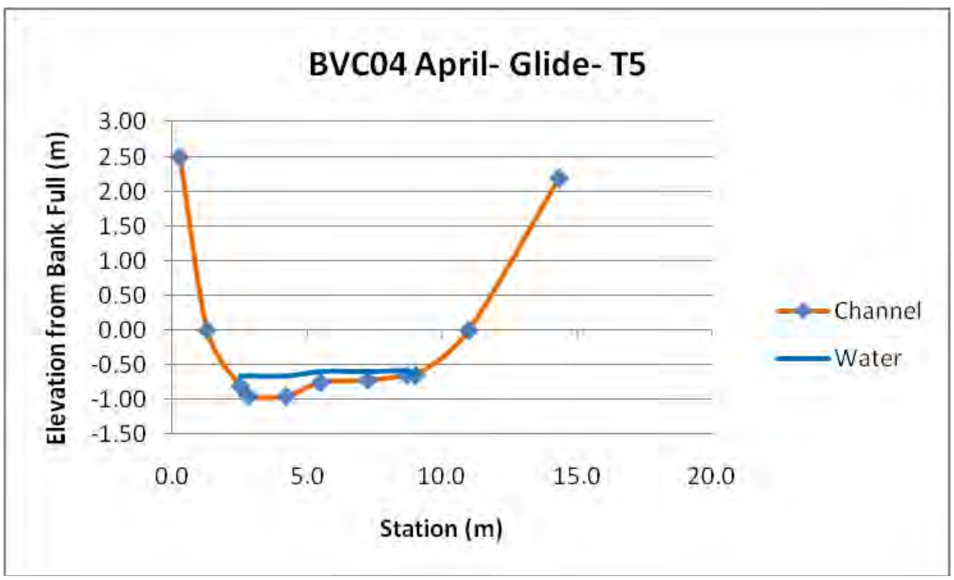

Figure 5.4-7 Channel Dimensions in Glide Habitat, Transect 5

July

In July 2008, the channel dimensions were essentially the same as measured during April, with some localized changes. Between the April and July field visits Beaver Creek experienced high flows that appeared to have resulted in somewhat less fine sediment in the pools, and transport of woody debris out of the survey reach. Stream discharge in July was 12.3 cfs, approximately 5 cfs higher than in April. The average wetted width measured was 6.9 m in April and 7.5 min July.

The July air temperature reached 25 degrees to 35 degrees C and water temperatures were quite warm at 23 degrees C to 24 degrees C. As during April, riparian vegetation was limited to herbaceous and short shrubs, with only occasional trees. Shade along the banks was greater in July, since trees were generally bare in April and fully leafed-out in July. However, most of the stream channel itself was unshaded during both site visits indicating a high degree of solar warming is typical in Beaver Creek.

Within the BVC04 survey reach, habitat included one pool, three glides, and three riffles. The total length of riffles was 59.9, although two riffle segments ran to either side of an island. If these two are considered together, the riffle length measured 43.9 m.

As described under spring conditions, fine silt dominated the sediment composition of the reach and filled the larger part of the pools in at this site. Sand, gravel and cobbles dominate the substrate of the faster moving riffle and glides. The cumulative and proportional particle distribution of sediment for the BVC04 reach during the summer survey is shown in Figure 5.4-8 demonstrating a slightly higher proportion of gravel in the overall substrate composition than in April.

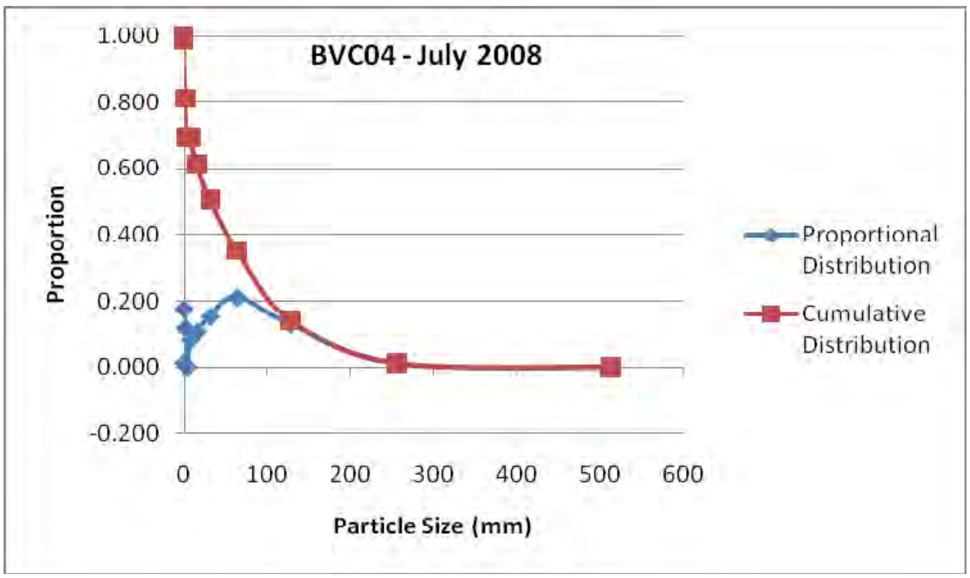

Figure 5.4-8 Cumulative Sediment Particle Distribution at Site BVC04, Transects 1 through 11 Combined during July

Large wood in the reach was essentially absent in July. Small pieces that had been present in April apparently were washed out of the survey reach during the peak flows that occurred in June.

The wetted stream width during the summer survey was 4.3 to 10.1 m; bank-full width ranged from 6.0 to 11.2 m; and the width at the top of bank was 15.0 to 21.0 m. Bank height was 2.1 to 3.9 m.

As mentioned previously, pools contained a large volume of silt. This silt reduces the depth and volume of the pools, reducing the quality and quantity of available fish habitat. Due to pool filling and lack of cover, pool quality is poor.

Site BVC01

Site BVC01 is located upstream of the Argentine Road bridge over Beaver Creek in Fall County, SD. This site was selected as the test site as it is downstream of most proposed production activity and all proposed process water land application sites.

At BVC01, Beaver Creek is still a low gradient, incised prairie stream as it is at BVC04. However, the stream gradient is slightly higher and banks are generally lower. Riparian habitat along BVC01 is more actively managed for cattle grazing than BVC04 and there are fewer trees and shrubs and more grass at

BVC01 than at BVC04. Fine sediment was present in pools. However, there appeared to be less fine sediment in July indicating that high flows transported sediment out of this reach.

April
The preliminary average channel width at BVC01 was 7.35 m. Sample transects were located 22 m apart, with a total surveyed reach length of 220 m.

During the April habitat and fish surveys, water temperature varied from 11.8 degrees C to 16.9 degrees C, indicating that stream temperature at this site is also variable during the day. As was the case at site BVC04, riparian vegetation at BVC01 was limited to herbaceous and short shrubs, with only a single boxelder tree in the survey reach. With the exception of the bridge, there was no shade present in the center of the channel and the creek is subject to substantial solar heating during the day.

Water was clear during the survey, although specific conductivity was high (7,186 µS/cm); somewhat higher than observed at BVC04. Discharge at BVC01 was 5.08 cfs on April 14, 2008.

Within the BVC01 survey reach, habitat included three pools, two glides, and three riffles. The total length of riffles was 28 m.

Overall, gravel dominated the sediment composition of the BVC01 reach. The cumulative and proportional particle distribution of sediment for the BVC01 reach during the April survey is shown in Figure 5.4-9. This distribution indicates a predominance of gravel with some fine sediment. The fine sediment was primarily confined to pool areas.

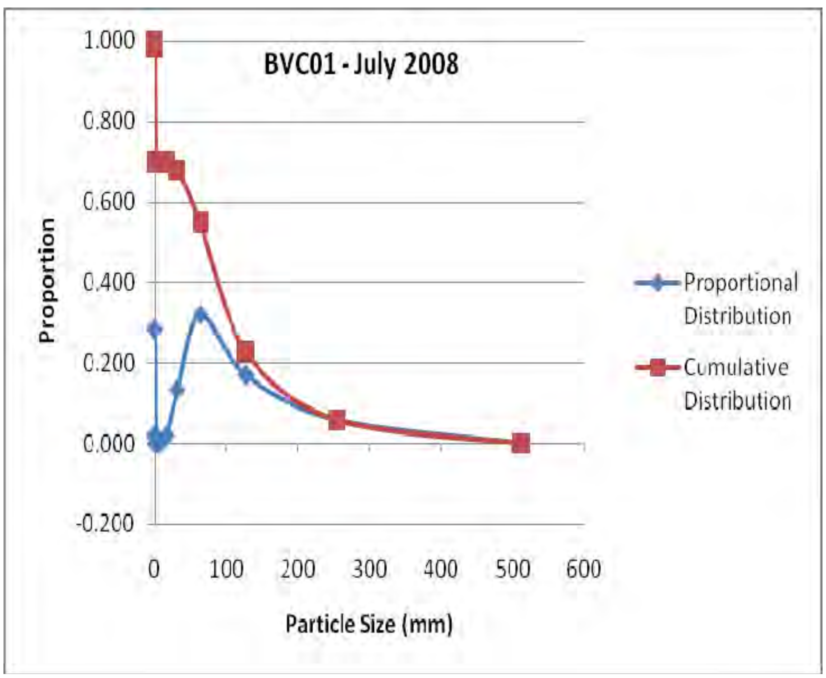

Figure 5.4-9 Cumulative and Proportional Sediment Particle Distribution at Site BVC01, Transects 1 through 11 Combined, April 2008

Beaver Creek is significantly incised along the BVC01 reach, although bank height was generally lower than at the upstream (BVC04) site. Bank slumpage was observed at nine transects and erosion at seven of the eleven transects in this reach. The wetted stream width during the April survey was 3.5 to 7.8 m; bank-full width ranged from 6.5 to 10.2 m; and the width at the top of bank was 12.0 to 17.4 m. Bank height was 1.3 to 2.0 m. Riparian land use is rangeland with no riparian buffer, cattle have access to the stream, especially in the vicinity of the bridge and transect 1. Woody vegetation is nearly absent from the vicinity of BVC01 and no woody debris was observed in the BVC01 survey reach.

Examples of channel dimensions in pool, riffle, and run habitat types are shown in Figures 5.4-10, 5.4-11, and 5.4-12 below.

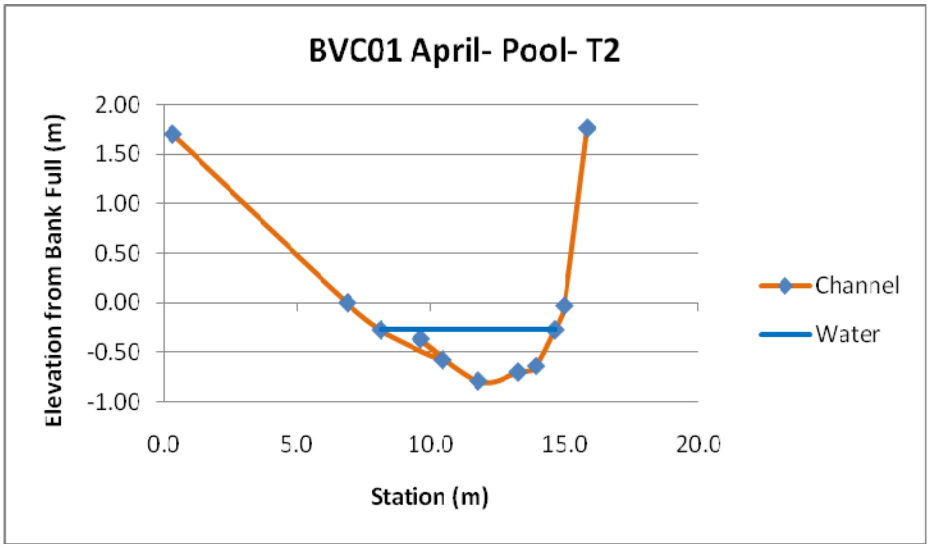

Figure 5.4-10 Channel Dimensions in Pool Habitat, Transect 2

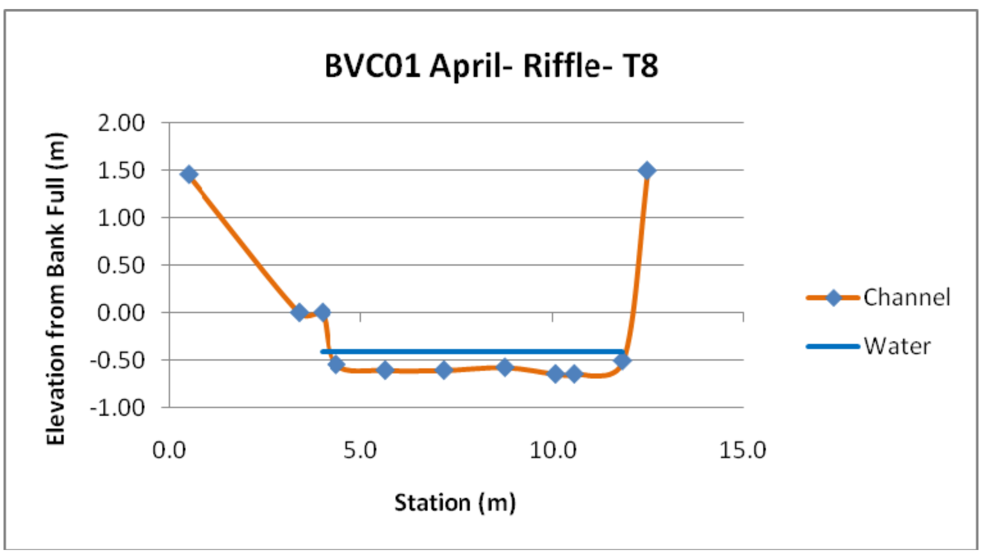

Figure 5.4-11 Channel Dimensions in Riffle Habitat, Transect 8

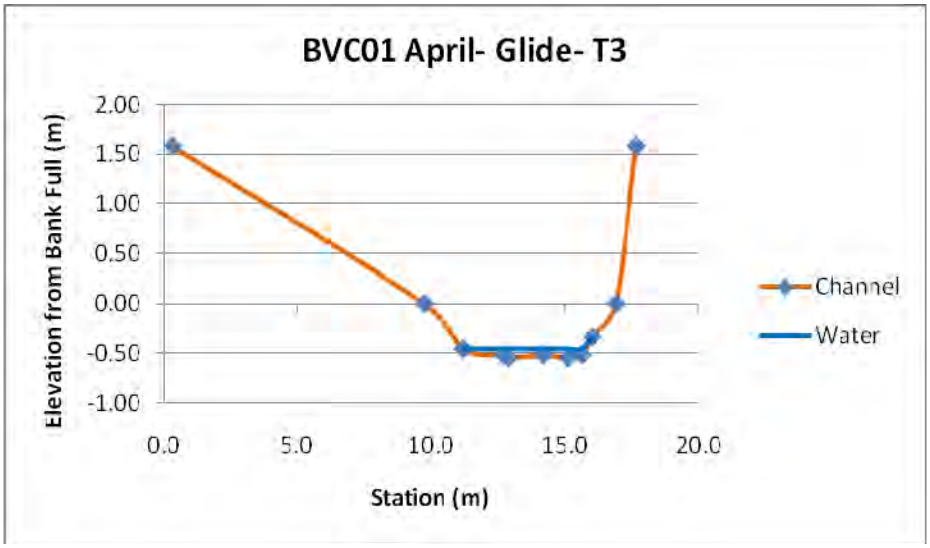

Figure 5.4-12 Channel Dimensions in Glide Habitat, Transect 3

Pools in reach BVC01 were not as deep or long as those in BVC04 and therefore were less conducive to fine sediment deposition. Due to shallow pool depth and lack of cover, pool quality was poor.

July

In July, 2008, the channel dimensions were essentially the same as measured during April, with some localized changes. The high flows that Beaver Creek experienced between the April and July field visits appeared to have resulted in somewhat less fine sediment in the pools. Stream discharge in July was 7.5 cfs, approximately 48 percent higher than in April. In both April and July, discharge was higher at the upstream site (BVC04) than at the downstream site (BVC01). The average wetted width 6.2 m in April and 7.5 m in July.

In July the air temperature at BVC01 a water temperatures of 24 degrees C was recorded at 9:20 am. Although trees were generally bare in April and fully leafed-out in July, the one tree in the riparian buffer was too far from the stream to provide shade to the wetted portion of the channel.

Within the BVC01 survey reach, habitat included two pools, one glide, and two riffles during July. The total length of riffles was 70.8 m. This represented a change from what was observed in April that was due to increased flow and probably some redistribution of gravel substrate in the channel during high flows.

In contrast to April conditions, very little silt was observed within BVC01 during July. Where fine sediment was present it was restricted to slow moving water in pools and along banks. The cumulative and proportional particle distribution of sediment for the BVC01 reach during the summer survey is shown in Figure 5.4.13, demonstrating the dominance of gravel in the particle size distribution.

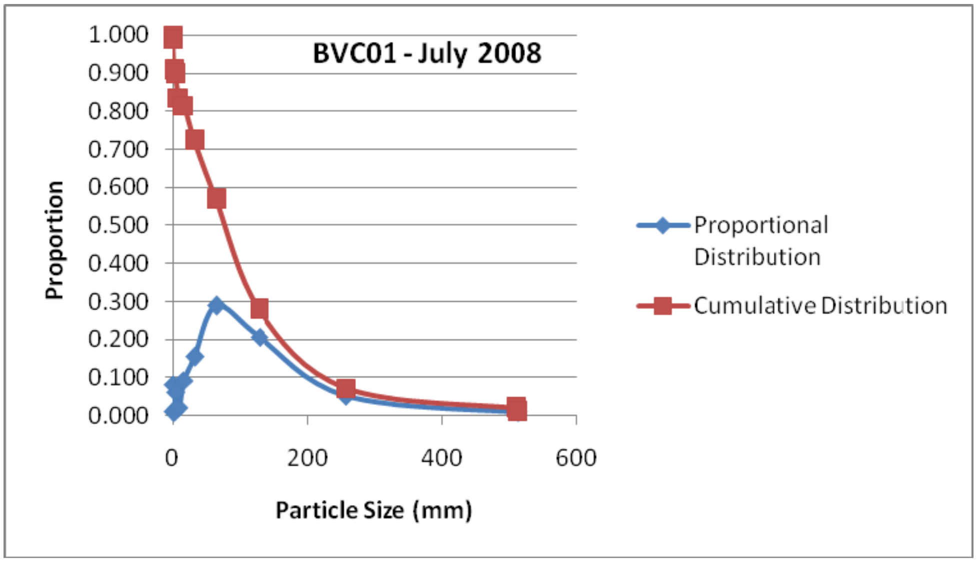

Figure 5.4-13 Cumulative Sediment Particle Distribution at Site BVC01, Transects 1 through 11 Combined during July

Large wood in the reach was essentially absent in July as in April.

The wetted stream width during the summer survey was 4.1 to 8.2 m; bank-full width ranged from 6.8 to 11.3 m; and the width at the top of bank was 12.6 to 18.9 m. Bank height was 1.5 to 2.8 m.

As mentioned previously, pools were considered poor due to lack of depth and cover. Emergent rushes (Juncus spp.) and submerged stonewort (Chara spp.) were observed growing along the banks in pools during the July survey providing some cover for small fish and substrate for aquatic invertebrates.

5.4.4.5.1.2.2 Habitat/Species Relationships

Benthic Invertebrates

Benthic invertebrates can be useful indicators of habitat quality, providing an index of quality that is integrated over time. Different taxa of aquatic invertebrates (primarily insects, crustaceans, and mollusks) exhibit different habitat requirements, feeding strategies, and tolerances to environmental perturbation. Therefore, there are several metrics of benthic invertebrate community composition that are indicative of aquatic habitat quality. Several of the most indicative and most commonly described of these metrics are summarized in Table 5.4-24.

The invertebrate communities sampled indicate poor habitat conditions in Beaver Creek. The counts of each taxa are shown in Table 5.4-25, and a synopsis of the Community composition metrics is shown in Table 5.4-26. The total number of invertebrates and the taxonomic richness (number of species) were both very low at both Beaver Creek sites. Ephemeroptera (mayflies) and plecoptera (stoneflies) were absent from both sites, indicating an impaired condition. Most taxa collected were moderately tolerant taxa. One individual of a sensitive taxa, Lepidostoma, and one individual of a very tolerant taxa, Culiciodes, were collected at the downstream site (BVC01) in April. All other taxa collected are considered moderately tolerant.

The downstream site, BVC01, had very low abundance, particularly in the July samples. During the month of June 2008, very high flows occurred in Beaver Creek. It is likely that the high flows mobilized a large volume of sediment and probably resulted in considerable scouring of the sediment, particularly at this site. The reduced macro-benthos present in July may have been due, at least in part, to the high flows that occurred in June.

During a year with more moderate flows, the macro-benthos would likely show an increase in abundance and taxonomic richness throughout the growing season, while a year with drought conditions might have no flow in the riffles where the greatest diversity of benthic invertebrates is typically seen.

High pH, conductivity, and temperatures; and a high volume of fine sediment all may contribute to the depauperate invertebrate communities observed in Beaver Creek.

Table 5.4-24 Benthic Invertebrate Community Composition Metrics and Predicted Direction of Response to Perturbation

Category	Metric	Definition	Predicted response to increasing perturbation
Richness measures	Total taxa	Measures the overall variety of the macroinvertebrate assemblage	Decrease
	EPT taxa	Number of taxa in the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)	Decrease
	Ephemeroptera taxa	Number of mayfly taxa (usually genus or species level)	Decrease
	Plecoptera taxa	Number of stonefly taxa (usually genus or species level)	Decrease
	Trichoptera taxa	Number of caddisfly taxa (usually genus or species level)	Decrease
Composition measures	% EPT	Percent composite of mayfly, stonefly, and caddisfly taxa	Decrease
	% Ephemeroptera	Percent of mayfly nymphs	Decrease
Tolerance/Intolerance measures	No. of Intolerant taxa	Taxa richness of those organisms considered to be sensitive to perturbation	Decrease
	% Tolerant organisms	Percent of macrobenthos considered to be tolerant of various types of perturbation	Increase
	% Dominant taxon	Measures the dominance of the single most abundant taxon. Can be calculated as dominant 2, 3, 4, or 5 taxa.	Increase
Feeding measures	% Filterers	Percent of the macrobenthos that filter fine organic particulate matter from the water column or sediment.	Variable
	% Grazers and Scrapers	Percent of the macrobenthos that scrape or graze upon periphyton	Decrease
Habitat measures	Number of clinger taxa	Number of taxa of clinging insects	Decrease
	% Clingers	Percent of insects having fixed retreats or adaptations for attachment to surfaces in flowing water.	Decrease

Source:Barbour et al. 1999

Table 5.4-25 Benthic Macroinvertebrate Counts for Composite Samples Collected April and July 2008

Taxa	Site and Date			
	BVC01 14-Apr-08	**BVC04 14-Apr-08**	**BVC01 9-Jul-08**	**BVC04 9-Jul-08**
Phylum:Mollusca Class:Gastropoda Order: Bassommatophora Family: Physidae	2		2	1
Phylum: Arthropoda Class: Insecta Order: Diptera Family: Ceratopogonidae Genus: *Culiciodes*	1			
Family: Chironomidae Subfamily: Orthocladiinae	14	33		2
Subfamily: Chironomnae		11		1
Subfamily: Tanypodinae			4	23
Family: Siluliidae Genus: *Simulium*	2			1
Order: Trichoptera Family: Hydropsychidae Genus: *Cheumatopsyche*				76
Family: Lepidostomadtidae Genus: *Lepidostoma*	1			
Family: Limnephilidae Genus: *Limnephilus*	3	2		
Order: Coleoptera Family: Elmidae			1	3

Table 5.4-26 Community Composition Metrics for Benthic Macro-invertebrates Collected at the Beaver Creek Sites

			Functional Feeding Group		Habitat/ Behavior		Abundance BVC01	BVC04	BVC01	BVC04
Measures	**Taxa**	**Tolerance**	**Primary**	**Secondary**	**Primary**	**Secondary**	**April**	**April**	**July**	**July**
Taxa	Physidae	8	SC				2		2	1
	Culicoides	10	PR	GC	bu		1			
	Orthocladiinae	5	GC		bu		14	33		2
	Chironominae	6	GC					11		1
	Tanypodinae	7	PR		bu				4	23
	Simulium	6	FC				2			1
	Cheumatopsyche	5	FC							76
	Lepidostoma	1	SH				1			
	Limnephilus	5	SH		sp		3	2		
	Elmidae (early instar)	4	GC		cn	bu			1	3
Abundance	Abundance						23	46	7	107
Richness	Total Taxa						6	3	3	7
	EPT Taxa						3	1	0	1
	Ephemeroptera Taxa						0	0	0	0
	Plecoptera Taxa						0	0	0	0
	Trichoptera Taxa						3	1	0	1
Composition	% EPT Taxa						17.4%	4.3%	0.0%	71.0%
	% Ephemeroptera						0%	0%	0%	0%
Tolerance	Number of Intolerant Taxa						1	0	0	0
	% Tolerant Macrobenthos						13.0%	0.0%	28.6%	0.9%
	% Dominant Taxa						60.9%	71.7%	0.0%	1.9%
Feeding	% Filterers						8.7%	0.0%	0.0%	72.0%
	% Grazers & Scrapers						69.6%	95.7%	42.9%	6.5%
Habitat	Number of Clinger Taxa						0	0	0	0
	% Clingers						0%	0%	20%	3%

Notes: SC=Scraper, PR = Predator, GC = Gatherer collector, FC = Filterer/collector, SH = Shredder
bu = burrower, sp = sprawler, cn = clinger

Tolerance scores on scale of 1-10 with 1 being most sensitive and 10 most tolerant of environmental stressors

Fish

A total of 12 fish species were collected from the three sampling locations: BVC04–Beaver Creek upstream of the PAA; BVC01–Beaver Creek downstream of the PAA; and CHR05–Cheyenne River downstream of the confluence of Beaver Creek. The species, trophic category, and habitat notes are summarized in Table 5.4-27. The abundance (presented as catch per unit effort or fish per m of stream length), and average sizes of fish are shown in Table 5.4-28. Fish collection data forms are presented in Appendix 5.4--K.

Table 5.4-27 Fish Species and Trophic Categories

Species Code	Common Name	Latin Name	Trophic Category	Notes
SAS	Sand shiner	*Notropis stramineus*	Omnivore	
CRC	Creek chub	*Semotilus atromaculatus*	Primarily carnivorous omnivore	
PLM	Plains Minnow	*Hybognathus placitus*	Primarily herbiverous	Generally in slower water and side channels of turbid streams. Eats benthic algae & other plant material.
CAP	Common carp	*Cyprinus carpio*	Omnivore	Introduced species. Bottom feeder.
LND	Longnosed dace	*Rhynichthys cataractae*	Primarily carnivorous omnivore	Primarily in riffles
FHM	Fathead minnow	*Pimephales promelas*	Primarily herbiverous	Widely cultivated for bait, and extensively used in toxicological studies
RIC	River Carpsucker	*Carpoides carpio*	Bottom feeding omnivore	
SHR	Shorthead Redhorse Sucker	*Moxostoma macrolepidotum*	Bottom feeding carnivore	
CHC	Channel Catfish	*Ictalurus punctatus*	Bottom feeding omnivore	Species most likely to be eaten by humans.
PLT	**Plains topminnow**	***Fundulus sciadicus***	**Surface feeding carnivore**	
PLK	Plains Killifish	*Fundulus zebrinus*	Surface feeding carnivore	
GRS	Green sunfish	*Lepomis cyanellus*	Carnivore	Palatable but generally too small for human consumption

Notes:
Bold species are tracked by the South Dakota Natural Heritage Program – South Dakota Department of Game, Fish and Parks (SDGFP web page, last updated September 2, 2008).

Table 5.4-28 Summary of Fish Size and Abundance

Location	Date	Common Name	CPUE (fish/m)	Average total length (mm)	Average weight (g)
CHR05 – Cheyenne River at Marietta	4/15/08	Green sunfish	0.01	98	20
		Sand shiner	0.53	48	4.6
		Creek chub	1.00	47	0.9
		River Carpsucker	0.01	97	13
		Shorthead Redhorse Sucker	0.14	145	115
		Plains topminnow	**0.01**	**51**	**<1**
		Plains killifish	0.48	49	1.5
CHR05 – Cheyenne River at Marietta	7/09/08	Common carp	0.01	135	31
		Longnosed dace	0.01	74	4
		Fathead minnow	0.10	47	0.7
		Sand Shiner	0.45	49	1.5
		Shorthead Redhorse Sucker	0.14	153	39
		River Carpsucker	0.04	407	1,038
		Channel catfish	0.03	222	88
		Plains killifish	0.07	58	1.9
BVC01 – Beaver Creek at Argentine Road	4/16/08	Fathead minnow	0.64	48	1.3
		Plains killifish	0.02	45	4
		Longnosed dace	0.01	48	<1
		Green sunfish	0.01	120	25
BVC01 – Beaver Creek at Argentine Road	7/10/08	Common carp	0.01	171	73
		Sand Shiner	0.10	50	1.1
		Fathead minnow	0.33	50	1.5
		Longnosed dace	0.01	59	2
		Plains minnow	0.01	73	1
		Plains topminnow	**0.06**	**56**	**2**
		Plains killifish		60	1.8
BVC04 – Beaver Creek at old Hwy 85 Bridge	4/16/08	Common carp	0.03	75	9.3
		Fathead minnow	0.84	45	1.1
		Channel catfish	0.01	215	72
		Plains killifish	0.10	44	1.4
		Green sunfish	0.04	66	7.5
BVC04 – Beaver Creek at old Hwy 85 Bridge	7/10/08	Common carp	0.01	260	230
		Sand Shiner	0.26	52	1.3
		Fathead minnow	0.47	50	1.4
		Longnosed dace	0.02	63.5	2.5
		Shorthead redhorse sucker	0.01	136	130
		Plains killifish	0.09	55	1.4

Notes: 1CPUE = Catch per unit effort.
Bold species are tracked by the South Dakota Natural Heritage Program – South Dakota Department of Game, Fish and Parks (SDGFP web page, last updated September 2, 2008).

5.4.4.5.1.2.2.1 Locally Significant Fish Species

Recreational anglers fish Beaver Creek, although the Cheyenne River and Angostura Reservoir provide greater fishing opportunities in the area. Channel catfish is the species most likely to be caught and eaten from Beaver Creek.

Hampton (1998) calculated the relative weight index (Wr) for channel catfish in the Cheyenne River to assess the condition of this species in the Cheyenne River. Hampton (1998) reported a curvilinear relationship between weight and length (Ws=63.75 +5,780/L where Ws= standard weight, and L= total length). Comparing the weight/length ratio of channel catfish collected in this study to the standard weight (Ws) described above, the relative weight (Wr=100*W/Ws) can be used as an indicator of fish condition. Generally, relative weights greater than 100 indicate better than average condition and those less than 100 indicate poorer than average condition. The weight of the largest (290 mm) channel catfish collected from the Cheyenne River had a very high relative weight (Wr = 198) while the other catfish collected from the Cheyenne River had low relative weights (Wr = 51 and 52), and the one channel catfish collected from Beaver Creek (at BVC04) had a moderately low relative weight (Wr=79). Although the average Wr for the Cheyenne River channel catfish (100.8) indicates good agreement with Hampton's (1998) modeled relationship, the weight/length ratio of individual fish varied considerably. A larger sample size would be needed to draw any conclusions about the relative condition of fish from these sites.

Relative weights are shown in Table 5.4-29, below.

Table 5.4-29 Relative Weight Index for Channel Catfish Collected at Beaver Creek and Cheyenne River

Site	Date	Length	Weight	Standard Weight (Ws)	Relative Weight (Wr)
BVC04	Apr-08	215	72	90.6	79.4
CHR05	Jul-08	290	166	83.6	198.4
CHR05	Jul-08	186	50	94.8	52.7
CHR05	Jul-08	181	49	95.6	51.2
CHR05 Average					100.8

5.4.4.5.1.2.2.2 Threatened and Endangered Aquatic Species

No threatened or endangered aquatic species are known to inhabit Beaver Creek, particularly within 1.0 mile of the permit boundary.

The plains topminnow (*Fundulus sciadicus*) was captured in July at the downstream Beaver Creek site (BVC01). This species is tracked by SDNHP.

5.4.4.5.1.2.3 Radiological Testing

The channel catfish was the only species collected in April that contained detectable Uranium (0.05 mg/kg, and 3 X 10-5µCi/kg) (Table 5.4-30). Unfortunately this species was only collected from the downstream Beaver Creek site (BVC04) during that session. In July, channel catfish were only collected from the Cheyenne River site (CHR05). The channel catfish is the only species collected in the PAA that is typically caught for human consumption.

Uranium was detected in all of the fish collected in July 2008 due, in large part, to increased sample sizes (Table 5.4-30). As indicated, April samples showed little, if any, detectable Uranium, however, the detection limits were higher during that sampling effort due to matrix interference. Therefore, it is not possible to determine if there was an actual seasonal difference in fish tissue Uranium concentration. Uranium concentrations and uranium radioactivity were generally low and similar across sample sites when compared by species. Radioactivity from Polonium-210, Thorium-230, and Radium-226 was detectable, but low in most samples. Lead-210 was only detected in one specimen (plains killifish [Fundulus zebrinus]) collected in April at the downstream Beaver Creek site (BVC01). Although this measurement was relatively high (0.02 µCi +0.02 µCi), it should be noted that, due to matrix interference, the precision was limited on this sample. Lead-210 was not detected in any of the other samples.

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Table 5.4-30 Beaver Creek Baseline Radiological Analysis of Whole Fish

Site	Species	No.	Length[a] mm	Sample Weight [b] g	U mg/kg	U uCi/Kg	Po 210 uCi/Kg	Pb 210 uCi/Kg	Th 230 uCi/Kg	Ra 226 uCi/Kg
BVC01 - April	GRS	1	120	22.96	ND	ND	u	u	u	0.0003
	PLK	1	48	1.77	ND	ND	u	0.02[c]	0.0002	u
	LND	1	48	0.64	ND	ND	0.002	u	0.0001	u
	FHM	1	30-60	4	ND	ND	0.0004	u	u	u
BVC04-April	PLK	1	40-60	0.72	ND	ND	u	u	u	u
	RIC	1	111	18.79	ND	ND	0.0004	u	0.00002	u
	GRS	1	50	2.16	ND	ND	0.0006	u	0.0008	u
	FHM	1	30-70	~1.2	ND	ND	u	u	0.00001	0.0004
	CHC	1	215	72	0.05	30	0.0009	u	0.00002	u
CHR05-April	RIC	1	97	13.73	ND	ND	0.0008	u	u	u
	GRS	1	98	13.67	ND	ND	0.00008	u	0.00001	u
	SRS	1	169	55.05	ND	ND	0.0002	u	0.00002	u
	CRC	1	30-70	2.92	ND	ND	u	u	u	u
	PLK	1	32-74	1.51	ND	ND	u	u	0.0001	u
	SAS	1	30-60	1.51	ND	ND	u	u	0.001	u
BVC01-July	FHM	5	42-67	~8	0.026	0.000018	0.0004	u	u	u
	CAP	1	171	73	0.0098	0.0000067	0.00078	u	u	u
	SAS	5	46-62	7	0.031	0.000021	0.00023	u	0.000098	u
	PLK	5	57-71	9	0.035	0.000024	0.00047	u	u	u
	PLT	5	48-71	12	0.021	0.000014	0.00035	u	0.0001	u
BVC04-July	SAS	5	45-58	~6.7	0.024	0.000016	0.00054	u	0.000027	u
	FHM	5	42-61	~3.7	0.031	0.000021	0.00018	u	u	u
	CAP	1	260	237	0.014	0.0000094	0.00015	u	0.0000023	u
	PLK	5	48-68	~7.2	0.019	0.000013	u	u	0.000094	u
	SRS	1	136	130	0.0072	0.0000049	0.00017	u	u	u
CHR05-July	FHM	5	38-60	~0.7	0.024	0.000016	0.00042	u	u	u
	SAS	5	42-60	~1.5	0.04	0.000027	0.00049	u	0.00014	u
	CAP	1	135	31	0.01	0.0000069	0.00074	u	0.000017	u
	RIC	4	381-415	5150	0.031	0.000021	u	u	u	0.000008
	SRS	2	146-160	78	0.0066	0.0000044	0.00005	u	0.0000032	u
	PLK	4	46-68	~7.4	0.017	0.000012	0.00047	u	u	u
	CHC	3	181-290	265	0.017	0.000012	0.00016	u	0.000009	u

Notes: GRS = Green Sunfish, PLK = Plains Killifish; LND = Longnosed Dace; RIC = River Carpsucker; FHM = Fathead Minnow; CHC = Channel Catfish; SRS = Shorthead Redhorse Sucker; CRC = Creek Chub; SAS = Sand Shiner. U = Uranium; Po = Polonium; Pb = Lead; Th = Thorium; RA = Radium. ND = Not Detected at the reporting limit, u = Not detected at minimum detectable concentration. [a]Lengths reported as a range when multiple specimens were combined as a composite sample, or when the individual processed for radiology was not recorded separately. [b] Approximate sample weights from field average weights for the species measured in the field. [c]Due to matrix interference, the precision of this measurement was equal to the detected concentration (i.e. 0.02 µCi ± 0.02 µCi).

5.5 Climate Data

5.5.1 Introduction

The proposed project is located in an area in southwestern South Dakota that can be characterized as a semiarid or steppe climate. It lies adjacent to the southwestern extension of the Black Hills. The area experiences abundant sunshine, low relative humidity, and sustained winds which lead to high evaporative demand. There are also large diurnal and annual variations in temperature.

Precipitation in the PAA is generally light. Migratory storm systems that originate in the Pacific Ocean release a majority of their moisture over the Rocky or Cascade Mountains. Major precipitation events can occur when these systems regain moisture already present in the area or moisture advected from the Gulf of Mexico. Localized summer convective storms, caused by the Black Hills, can produce heavy precipitation events.

To complete the site-specific analysis, a weather station was installed in coordination with the South Dakota State Climatology office at approximately the center of the PAA in July 2007. This site collects temperature, humidity, solar radiation, wind speed/direction, barometric pressure, and precipitation at 1-minute, 5-minute, and hourly time steps. To determine whether this period of data collection (July 18, 2007, to July 17, 2008) was representative of long-term meteorological conditions, weather data from the nearest National Weather Service (NWS) site at Chadron, Nebraska, for the same period was compared to data collected at the site from years 1978–2007.

The data compiled from several sites (listed in Table 5.5-1 and shown in Figure 5.5-1) surrounding the PAA from the High Plains Regional Climate Center (HPRCC) and South Dakota State University (SDSU) was used to represent the long-term meteorological conditions of the Proposed Action region. All the sites were used to characterize regional trends of temperature and precipitation along with growing, heating, and cooling degree days. Only the SDSU sites had sufficient data available to analyze regional patterns of humidity, and only the Oral, South Dakota, site had adequate data to characterize wind speed/direction and evapotranspiration.

Data were analyzed at each site by time of day, month, and season of the year. The seasons for this analysis are defined as: winter (December, January, February), spring (March, April, May), summer (June, July, August), and fall (September, October, November).

Table 5.5-1 Meteorological Stations Included in Climatology Analysis

Name	Data Source	*X*	*Y*	*Z* (ft)	Years of Operation
Redbird	NCDC[(a)]	10,417	4,315	3,890	1948–2006
Oral	SDSU[(b)]	10,316	4,324	2,960	1971–2007
Oelrichs	NCDC	10,314	4,311	3,340	1948–2007
Newcastle	NCDC	10,414	4,351	4,380	1918–2006
Edgemont	NCDC	10,349	4,318	3,440	1948–2007
Custer	NCDC	10,336	4,346	5,330	1926–2007
Ardmore	NCDC	10,339	4,304	3,550	1948–2007
Angostura	NCDC	10,326	4,322	3,140	1948–2007
Jewel Cave	SDSU	10,349	4,343	5,298	2004–2008

Source: High Plains Regional Climate Center, 2008; South Dakota State University, 2008
(a) National Climatic Data Center.
(b) South Dakota State University Climate Web site.

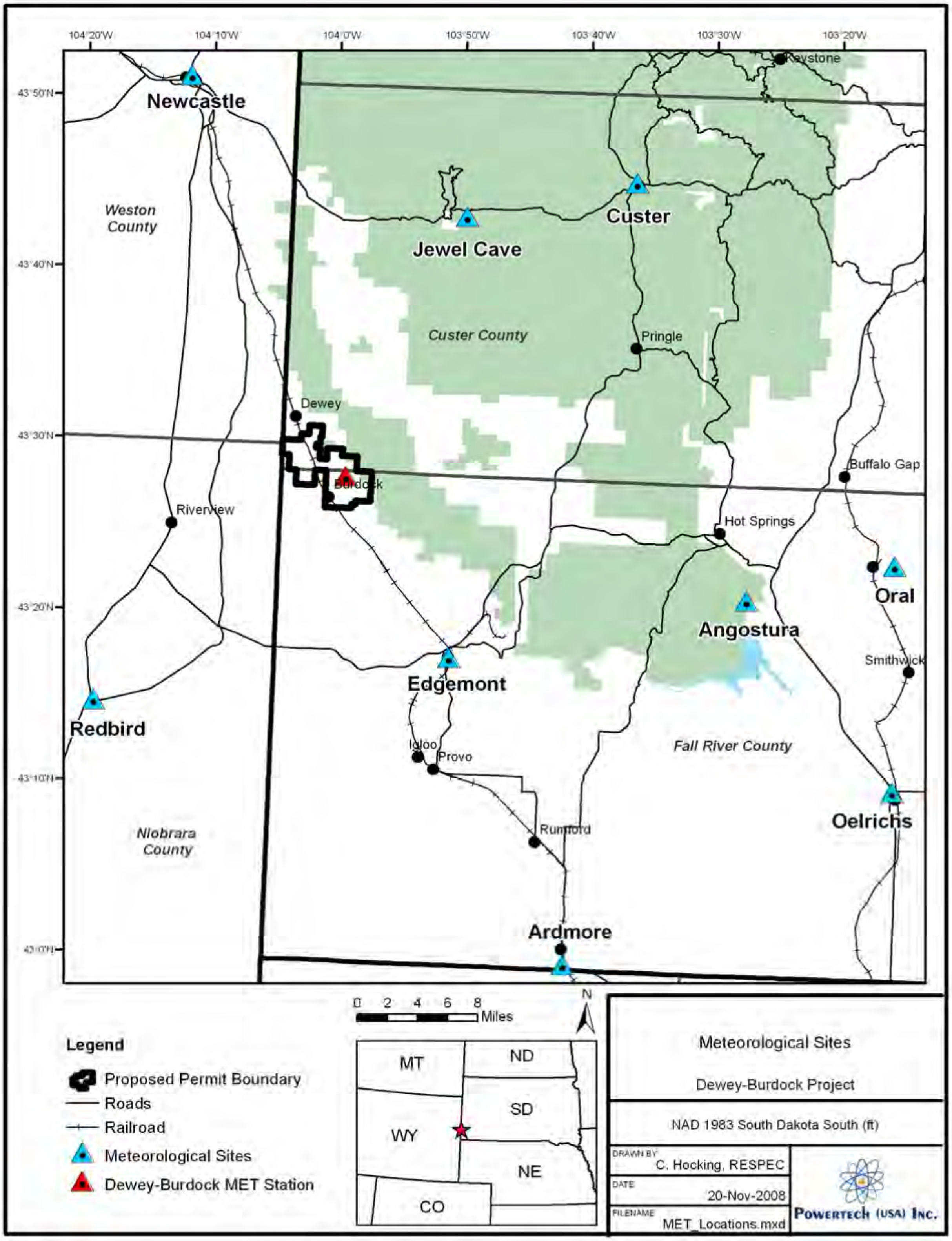


Figure 5.5-1 Meteorological Sites

5.5.2 Regional Overview

Meteorological data from the NWS site at Chadron, Nebraska, were collected from the HPRCC and analyzed to determine whether the past year's data (July 18, 2007, to July 17, 2008) was representative of long-term meteorological conditions (January 1, 1978, to July 17, 2008) in the area. The parameters analyzed were average daily temperature, wind speed, and precipitation.

The average daily temperature over the last (current) year was 47.8 degrees F, which is slightly cooler than the 30-year average (historic) daily temperature of 50.5 degrees F. Figure 5.5-2 displays a boxplot of the current and historic temperature data. The interquartile range for the current data is from 30.3 degrees F to 64.5 degrees F with a median value of 48.2 degrees F, compared to the historic data that has an interquartile range from 35.3 degrees F to 68.3 derees F and a median value of 50.5 degrees F. When looking at the data on a month-by-month basis, the mean value of the current data lies within one standard deviation of the mean value of the historic data (see Appendix 5.5-A).

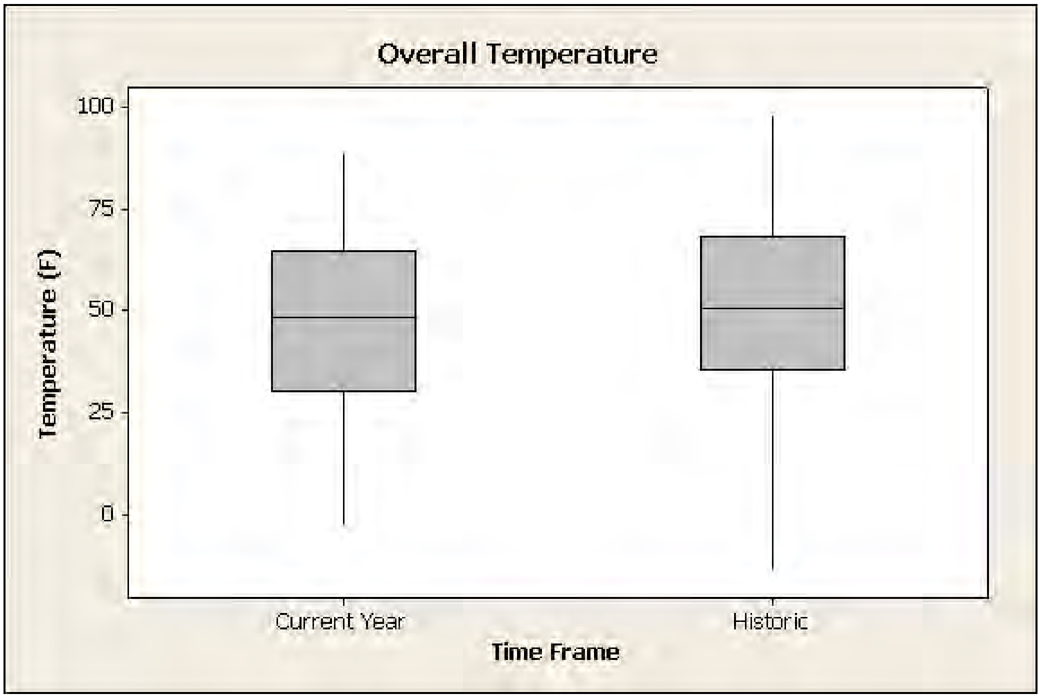


Figure 5.5-2 Temperature at Chadron, Nebraska, National Weather Service Site

The average daily wind speed over the current year was approximately 1 mph less than historically (9.8 to 10.8 mph). Figure 5.5-3 displays a boxplot of monthly wind speed for the current and historic data. The median value lies with the interquartile range for all months.

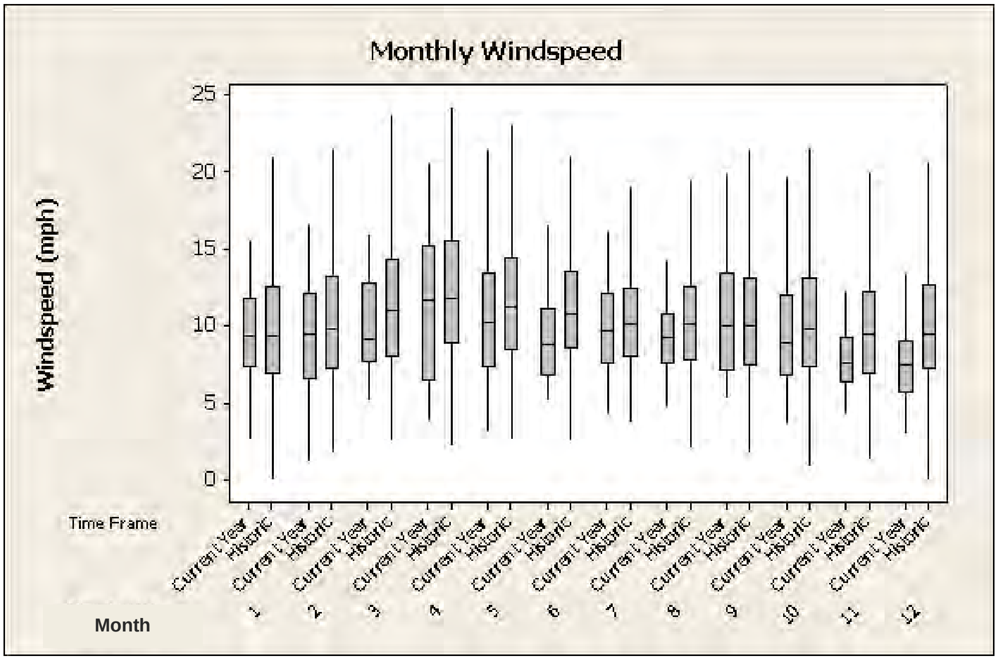
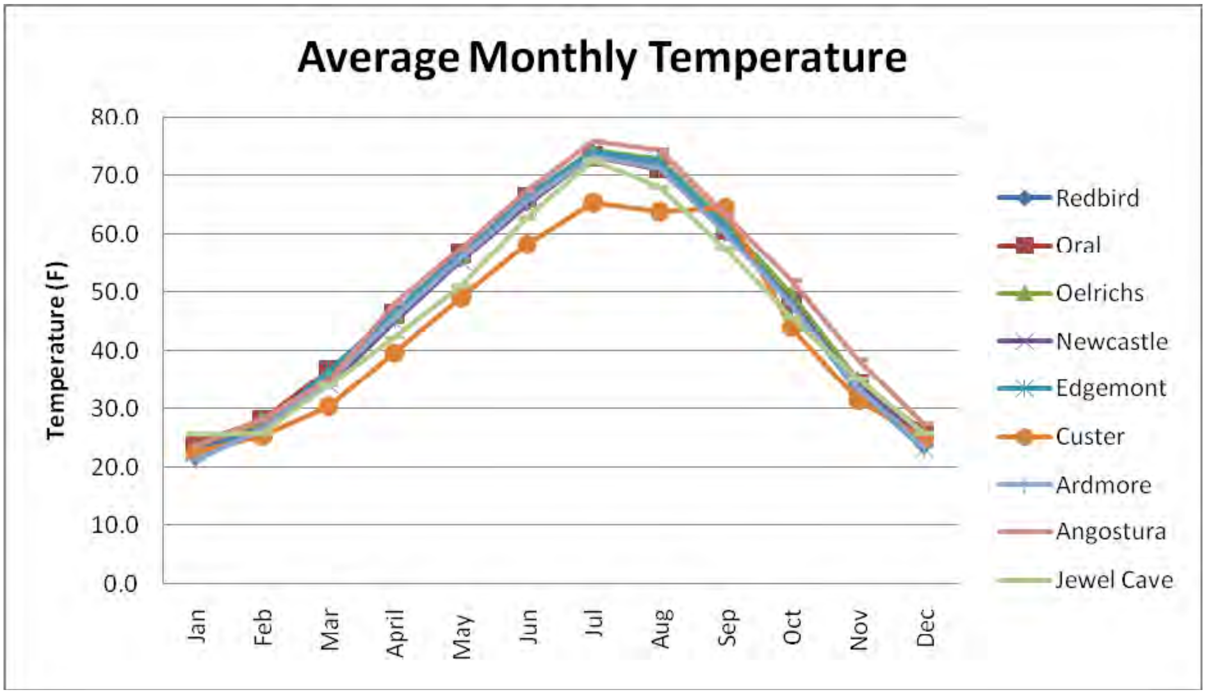


Figure 5.5-3 Monthly Wind Speed at Chadron, Nebraska, National Weather Service Site

The current year had well above the average amount of yearly precipitation. The current year had 32.8 inches of precipitation compared to the average yearly historic precipitation of 18.2 inches.

5.5.2.1 Temperature

The annual average temperature in this region is 46.7 degrees F. Figure 5.5-4 and Table 5.5-2 display the monthly, annual, and seasonal average temperatures. This region has some of its warmest days in the summer months with the hottest month being July (average temperature of 72.8 degrees F). The coldest month of the year is January, with an average temperature of 23.0 degrees F. The differences seen between sites can be attributed to elevation. Custer and Jewel Cave have the lowest average temperature primarily because these sites are nearly 1,000 feet higher in elevation than all other sites.



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

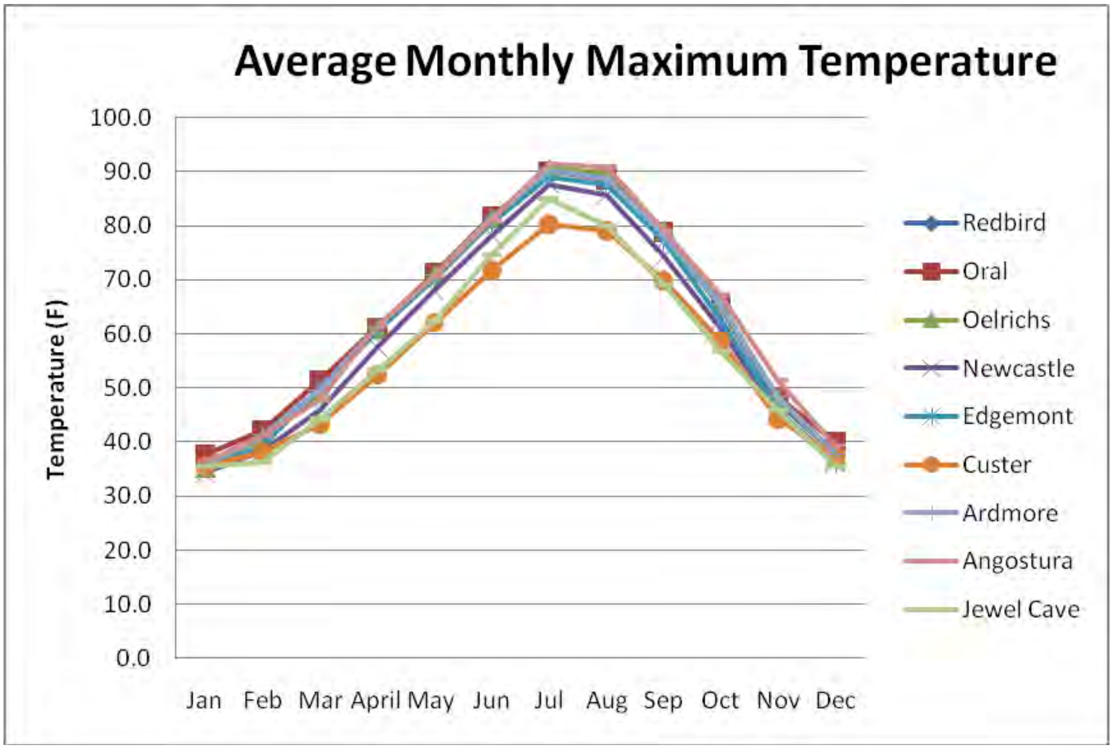
Figure 5.5-4 Average Monthly Temperatures for Regional Sites

Table 5.5-2 Average Monthly, Annual, and Seasonal Temperatures for Regional Sites

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Winter	Spring	Summer	Fall
Redbird	21.8	27.3	35.1	45.8	55.8	65.5	73.3	71.4	60.4	47.9	33.1	23.8	46.8	24.3	45.6	70.1	47.2
Oral	24.1	27.9	36.6	46.3	56.6	66.2	73.2	71.1	60.7	48.3	34.3	26.1	47.6	26.1	46.5	70.2	47.8
Oelrichs	23.2	28.0	35.4	46.3	56.5	66.3	74.2	72.8	62.1	49.5	35.0	25.7	47.9	25.7	46.1	71.1	48.9
Newcastle	22.8	26.7	34.1	44.9	55.3	64.9	73.3	71.3	60.5	48.2	33.9	25.4	46.8	25.0	44.7	69.8	47.5
Edgemont	22.5	26.3	36.6	46.5	56.8	66.4	74.1	72.3	61.4	47.7	32.9	23.1	47.2	24.0	46.6	70.9	47.3
Custer	22.5	25.3	30.3	39.6	49.1	58.2	65.4	63.8	64.5	43.9	31.4	24.8	42.4	24.2	39.7	62.5	43.3
Ardmore	21.3	26.5	34.8	45.5	55.7	65.6	73.1	71.2	60.2	47.8	33.4	23.3	46.5	23.7	45.3	70.0	47.1
Angostura	23.5	28.1	34.9	47.9	57.5	67.4	75.9	74.3	63.3	51.8	38.4	27.3	49.2	26.3	46.8	72.5	51.2
Jewel Cave	25.5	25.8	34.0	42.2	51.1	62.7	72.5	67.9	57.6	45.6	35.0	25.7	45.5	25.7	42.4	67.7	46.1
Regional Average	23.0	26.9	34.6	45.0	54.9	64.8	72.8	70.7	61.2	47.9	34.2	25.0	46.7	25.0	44.9	69.4	47.4

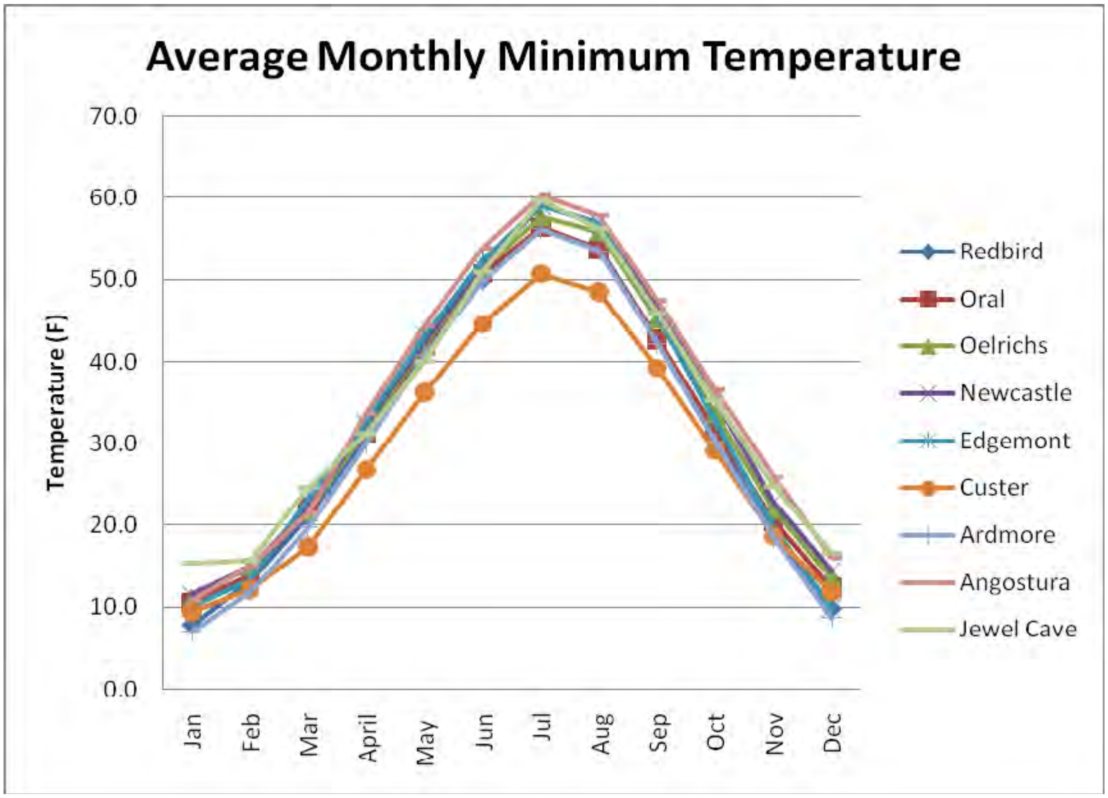
Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figures 5.5-5 and 5.5-6 show the average maximum and minimum temperatures in the region. The average maximum temperature is 60.7 degrees F annually, while the annual average minimum temperature is 32.7 degrees F, as shown in Tables 5.5-3 and 5.5-4. The highest average maximum temperatures in the region usually fall during the month of July (88.3 degrees F). The lowest minimum temperatures can be found in January with a regional average of 10.4 degrees F.



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-5 Average Monthly Maximum Temperatures for Regional Sites



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-6 Average Monthly Minimum Temperatures for Regional Sites

Table 5.5-3 Average Monthly, Annual, and Seasonal Maximum Temperatures for Regional Sites

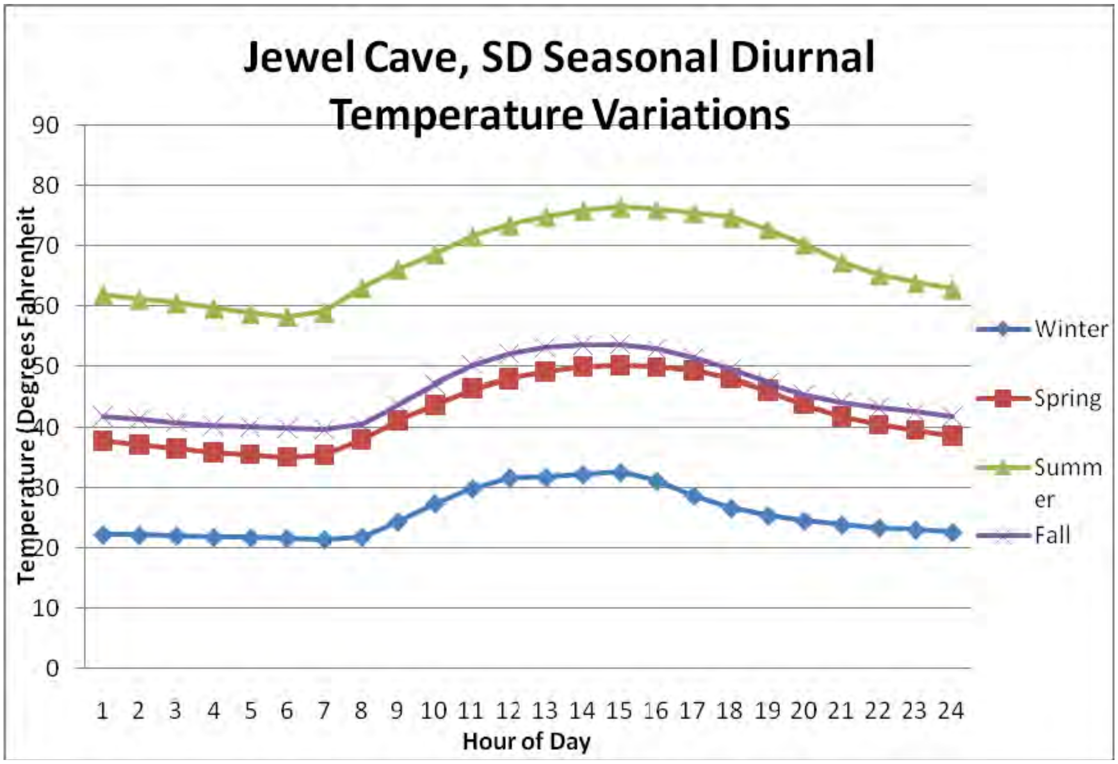
Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Winter	Spring	Summer	Fall
Redbird	35.8	41.3	49.3	60.7	70.6	81.1	90.2	88.9	78.2	65.0	47.4	37.9	62.2	38.3	60.2	86.7	63.5
Oral	37.7	42.2	51.4	61.2	71.2	81.8	90.1	88.5	78.8	65.0	48.3	40.1	63.0	40.0	61.3	86.8	64.0
Oelrichs	35.3	40.8	49.0	60.9	71.0	81.5	90.6	89.7	79.3	65.5	48.0	37.8	62.5	38.0	60.3	87.3	64.2
Newcastle	34.2	38.4	46.0	57.5	68.1	78.2	87.7	85.7	74.3	61.1	45.0	36.3	59.4	36.3	57.2	83.9	60.1
Edgemont	35.2	39.3	49.9	60.6	70.3	80.4	89.0	87.7	77.1	62.8	45.9	36.2	61.2	36.9	60.3	85.7	61.9
Custer	35.5	38.2	43.2	52.4	62.1	71.8	80.2	79.1	69.9	58.7	44.2	37.5	56.1	37.1	52.5	77.0	57.6
Ardmore	35.6	41.2	49.7	61.2	70.8	81.4	90.1	88.9	78.2	65.4	48.4	37.8	62.4	38.2	60.5	86.8	64.0
Angostura	36.2	41.2	47.7	61.6	70.8	80.9	91.4	91.0	79.1	67.2	51.4	39.4	63.2	38.9	60.0	87.8	65.9
Jewel Cave	35.4	36.2	44.3	53.3	62.4	74.6	85.1	80.0	69.2	56.8	45.9	35.4	56.5	35.6	53.3	79.9	57.3
Regional Average	35.7	39.9	47.8	58.8	68.6	79.1	88.3	86.6	76.0	63.1	47.2	37.6	60.7	37.7	58.4	84.7	62.1

Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Table 5.5-4 Average Monthly, Annual, and Seasonal Minimum Temperatures for Regional Sites

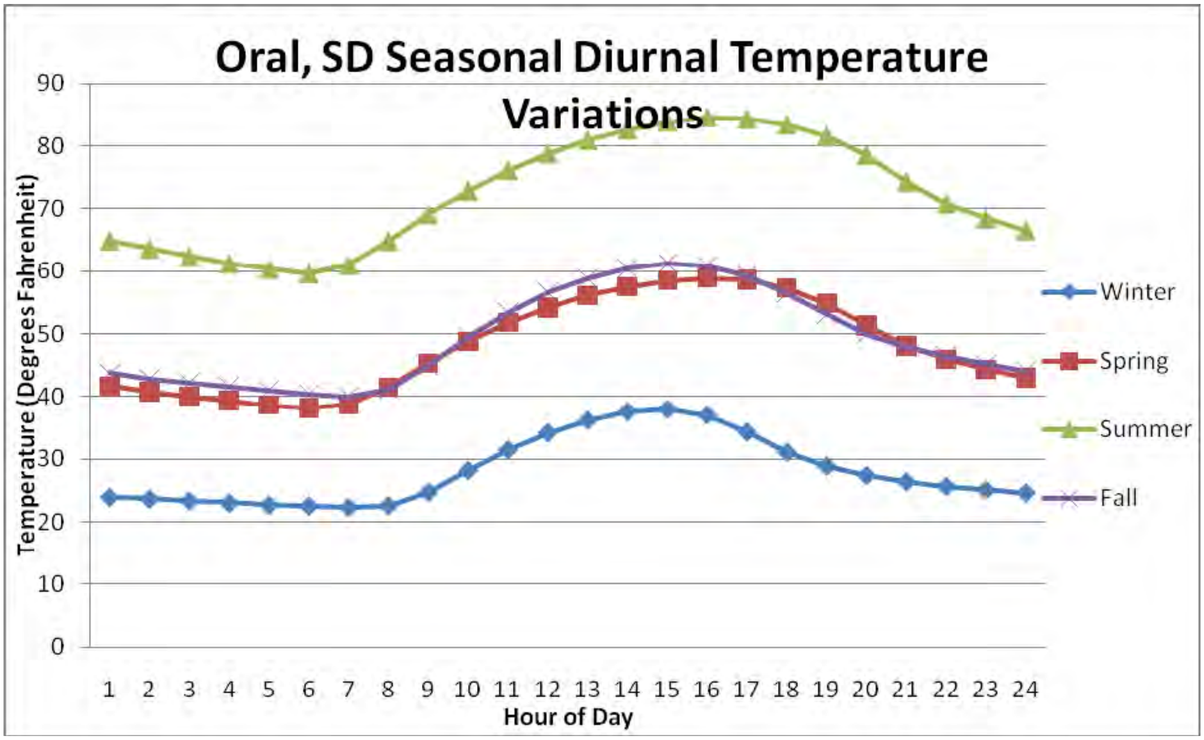
Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Winter	Spring	Summer	Fall
Redbird	7.8	13.2	21.0	30.8	41.1	49.9	56.3	53.9	42.6	30.9	18.8	9.8	31.4	10.3	31.0	53.4	30.8
Oral	10.6	13.8	22.2	31.3	41.9	50.7	56.4	53.7	42.7	31.6	20.4	12.3	32.3	12.2	31.8	53.6	31.6
Oelrichs	11.1	15.0	21.7	31.7	42.0	51.2	57.7	55.9	45.2	33.6	21.9	13.6	33.4	13.3	31.8	54.9	33.6
Newcastle	11.5	15.0	22.2	32.2	42.4	51.5	59.1	57.0	46.6	35.3	22.8	14.5	34.2	13.6	32.3	55.9	34.9
Edgemont	10.0	13.4	23.2	32.5	43.2	52.4	59.1	56.9	45.6	32.7	19.7	9.9	33.2	11.1	33.0	56.1	32.7
Custer	9.4	12.2	17.4	26.8	36.2	44.6	50.7	48.5	39.2	29.1	18.7	11.8	28.7	11.1	26.8	47.9	29.0
Ardmore	7.0	11.9	19.7	30.0	40.7	49.7	56.2	53.5	42.2	30.2	18.4	8.7	30.7	9.2	30.2	53.1	30.2
Angostura	10.8	15.1	21.5	33.7	44.3	53.9	60.3	57.8	47.4	36.5	25.9	16.0	35.3	14.0	33.2	57.3	36.6
Jewel Cave	15.4	15.7	24.5	31.1	40.0	51.0	59.7	56.3	45.9	35.1	24.8	16.6	34.7	15.9	31.9	55.7	35.3
Regional Average	10.4	13.9	21.5	31.1	41.3	50.5	57.3	54.8	44.2	32.8	21.3	12.6	32.7	12.3	31.3	54.2	32.7

Figures 5.5-7 and 5.5-8 display diurnal temperature variations by season for the Jewel Cave and Oral sites. These sites were used because they were the only sites that recorded hourly temperatures near the Proposed Action. As the figures show, there are large variations in diurnal temperature, especially during the summer months.



Source: South Dakota University, 2008

Figure 5.5-7 Jewel Cave, South Dakota, Seasonal Diurnal Temperature Variations

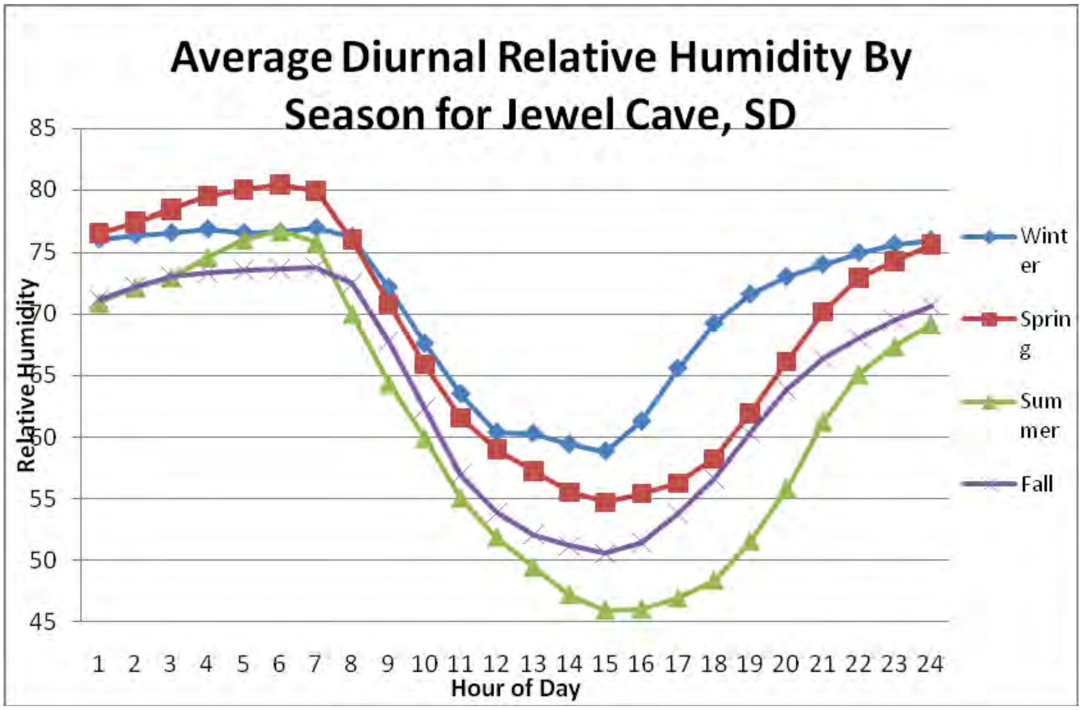


Source: South Dakota University, 2008

Figure 5.5-8 Oral, South Dakota, Seasonal Diurnal Temperature Variations

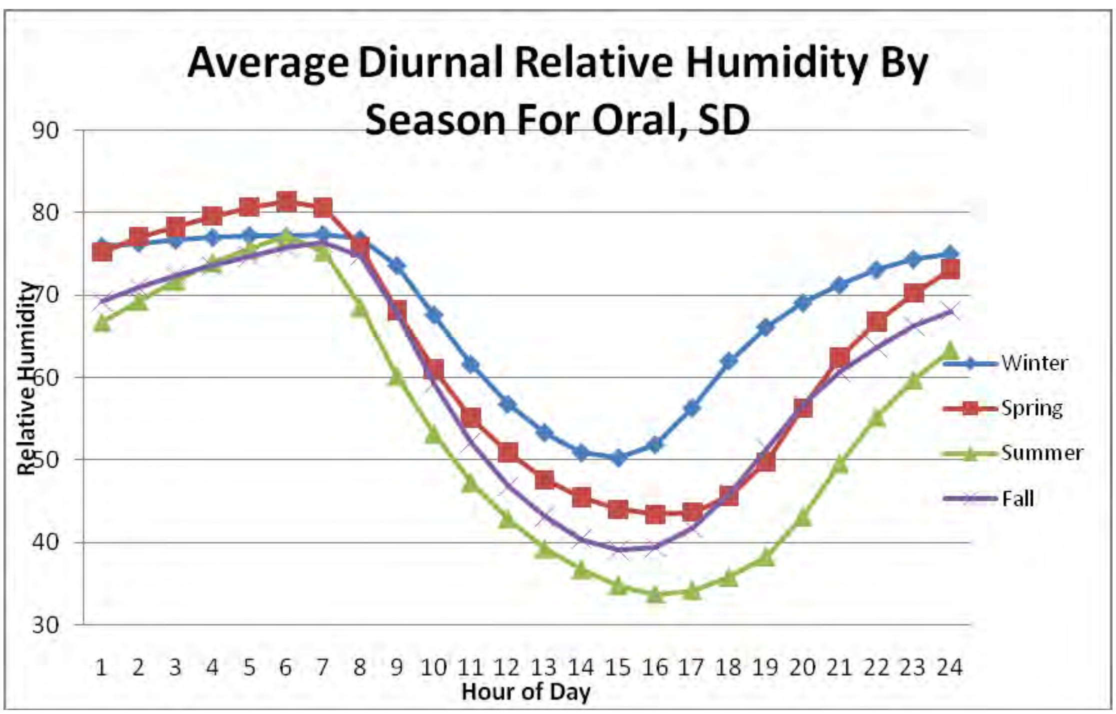
5.5.2.2 Relative Humidity

Relative humidity measures the fraction of moisture in the air to saturated moisture content at a certain temperature. This parameter was analyzed for both the Jewel Cave and Oral sites. Figures 5.5-9 and 5.5-10 display the relationship of relative humidity to the season and time of day for each site. The figures show that the summer has the lowest relative humidity, averaging 60 percent, while winter has the highest relative humidity, averaging 69 percent.



Source: South Dakota University, 2008

Figure 5.5-9 Average Diurnal Relative Humidity by Season for Jewel Cave, South Dakota



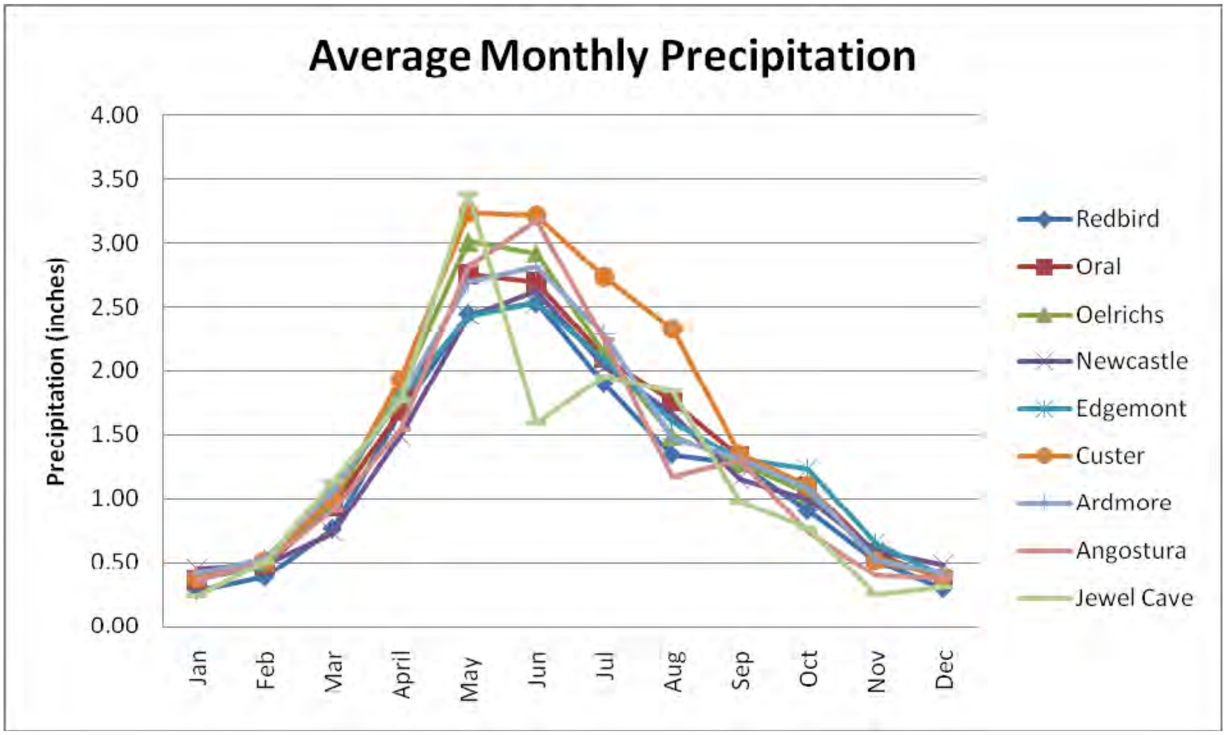
Source: South Dakota University, 2008

Figure 5.5-10 Average Diurnal Relative Humidity by Season for Oral, South Dakota

The relative humidity in this region peaks out in the morning at around 6:00 am with the minimum falling in the afternoon around 3:00 pm. The readings during the peak time average 77 percent at Jewel Cave and 78 percent at the Oral site. The readings with the lowest relative humidity during the day average 53 percent and 42 percent at Jewel Cave and Oral, respectively.

5.5.2.3 Precipitation

Figure 5.5-11 and Table 5.5-5 show that this area can be very dry at times with a regional annual average precipitation of 16.5 inches. Most of the precipitation accumulates during May, June, and July (48 percent of the annual). Typically, May is the wettest month of the year for this region with an average accumulation of 2.8 inches. Winter receives roughly 8 percent of the annual accumulated precipitation. January is the driest month of the year with an average accumulation of 0.36 inches of precipitation.



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

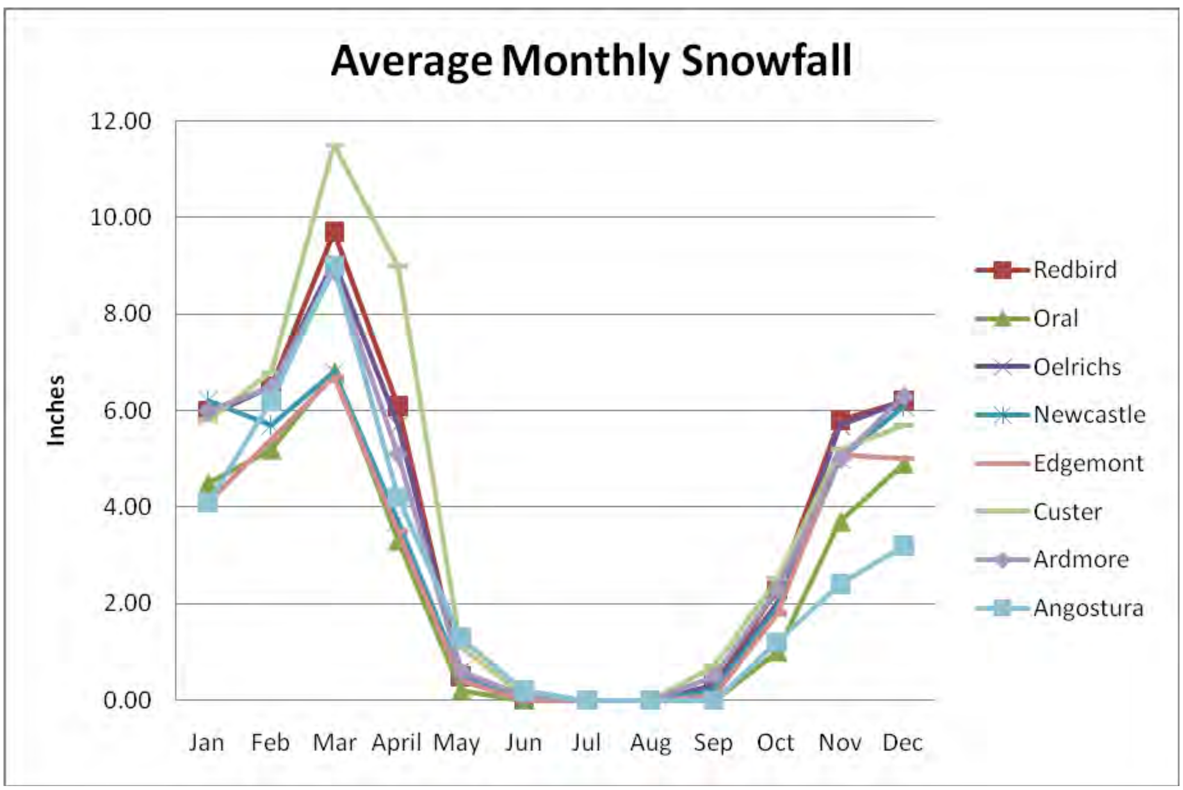
Figure 5.5-11 Average Monthly Precipitation for Regional Sites

Table 5.5-5 Average Seasonal and Annual Precipitation for Regional Sites

Name	Annual	Winter	Spring	Summer	Fall
Redbird	14.29	0.95	4.89	5.77	2.68
Oral	16.10	1.19	5.37	6.54	3.00
Oelrichs	16.50	1.28	5.83	6.54	2.85
Newcastle	15.11	1.41	4.65	6.32	2.73
Edgemont	15.87	1.22	5.26	6.20	3.19
Custer	18.66	1.27	6.15	8.28	2.96
Ardmore	16.35	1.34	5.54	6.56	2.91
Angostura	15.51	1.22	5.26	6.59	2.44
Jewel Cave	20.00	6.30	6.30	5.40	2.00
Region Average	16.49	1.80	5.47	6.47	2.75

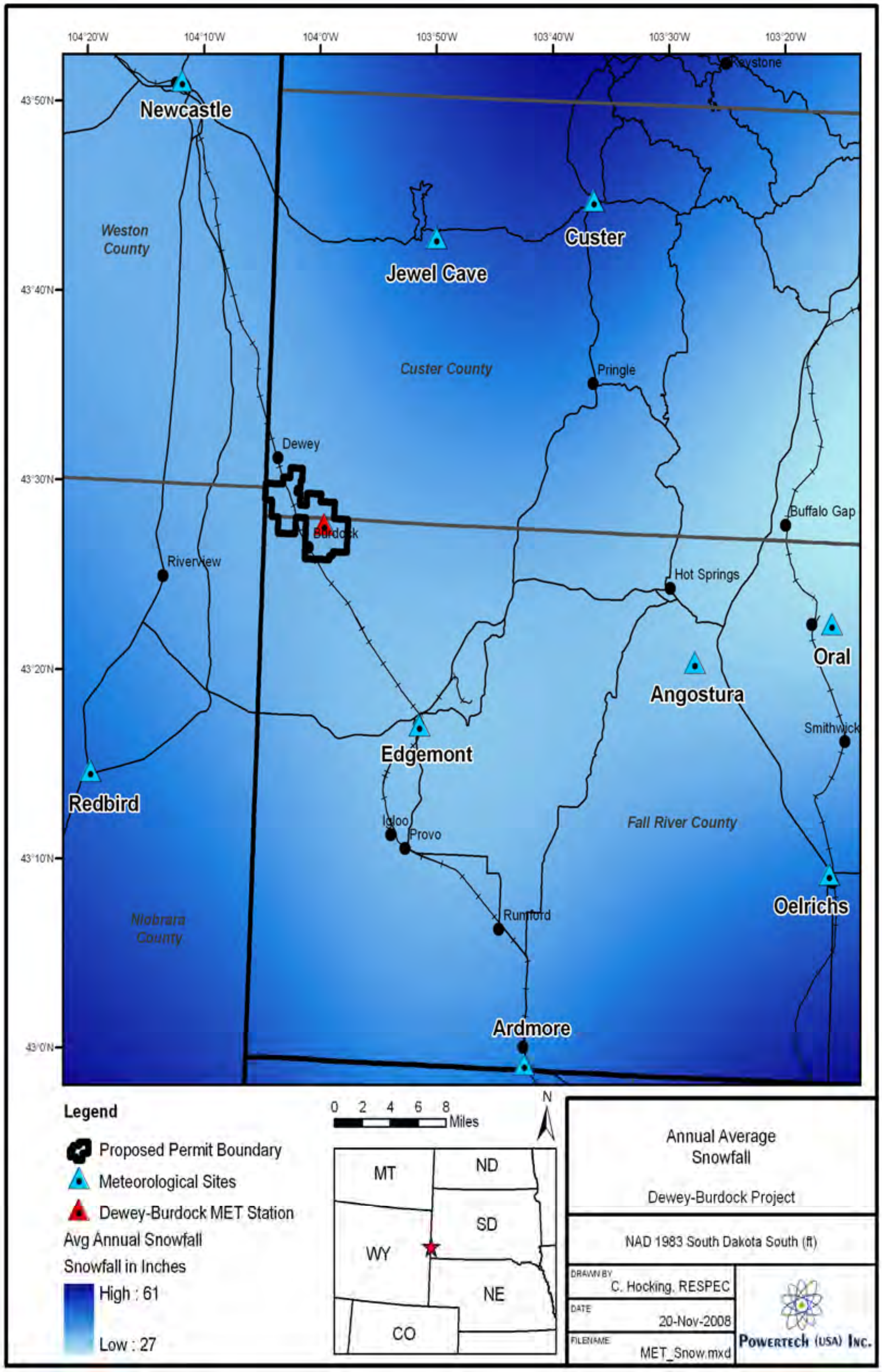
Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

This region receives an average of 38 inches of snowfall each year. As shown in Figure 5.5-12, most snowfall accumulates during the month of March with a regional average of 8.5 inches. Custer receives the most annual snowfall (48 inches). This can be attributed to the higher elevation and the influence of the Black Hills that surround it (Figure 5.5-13).



Source: South Dakota University, 2008

Figure 5.5-12 Average Monthly Snowfall at Regional Sites

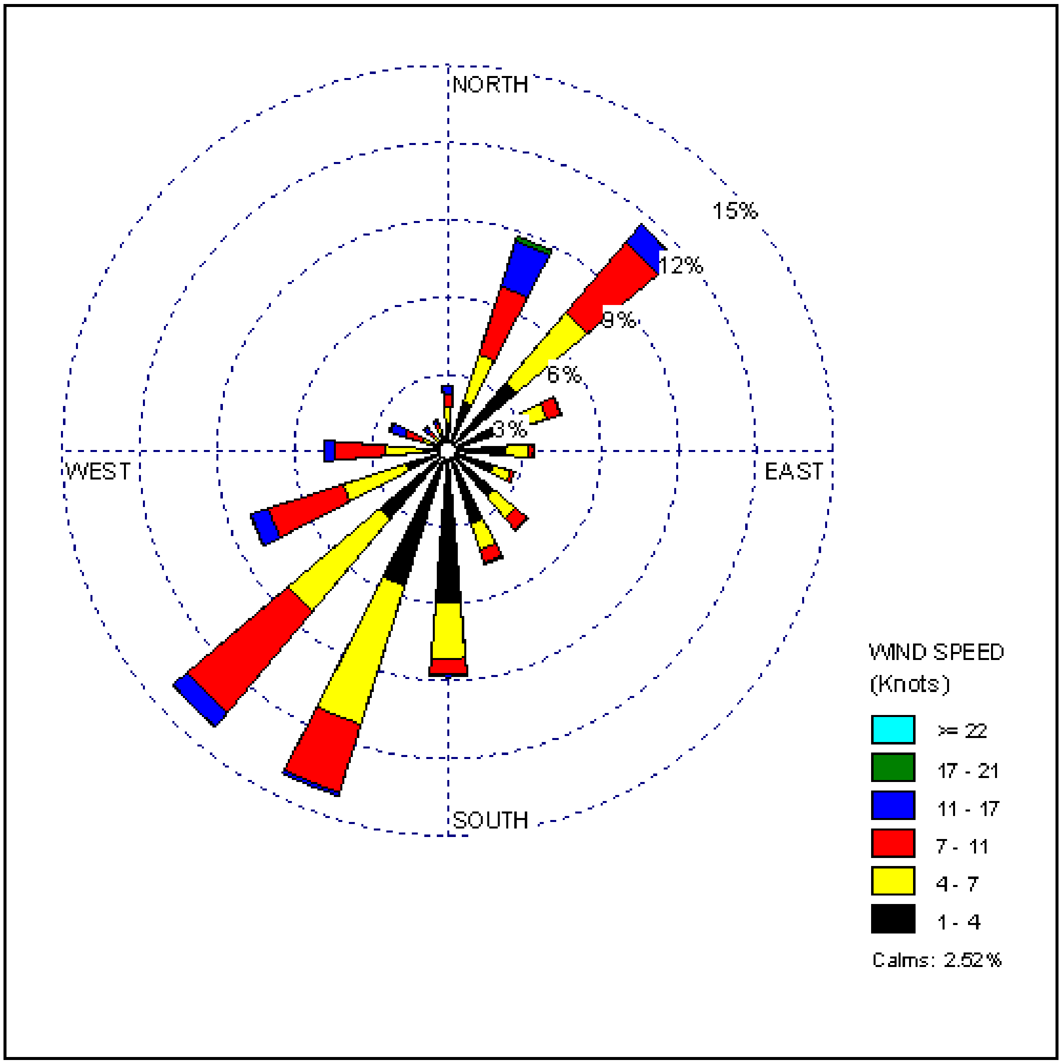


Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-13 Average Snowfall Accumulation throughout the Region

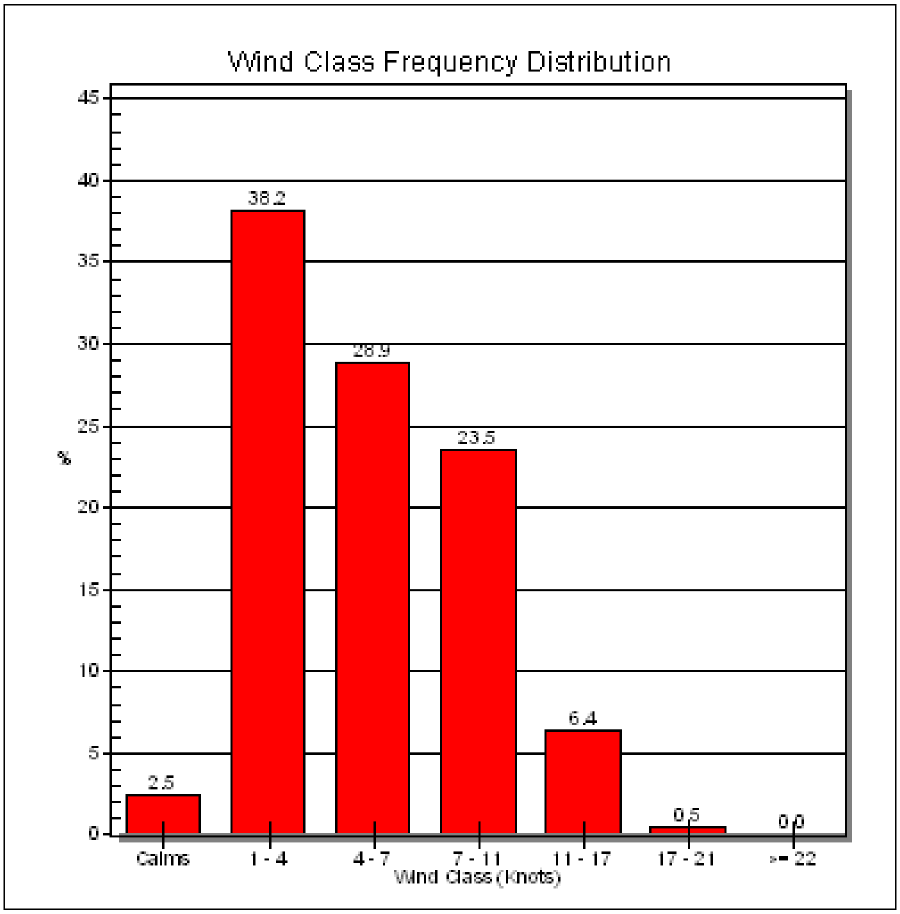
5.5.2.4 Wind Patterns

The Oral site was the only site in the region with representative data for wind speed and direction. The wind speed averaged 6.4 mph over the entire period of record with approximately 51 percent of the winds blowing from the southwest (Figure 5.5-14). Over 38 percent of the wind is between 1.2 and 4.6 mph (1 to 4 knots) with calm winds (less than 1.2 mph or 1 knot) occurring 2.5 percent of the time (Figure 5.5-15).



Source: South Dakota University, 2008

Figure 5.5-14 Wind Rose of Data from Oral, South Dakota

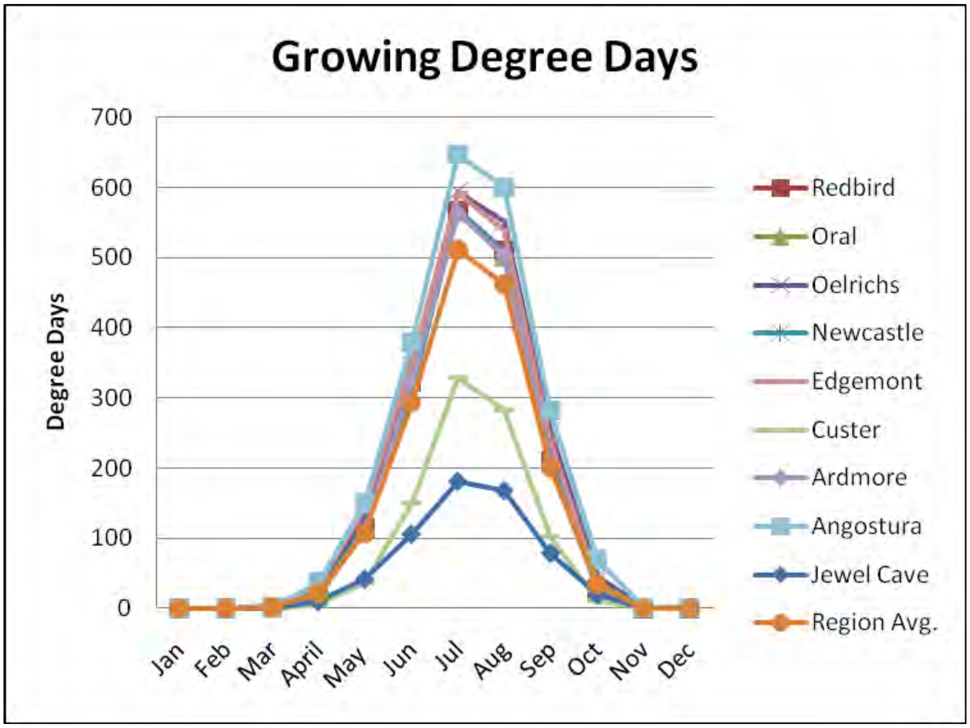


Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-15 Wind Class Frequency Distribution for Oral, South Dakota, from November 2002 – July 2008

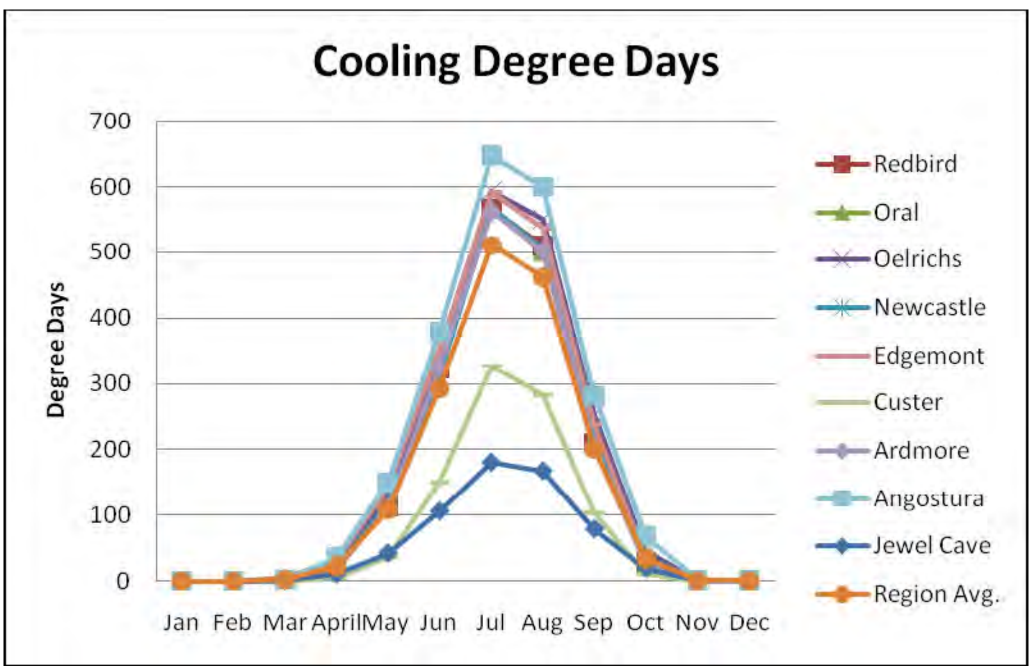
5.5.2.5 Cooling, Heating and Growing Degree Days

The graphs shown in Figures 5.5-16, 5.5-17, and 5.5-18 summarize the growing degree, cooling, and heating days for the nine meteorological sites in the area. The data show a similar pattern for all three parameters throughout the sites with the exception of the Jewel Cave and Custer sites, which is likely caused by the higher relative elevation of these two sites.



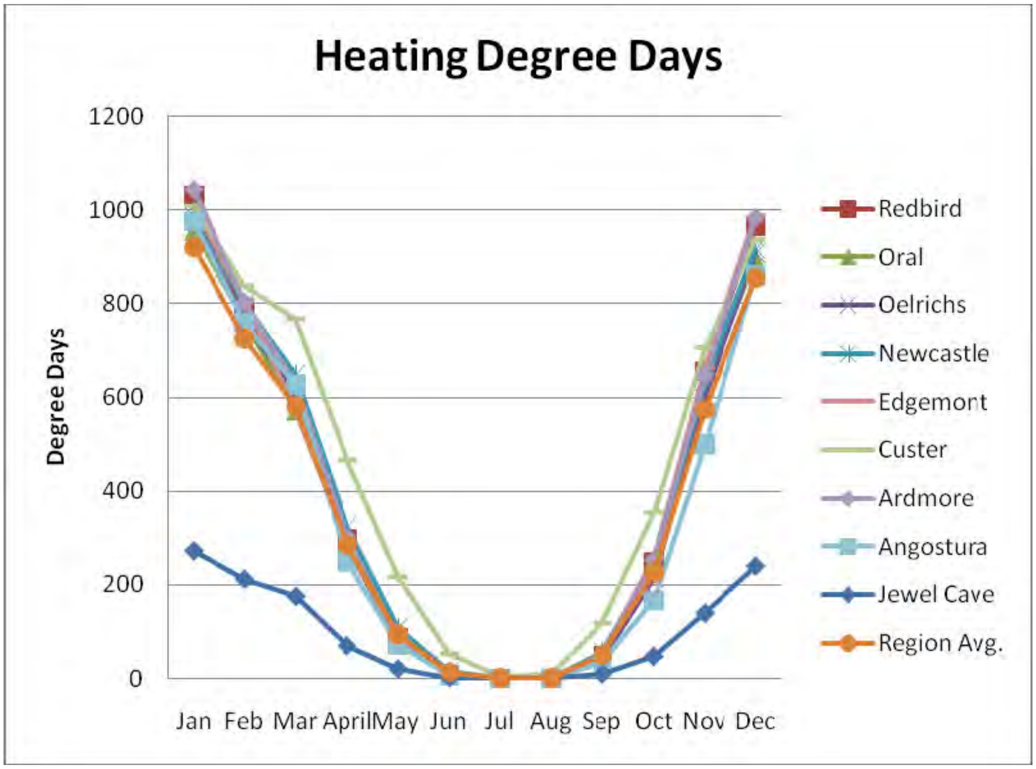
Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-16 Growing Degree Days for Regional Sites



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-17 Cooling Degree Days for Regional Sites



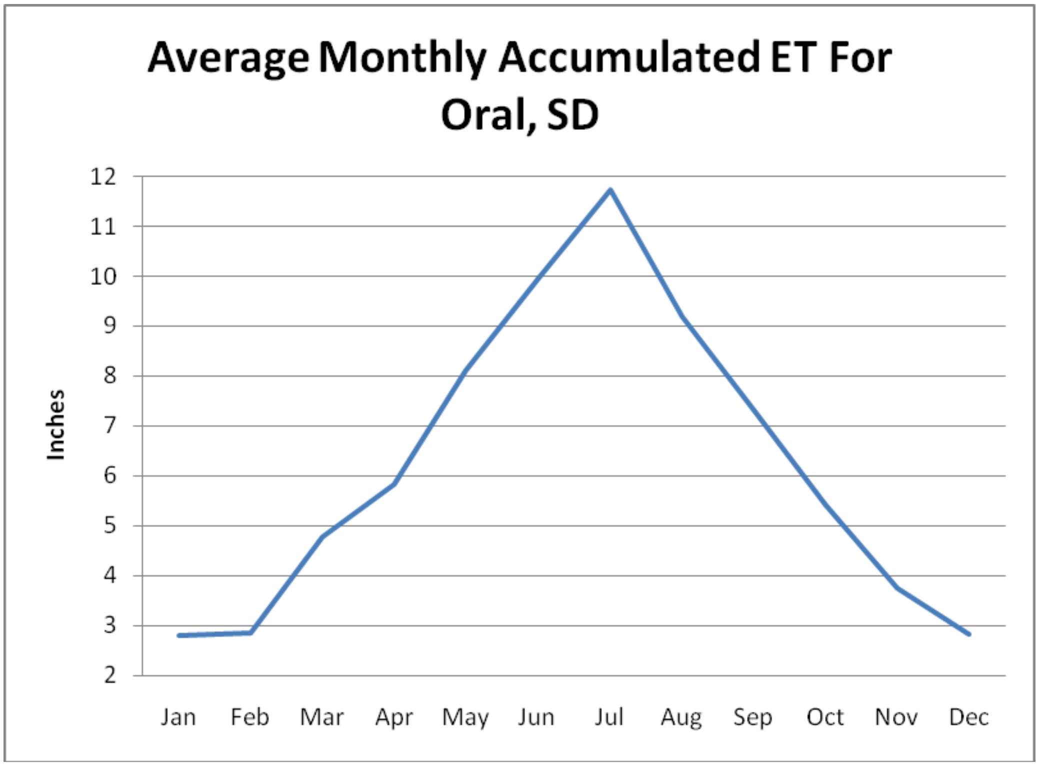
Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-18 Heating Degree Days for Regional Sites

All degree days calculations used a base temperature of 55 degrees F. Heating and cooling degree days are included to show deviation of the average daily temperature from the chosen base temperature. The number of heating degree days is computed by taking the average of the high and low temperature occurring that day and subtracting it from the base temperature. The number of growing degree days and cooling degree days is computed in the opposite fashion where the base temperature is subtracted from the average of the high and low temperature for the day. Negative values are disregarded for both calculations.

5.5.2.6 Evapotranspiration

The American Society of Civil Engineers (ASCE) Standardized Reference Evapotranspiration Equation was used to calculate daily evapotranspiration (ET) using a tall reference crop coefficient. The weather parameters needed to calculate ET using this method are daily maximum and minimum temperature, maximum and minimum relative humidity, total solar radiation, and average wind speed. The Oral site was the only one in the region with all these weather parameters being sampled, and was, therefore, the site used for this analysis. The data were available from May 8, 2003, to July 20, 2008. Figure 5.5-19 displays a graph of the average accumulated ET for each month. Most ET occurs during the summer months of June, July, and August with an average monthly accumulation of 10.3 inches. During the winter months, low ET (2.8 inches) occurs because of low temperatures and low solar radiation.



Source: High Plains Regional Climate Center, 2008; South Dakota University, 2008

Figure 5.5-19 Average Monthly Accumulated Evapotranspiration for Oral, South Dakota

5.5.3 Site Specific Analysis

The site-specific analysis was completed using data collected from a weather station installed in approximately the center of the proposed permit boundary. The station is located on a site that is representative of the area within the boundary. Twelve months of data from July 18, 2007, to July 17, 2008, are used for this analysis.

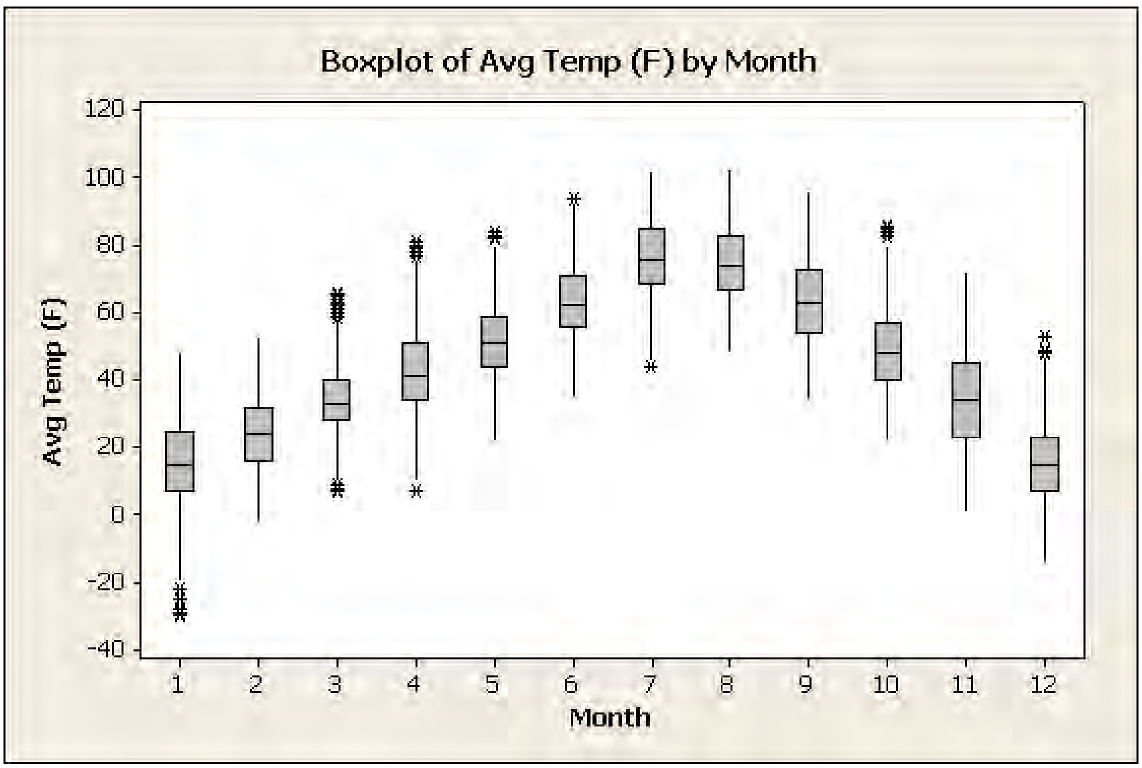
This site was installed in cooperation with the South Dakota State Climatology office according to the standards they use to install their Automatic Weather Data Network (AWDN) stations. The parameters being sampled at the site are air temperature, solar radiation, humidity, precipitation, and wind speed/direction at both 3- and 10-m heights (9.8 and 32.8 feet). Table 5.5-6 lists the model number and specifications of the sensors that were installed. The accuracy of all the sensors used is within the standards required by the NRC. All results of the statistical analysis, completed using **Minitab** software version 14.0 for the parameters analyzed, are included in Appendix 5.5-B.

Table 5.5-6 Specifications for Weather Instruments Installed to Perform Site-Specific Analysis

Measurement	Model	Manufacturer	Accuracy	Operating Temperature
Precipitation	VR6101	Vaisala	0.01 inch	–40°C to 60°C
Wind Direction	024A	Met-One	±5 degrees	–50°C to 70°C
Wind Speed	014A	Met-One	0.25 mph (0.11 m/s)	–50°C to 70°C
Temperature and RH	HMP45C	Vaisala	±2% for 10–90% RH; ±3% of 90–100% RH	–40°C to 60°C
Solar Radiation	L1200X	Lt-Cor	Absolute error in natural daylight is ±5% max; ±3% typical	–40°C to 65°C

5.5.3.1 Temperature

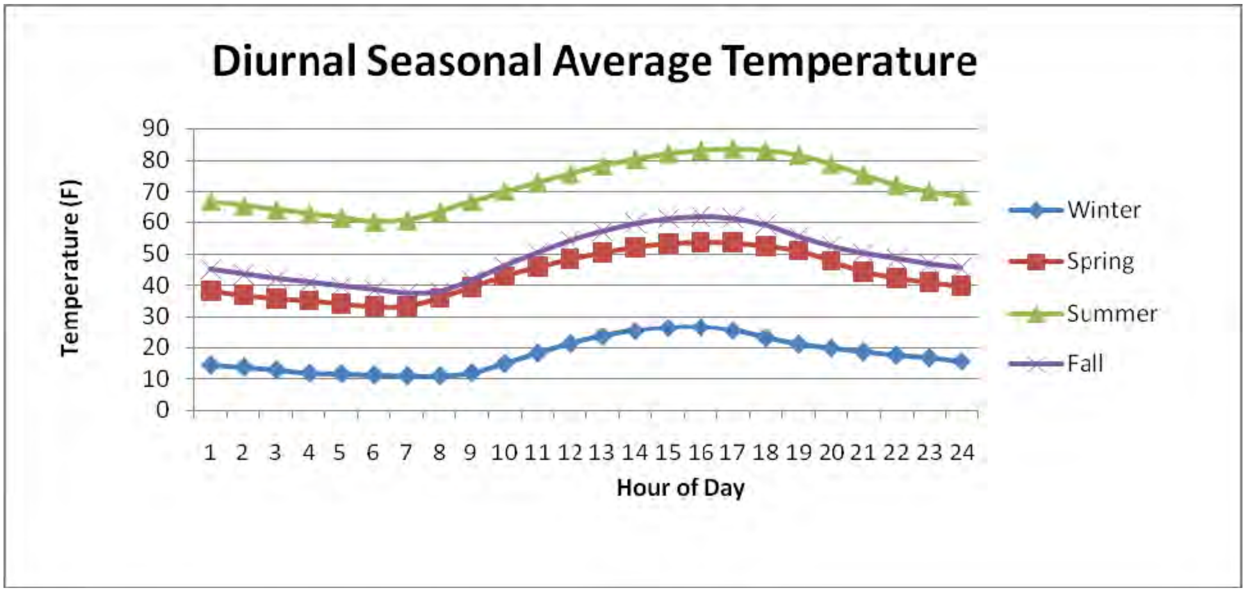
The average hourly temperature over the year for the site was 45.5 degrees F. A maximum temperature of 104 degrees F was reached on both July 21, 2007, and August 13, 2007, while the minimum temperature for the period of record was –28 degrees F on January 22, 2008. A boxplot of the average temperature by month is shown in Figure 5.5-20. July was the warmest month with a median temperature of 76 degrees F with a first quartile of 69 degrees F and a third quartile value of 85 degrees F. Conversely, December and January were the coolest months with a median temperature of 15 degrees F.



Source: South Dakota University, 2008

Figure 5.5-20 Average Temperature (degrees Fahrenheit) by Month from the PAA Meteorological Site

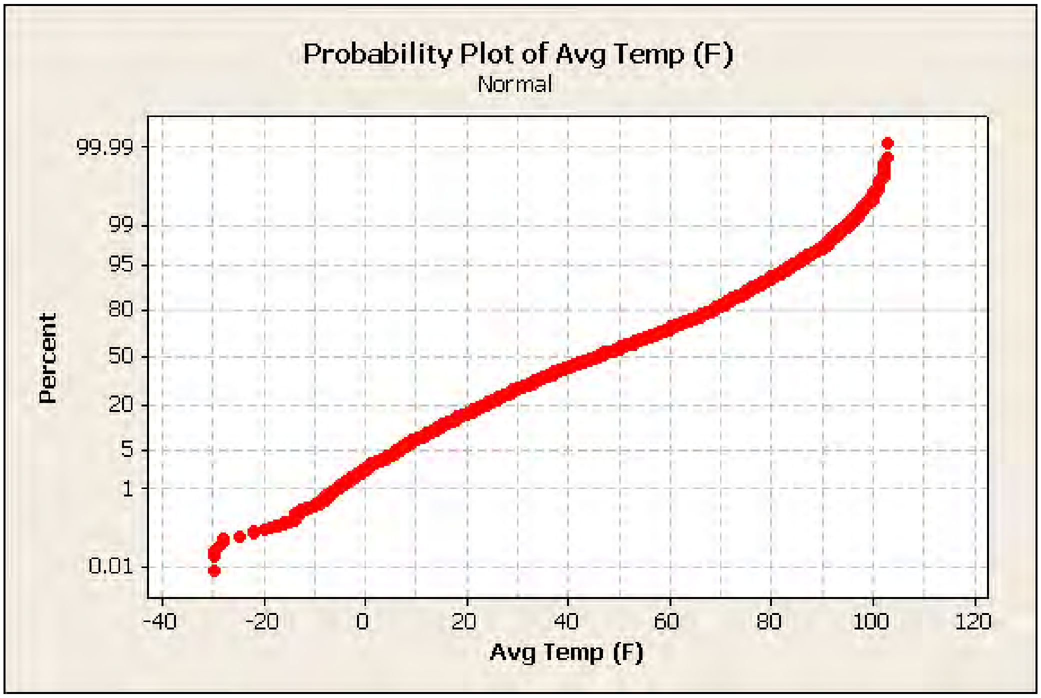
There were large variations in seasonal and diurnal temperature (Figure 5.5-21). In the summer season, average temperatures were as low as 60 degrees F at 6:00 am to 83.6 degrees F at 5:00 pm. In the winter season, temperatures varied from an average of 11 degrees F between 7:00 am and 8:00 am and rose to nearly 27 degrees F at 4:00 pm. The diurnal variations are the result of the lack of relative humidity in the atmosphere at the site, which causes the earth's surface to rapidly absorb and release the energy supplied by the sun.



Source: South Dakota University, 2008

Figure 5.5-21 Diurnal Average Temperature for the PAA Meteorological Site by Season

Figure 5.5-22 shows a probability plot of average hourly temperature for the year. Temperatures above or below 46 degrees F were expected at the site 50 percent of the time, and temperatures dipped below the freezing mark of 32 degrees F 31 percent of the time.



Source: South Dakota University, 2008

Figure 5.5-22 Probability Plot of Average Temperature from the PAA Meteorological Site

5.5.3.2 Wind Patterns

Wind speed and direction was measured in the field using Met-One 014A and 024A model sensors. Statistical analysis and visualization of wind data were performed using WRPLOT View Version 5.3 distributed by Lakes Environmental. All data analysis outputs are included in Appendix 5.5-C. The average wind speed over the period of record was approximately 5 mph, while calm winds occurred only 1.8 percent of the time.

As shown in Table 5.5-7, a majority of the winds (51 percent) come from the southeast and approximately 55 percent of all winds were less than 4.6 mph. December had the least amount of wind with 7.66 percent of the total winds being classified as calm and having an average wind speed of 2.8 mph. In contrast, May was the windiest month with only 0.41 percent of calm winds and an average wind speed of 6.9 mph. Southeasterly winds were prevalent in the winter months (38 percent of total shown in Figure 5.5-23) as well as the summer months (56 percent of total shown in Figure 5.5-24).

Table 5.5-7 Normalized Frequency Distribution of Wind at the PAA Meteorological Site

Frequency Distribution (Normalized)							
Wind Direction	**Knots**						
	1–4	**4–7**	**7–11**	**11–17**	**17–21**	**≥ 22**	**Total**
348.75–11.25	0.000345	0.000115	0.000000	0.000000	0.000000	0.000000	0.000459
11.25–33.75	0.002526	0.000804	0.000459	0.000115	0.000000	0.000000	0.003904
33.75–56.25	0.012517	0.003790	0.003790	0.000804	0.000230	0.000230	0.021360
56.25– 78.75	0.028250	0.016996	0.021475	0.003330	0.000459	0.000000	0.070510
78.75–101.25	0.057074	0.037322	0.018489	0.001263	0.000000	0.000000	0.114148
101.25– 123.75	0.069936	0.025609	0.011713	0.000000	0.000000	0.000000	0.107258
123.75–146.25	0.070740	0.022738	0.007350	0.000115	0.000115	0.000000	0.101056
146.25–168.75	0.071199	0.015618	0.001378	0.000345	0.000000	0.000000	0.088539
168.75–191.25	0.057533	0.004364	0.000459	0.000230	0.000000	0.000000	0.062586
191.25–213.75	0.035829	0.004364	0.000345	0.000115	0.000000	0.000000	0.040652
213.75–236.25	0.035140	0.005397	0.002182	0.001034	0.000000	0.000000	0.043753
236.25– 258.75	0.030202	0.006890	0.004593	0.001493	0.000115	0.000000	0.043294
258.75– 281.25	0.032269	0.014469	0.004364	0.001952	0.000000	0.000000	0.053055
281.25–303.75	0.027905	0.034566	0.019982	0.002986	0.000000	0.000000	0.085439
303.75–326.25	0.017570	0.040652	0.052710	0.015962	0.000230	0.000000	0.127124
326.25–348.75	0.004364	0.006546	0.006775	0.001263	0.000115	0.000000	0.019063
Subtotal	**0.553399**	**0.240239**	**0.156063**	**0.031006**	**0.001263**	**0.00023**	**0.973702**
Calms							**0.017646**
Missing/Incomplete							**0.008652**
Total							**1.000000**

Source: South Dakota University, 2008

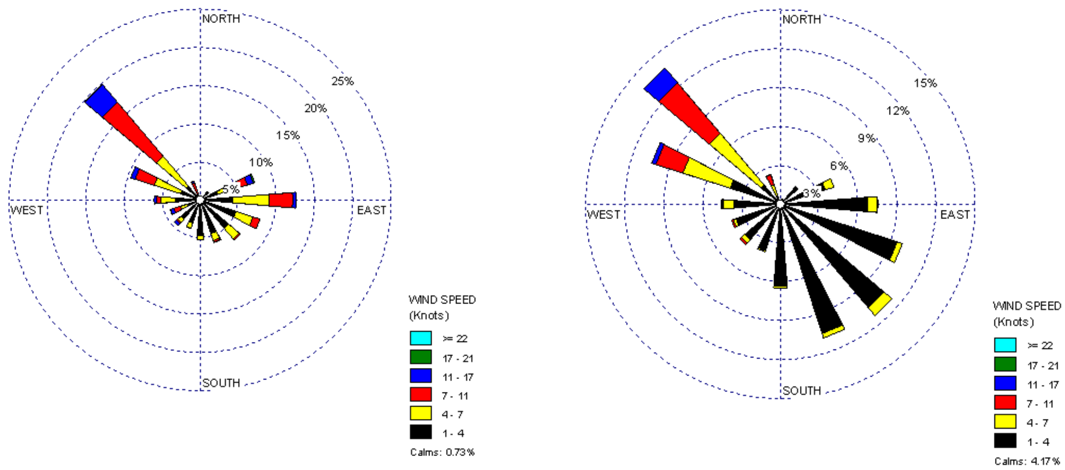


Figure 5.5-23 Winter and Spring Wind Roses

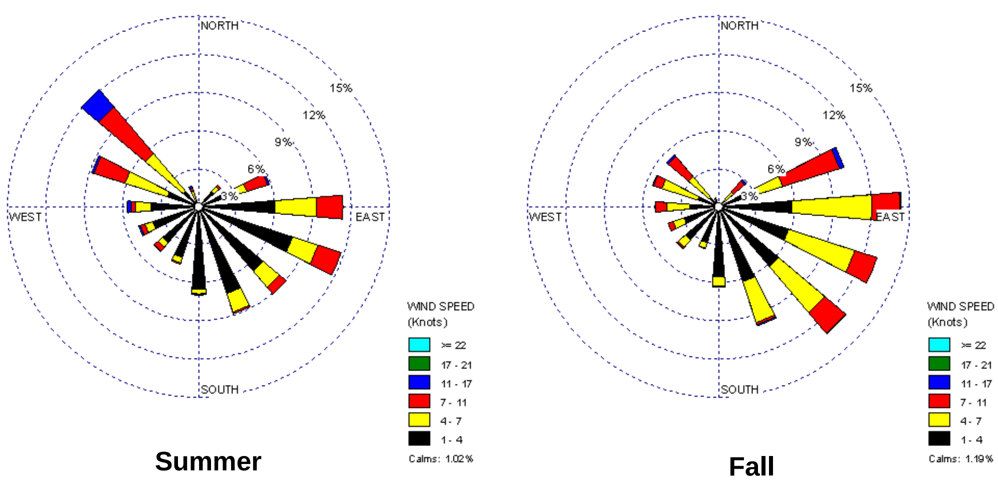
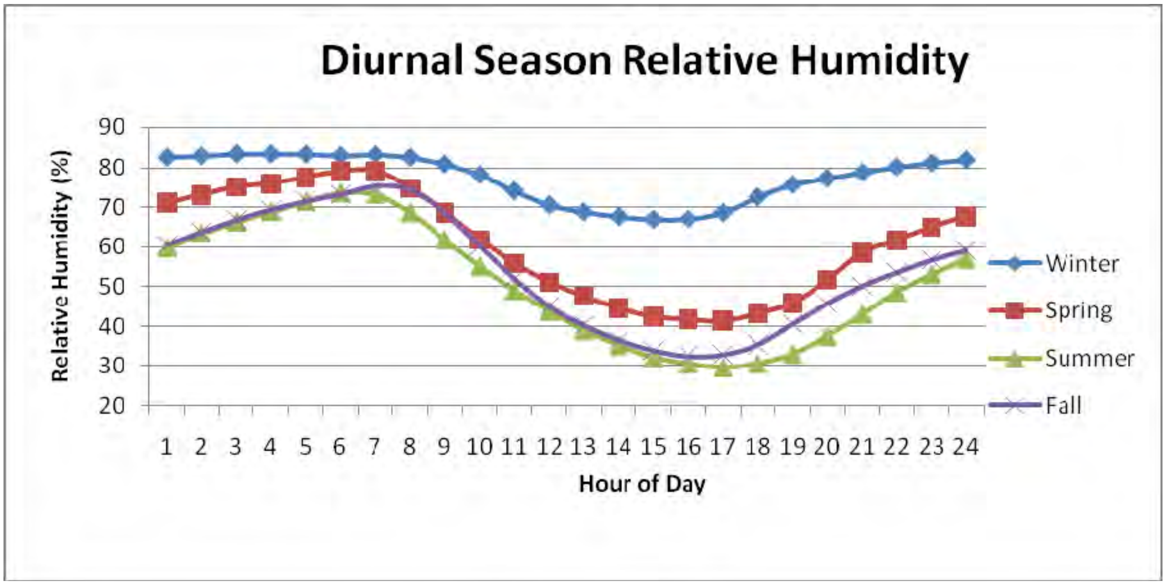


Figure 5.5-24 Summer and Fall Wind Roses

5.5.3.3 Relative Humidity

As mentioned in previous sections, the relative humidity at the site is low. Mean values range from a low of 51 percent in the summer months compared to a high of 77 percent in the winter months. Relative humidity values varied greatly throughout the day, especially in the summer and spring months. On average, during the spring, summer, and fall months, relative humidity reached its maximum from 5:00 am to 7:00 am and then declined steadily until 4:00 pm to 5:00 pm when it began its evening ascent (Figure 5.5-25). During the winter months, the diurnal relative humidity range was much less because of less intense and shorter duration solar radiation.

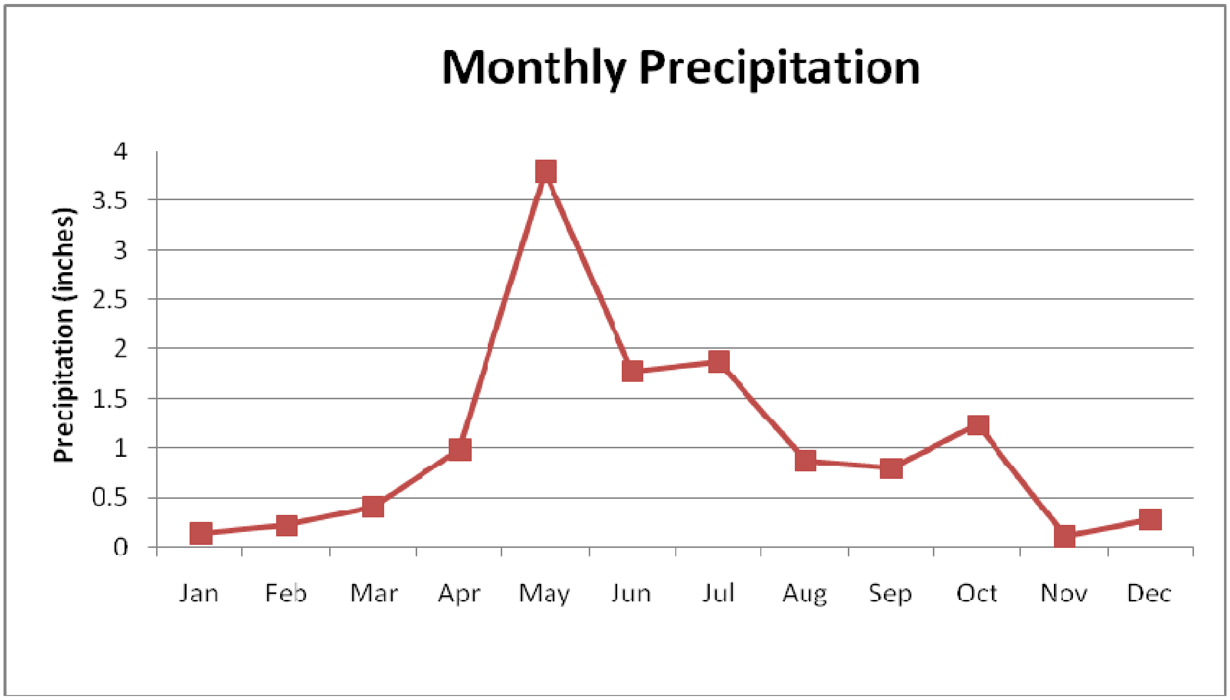


Source: South Dakota University, 2008

Figure 5.5-25 Diurnal Relative Humidity by Season from Project Meteorological Site

5.5.3.4 Precipitation

Data for this site were collected using a Vaisala VRG 101 all-weather precipitation gauge. The region received 12.42 inches of precipitation during the year of monitoring. Figure 5.5-26 displays the precipitation totals by month. The largest monthly precipitation total occurred in May (3.8 inches) and the least occurred in November (0.10 inch). The greatest daily precipitation total (1.29 inches) occurred on May 23, 2008. Also on May 23, 2008, the area received 0.71 inch of precipitation between the hours of 8 p.m. and 9 p.m., which was the most intense event of the sampled year.

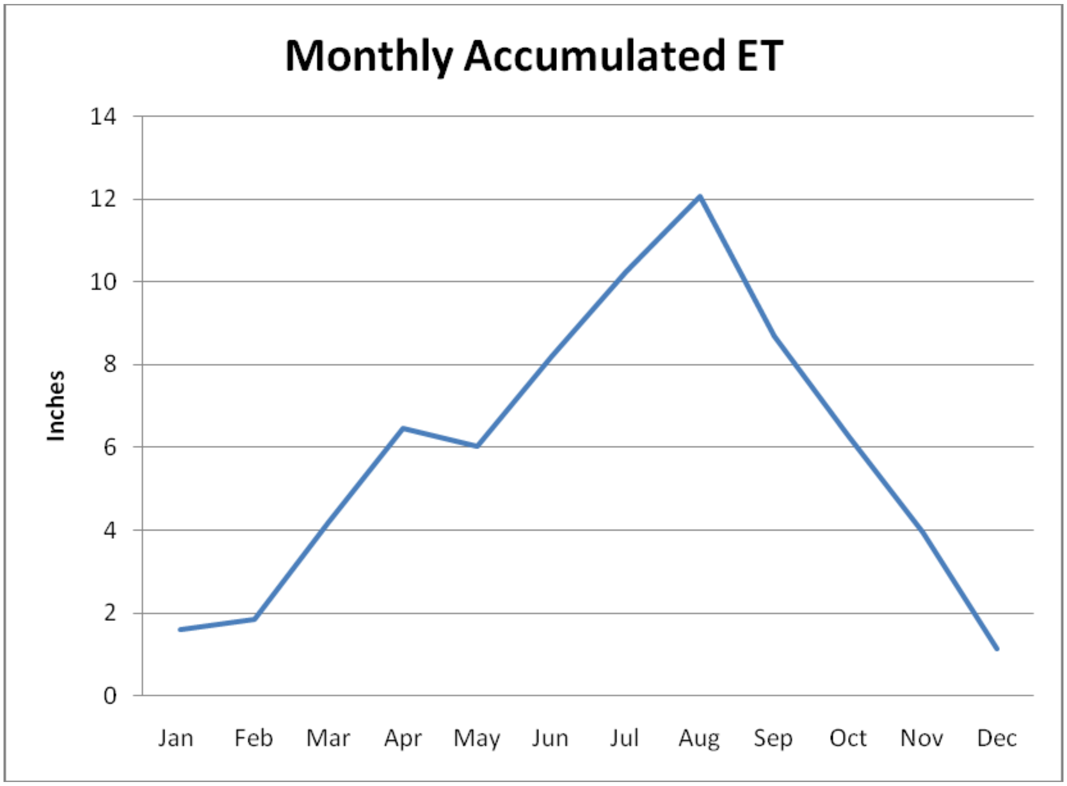


Source: South Dakota University, 2008

Figure 5.5-26 Monthly Precipitation from the PAA Meteorological Site

5.5.3.5 Potential Evapotranspiration

The potential ET data were taken from July 18, 2007, to July 14, 2008. The ASCE Standardized Reference Evapotranspiration Equation for a tall reference crop was used to estimate daily ET. The weather parameters needed to estimate ET using this method are daily, maximum and minimum temperature, maximum and minimum relative humidity, total solar radiation, and average wind speed. Most ET occurs during the months of July, August, and September with an average monthly accumulation of 10.3 inches (Figure 5.5-27) because of the high temperatures and unstable weather. During the winter low, ET occurs because of low temperatures and low solar radiation. The average ET during the winter months is 1.5 inches.



Source: South Dakota University, 2008

Figure 5.5-27 Estimated Evapotranspiration Calculated Using Weather Data Collected at the PAA Meteorological Site

5.6 Mining Chemicals and Wastes Management

5.6.1 Chemical Storage Facilities

The ISL process requires chemical storage and feeding systems to store and use chemicals at various stages in the extraction, processing, and waste treatment processes. Chemical storage and feeding systems will include sulfuric and/or hydrochloric acid, sodium hydroxide, hydrogen peroxide, carbon dioxide, oxygen, sodium chloride, sodium carbonate, barium chloride, and propane. Each chemical storage and feeding system will be designed to safely store and accurately deliver process chemicals to their intended delivery point in the process. Design criteria for chemical storage and feeding systems include applicable sections of the international building code, international fire code, OSHA regulations, Resource Conservation and Recovery Act (RCRA) regulations, and Homeland Security regulations.

5.6.1.1 Sodium Chloride Storage

Sodium chloride will be used to make up fresh eluant and will be stored in tanks as a saturated solution (approximately 26 percent by weight) in equilibrium with a bed of crystals in each storage tank. Dry sodium chloride will be delivered by truck and will be blown into the storage tanks using air pressure.

5.6.1.2 Sodium Carbonate Storage

Sodium carbonate will be used to make up fresh eluant and will be stored in tanks as a saturated solution in equilibrium with a bed of crystals in the storage tank. Sodium carbonate solution must be kept above 140 °F to prevent precipitation in the tank and piping. This will be accomplished by heating the water added to the tank, and continuously circulating liquid from the tank through a heat exchanger. An electric heater will be used to heat a thermal fluid to heat the exchanger. Dry sodium carbonate will be delivered by truck and will be blown into the storage tanks using air pressure.

5.6.1.3 Acid Storage and Feeding System

The acid storage and feeding system will include a storage tank and delivery pump. The storage tank will be located outside of the CPP building in a lined concrete secondary containment basin designed to contain 110 percent of tank volume plus a 25 year, 24 hour storm event. This secondary containment basin will be separate from the containment basins for other chemical systems. The acid feed pump will be located inside the building, directly adjacent to the storage tank.

5.6.1.4 Sodium Hydroxide Storage and Feeding System

The sodium hydroxide system will include a storage tank and delivery pump. The storage tank will be located outside of the CPP building in a concrete secondary containment basin designed to contain 110 percent of tank volume plus a 25-year, 24-hour storm event. This secondary containment basin will be separate from the containment basins for other chemical systems. The sodium hydroxide feed pump will be located inside the building, directly adjacent to the storage tank. Sodium hydroxide will be purchased as aqueous caustic soda, and will be pumped directly into the storage tank from the supplier's tanker trucks.

5.6.1.5 Hydrogen Peroxide Storage and Feeding System

The hydrogen peroxide system will include a storage tank and delivery pump. The storage tank will be located outside of the CPP building in a concrete secondary containment basin designed to contain 110 percent of tank volume plus a 25-year, 24-hour storm event. This secondary containment basin will be separate from the containment basins for other chemical systems. The hydrogen peroxide feed pump will be located inside the building, directly adjacent to the storage tank.

5.6.1.6 Oxygen Storage and Feeding System

Oxygen is typically stored near the central plant or within well field areas, where it is centrally located for addition to the injection stream in each header house. Since oxygen readily supports combustion, fire and explosion are the principal hazards that must be controlled. The oxygen storage facility will be located a safe distance from the CPP and other chemical storage areas for isolation. The storage facility will be designed to meet industry standards in NFPA-503.

5.6.1.7 Carbon Dioxide Storage and Feeding System

The carbon dioxide storage and feeding system will be used to dissolve carbon dioxide into the pregnant lixiviant to improve recovery of uranium in the ion exchange vessel. This system will be a vendor supplied packaged system including cryogenic tank, vaporizer, pressure gauges, and pressure relief devices.

5.6.1.8 Barium Chloride Storage and Feeding System

The barium chloride storage and feeding system includes a storage tank, agitator, and chemical metering pump. This system will be designed to dissolve solid barium chloride in water to make up the solution for feeding into the low total dissolved solids (TDS) wastewater for radium precipitation. This system will be located in a metal building located adjacent to the low TDS wastewater pond.

5.6.1.9 Non-Process Related Chemicals

Non-process related chemicals that will be stored at the project CPP include petroleum (gasoline, diesel) and propane. Due to the flammable and/or combustible properties of these materials, all bulk quantities will be stored outside of process areas at the facility. All gasoline and diesel storage tanks are located above ground and within secondary containment structures to meet EPA requirements. Non-regulated AEA liquid wastes such as used oil, hydraulic fluid, cleaners, solvents and degreasers will be recycled or disposed offsite at a permitted hazardous waste facility or other EPA approved disposal methods.

5.6.2 Historical Mine Wastes

Existing mine waste overburden remains over portions of the eastern side of the known mineralization. Powertech does not plan to conduct operations through the mine waste at this time due to the potential of increased liability associated with the potential for reclamation on waste having no relationship to ISL production. In the future, if liability is not an issue and/or reclamation is undertaken on these waste piles, Powertech will revisit the issue of known mineralization that is currently deemed inadvisable to exploit. In any event the same control and protection standards will be used for in situ mining should these areas be developed in the future.

5.6.3 Solid Waste Management

Solid wastes such as pond sludge; soils contaminated by spills or leaks; spills of loaded or spent IX resin; filter sand or other process media; and parts, equipment, debris (e.g., pipe fittings and hardware) and personal protective equipment (PPE) that cannot be decontaminated for unrestricted release are considered Atomic Energy Act (AEA) regulated wastes and will be disposed of at a licensed 11e(2) disposal facility. Non-regulated AEA solid wastes such as office trash and spent equipment parts not associated with uranium production will be disposed at an off-site municipal Subtitle D facility. Domestic sewage will be disposed in an on-site septic system and leachfield or other disposal methods permitted under State of South Dakota regulations.

Non-radioactive solid waste will be managed in accordance with existing regulations and disposed of in a landfill that has been permitted under subtitle D of RCRA.

5.6.4 Liquid Waste Management

There are several disposal options for the liquid waste generated during the production and restoration process including brine concentrators, discharge to surface waters, evaporation ponds, deep well injection and land application. The National Pollution Discharge Elimination System (NPDES) permitting process allows for the discharge of treated liquid effluents to surface waters that meet state and federal water quality standards, but surface discharge has been rejected because it is a poor use of water resources in a water sensitive region. The sole use of evaporation ponds was rejected because of the large surface impoundment area that would be required to evaporate the daily bleed water and the severe winters that would freeze the ponds for several months out of the year, thereby decreasing the evaporation rates. The use of the evaporation process in conjunction with a Class V deep disposal well or land application to handle the CPP waste, is considered to be the best alternatives to dispose of these types of liquid waste.

5.6.4.1 Types of Liquid Wastes

Wastewater from the Proposed Action will consist primarily of spent CPP elution brines, production well field bleed, and restoration flows; these wastewaters will be disposed of by injection into a Class V injection well(s), or by treatment and subsequent land application. Specific liquid waste sources will include:

- Wastewaters from decontamination showers, sinks, and washing machines located in the restricted area
- Production bleed
- Spent eluant brines
- Spilled process liquids

- Wastewater from groundwater restoration
- Decontamination/decommissioning solutions from surface facilities

As part of the wastewater management plan, there may be periodic releases of water from storage ponds for the beneficial use of crop irrigation.

5.6.4.2 Out of State Disposal

Powertech originally proposed that one method of liquid waste disposal would be to pipeline liquid waste from Dewey-Burdock to a deep well injection site(s) located in Wyoming. A second potential method of liquid waste disposal was to truck concentrated liquid waste to licensed disposal wells in Wyoming or Nebraska. In Powertech's discussion with both states, it has been determined that neither state is willing to accept liquid waste from an adjacent state. Therefore, the proposed options described in Section 4.2.2.2 of the Technical Report are not viable at this time and are hereby withdrawn.

5.6.5 Deep Disposal Well Option

Powertech has determined that Class I (Hazardous Waste) deep injection wells are prohibited within South Dakota, and in fact, the probability of discovering a horizon that has no possibility of a USDW horizon beneath the injections zone is remote. Therefore, Powertech intends to propose to the U.S. EPA that the company permit Class V (Non Hazardous) deep disposal wells within the project area. The proposed locations of the wells are shown on Exhibit 1.1-2 Deep Disposal Well Option_. Regional geology and measurements of water character value within the Minnelusa horizon of Permian Age shows that the horizon has sufficient permeability and sufficiently low water quality that deep well injection would be viable for disposal of process liquid waste with removal of hazardous constituents. The requisite ponds for extraction of radium are shown on Exhibit 1.1-2 Deep Disposal Well Option as Radium Settling Ponds.

The deep well(s) identified by Powertech (USA) will isolate liquid waste generated during the production and restoration processes from any underground source of drinking water (USDW).

5.6.5.1 Disposal Well Design

Cross Sections show the section that will be proposed for permitting. It is clear from these cross sections that the depth and character of the horizon is of sufficient thickness to support the application for a Class V permit. Powertech proposes that prior to beginning of injection operations, that the company will apply for and receive the appropriate permits to allow disposal of liquid wastes in these wells. In addition, prior to operation, the drilled and completed Class V wells will be thoroughly tested with results submitted to all appropriate agencies for approval of injection of non-hazardous waste water with appropriate controls.

Exhibit 1.1-1 show the proposed location of the Radium Settling Ponds that would be used prior to land application. In addition to the Radium Settling Ponds, wastewater holding ponds would be necessary for land application due to the lower evaporation rate in winter time. Powertech proposes the use of irrigation pivots to apply non hazardous waste water that meets the effluent discharge standards to the surface in order to grow an agricultural crop. This method was used regularly at Hobson, Mount Lucas and Highlands with no deleterious effect on the environment.

5.6.5.2 Pond Design

It is proposed that depending on the method of disposal ultimately selected, that all final data and design of as-built ponds will be submitted to the NRC and all appropriate agencies. The complete package will include design under the strictest engineering standards and will be designed and signed off by certified professional engineers.

Pond and water application designs for the land application option and pond designs for the deep well disposal option are presented in the Pond Design Report provided in Appendix 4.3-A. These designs have been completed following NRC Regulatory Guide 3.11-Rev. 1, NUREG 1569, 10 CFR Part 40, Appendix A, Criterion 5 and State of South Dakota Administrative Rule 74:29:11:23. A summary of the designs for both liquid waste disposal options is provided below.

5.6.5.2.1 Land Application Ponds

The land application option includes six categories of ponds:

- Radium settling ponds containing bleed and restoration water and are used to settle radium out of solution.
- Outlet ponds used to intercept treated water from the radium settling ponds and to store storm water falling on the radium settling ponds.
- Storage ponds used to store treated water during the non-irrigation season.
- A central plant pond containing brine produced at the Burdock Plant site.
- A spare pond used for emergency containment should the radium settling or central plant ponds fail.
- A spare storage pond used for emergency containment should any of the storage ponds fail or portions of the land application system become temporarily inoperable.

The design of the land application ponds includes the following:

- Two radium settling ponds, one each at the Dewey and Burdock, having a storage capacity of 39.4 acre-ft each.
- Two outlet ponds, one each at the Dewey and Burdock sites having a storage capacity of 4.9 acre-ft each.
- Two sets of storage ponds:
  - A system of 4 ponds constructed at the Dewey Site each having a storage capacity of 63.8 acre-ft.
  - A system of 4 ponds constructed at the Burdock Site each having a capacity of 63.8 acre-ft.
- One spare storage pond at the Dewey Site having a storage capacity of 63.8 acre-ft.
- A central plant pond at the Burdock Site having a capacity of 36.2 acre-ft.
- A spare pond at the Burdock Site having a capacity of 39.4 acre-ft.

5.6.5.2.2 Deep Well Disposal Ponds

The deep well disposal option includes four categories of ponds:

- Radium settling ponds, containing bleed water and restoration water and used to settle radium out of solution.
- Outlet ponds used to intercept treated water from the radium settling ponds and to store storm water falling on the radium settling ponds.
- A surge pond, containing water that has been treated and which is to be pumped to the disposal wells.
- A spare pond used for emergency containment should a liner on any of the ponds fail.
- A central plant pond containing brine produced at the Burdock Plant Site.

The design of the deep disposal well ponds includes the following:

- Two radium settling ponds, one each at the Dewey and Burdock sites having a storage capacity of 15.9 acre-ft each.
- Two outlet ponds, one each at the Dewey and Burdock sites having a storage capacity of 5.1 acre-ft each.
- Two surge ponds, one each at the Dewey and Burdock sites having a storage capacity of 8.4 acre-ft each.
- A central plant pond at the Burdock site having a capacity of 15.9 acre-ft.
- A spare pond at the Dewey Site having a capacity of 15.9 acre-ft.

All ponds have been designed to store water reporting to them while maintaining 3 feet of freeboard. The geometry and storage characteristics of the radium settling ponds have also been checked to verify that they will allow the efficient removal of radium from solution.

The radium settling, spare and central plant ponds will be provided with the following lining system:

- An 80-mil-HDPE primary liner
- A 60-mil-HDPE secondary liner
- A 1-ft-thick clay liner below the secondary liner
- A geonet drainage layer sandwiched between the primary and secondary HDPE liners
- A leak detection sump and access port system

All other ponds will contain treated water that is either to be used for land application or deep well disposal. These ponds will include a single 80-mil-HDPE liner underlain by a 1-ft-thick clay liner.

The results of the stability analyses calculated for the embankments using three different methods of analysis; Bishop Method, Janbu Method and Morgenstern-Price Method indicate that the slopes are stable under both static and MCE seismic loading conditions.

5.6.6 Groundwater Restoration, Decommissioning and Site Reclamation

Groundwater restoration will be implemented as part of routine ISL operations so that restoration can be performed after a well field is depleted of uranium but concurrently with the development of subsequent well fields for uranium production. The goal of the groundwater restoration program will be to return water quality within the exempted aquifer consistent with pre-operational baseline quality conditions or other NRC approved standard in accordance with NRC's application of 10 CFR Part 40 Appendix A Criterion 5(b)(5) to ISL operations. It is anticipated that a combination of phases and technologies will be utilized to restore groundwater. These restoration phases and technologies are described in Section 4.2.

The decommissioning of well fields will commence following regulatory agency acceptance of the groundwater restoration program. The well field decommissioning will include well plugging and abandonment and the removal of well field piping, instrumentation and other support structures. At the time the CPP is decommissioned, all process equipment, buildings and ancillary equipment will be decontaminated for unrestricted release or disposed at an NRC approved facility.

During site decommissioning and decontamination (D&D), areas that exceed NRC soil concentration limits will be cleaned and then surveyed for compliance with applicable standards. Surface topography and drainage patterns that have been disturbed during operations (including the surface impoundment) will be re-established and will be revegetated with native species.

5.6.7 Surety Arrangements

In accordance with 10 CFR Part 40, Appendix A, Criterion 9, related NRC guidance, and existing Commission administrative case law, ISL operators are required to submit detailed financial assurance cost estimates to NRC Staff for approval prior to the issuance of a license for ISL operations. Pursuant to these requirements, an ISL operator must submit a detailed, line-item cost estimate (breakdown) of the activities and their associated costs that are necessary to complete site-specific D&D, including groundwater restoration, and to release the project site for unrestricted use. As part of this license application, Powertech (USA) has prepared a detailed, line-item financial assurance cost estimate for the Proposed Action, including the mandatory minimum fifteen (15) percent contingency over and above the costs associated with site D&D. This financial assurance cost estimate is provided in Section 6.6.

However, while NRC regulations and requirements require NRC approval of such cost estimates, such regulations and requirements do not require identification of Powertech (USA)'s specific financial assurance mechanism (e.g., surety bond, letter of credit, etc.) that will be used to provide such financial assurance nor do they require posting of the required funding until the operator is prepared to commence licensed operations at its project site. As a result, Powertech (USA) submits that it will identify and supply a financial assurance mechanism for the amount of funding approved by NRC in accordance with 10 CFR Part 40, Appendix A, Criterion 9 and NUREG-1757, Volume 3 prior to the commencement of licensed operations.

In addition, Powertech (USA) recognizes that NRC's application of Criterion 9 to ISL operations requires annual financial assurance updates to account for potential changes in the approved financial assurance cost estimate such as inflation, increased workforce wages, and cost increases for materials. Powertech (USA) commits to this requirement and will submit annual financial assurance updates for NRC Staff approval in accordance with Criterion 9 and NUREG-1569 on a timely basis.

5.7 Potential Environmental Impacts

Potential impacts have been evaluated with regard to the Proposed Action. After a complete site specific analysis of the potential impacts of the Proposed Action Powertech (USA) concludes that such potential impacts fall within the scope of the analysis and conclusions in NUREG-1910 regarding the South Dakota-Nebraska Region.

5.7.1 Potential Impacts of the No-Action Alternative

The potential impacts of a no-action alternative include the lost opportunity to produce a large resource of domestic uranium for use in the commercial nuclear fuel cycle from an ISL-amenable source. In addition, failure to license the Proposed Action will result in the failure to realize substantial positive effects on the economic growth of Custer and Fall River Counties through job creation and tax collections in the State of South Dakota. As discussed in the Cost-Benefit Analysis, below the project is expected to have significant positive economic impacts.

In 2007, total domestic U.S. uranium production was approximately 4.5 million pounds U3O8. During the same time domestic U.S. uranium consumption was approximately 51 million pounds U3O8. The project represents a significant new source of domestic uranium supplies that are essential to provide a continuing and economically viable source of nuclear fuel to domestic electric power electrical generation facilities thus reducing dependence on foreign energy supplies.

5.7.2 Potential Land Use Impacts of Proposed Action

Rangeland and pastureland are the primary land uses within the PAA and the surrounding 2 km review area. The PAA encompasses 10,580 acres (4,282 ha). Under the proposed action, this land will be temporarily converted from its previous use as rangeland and pastureland to ISL use on a progressive, "phased" basis. The PAA encompasses 10,580 acres, the land potentially disturbed by the Proposed Action will be approximately 68 acres (facilities, piping, ponds, well fields and roads) during the year proceeding operation. The potentially disturbed area during the life of the project (production to restoration) is estimated to increase over time to a maximum of 108 acres. If the maximum area for land application of treated wastewater is included in the footprint of the Proposed Action, then a maximum of additional 355 acres potentially would be affected by the Proposed Action for most of the project life. The maximum potential land disturbance at any given time is expected to be 463 acres. The CPP acreage is estimated at 6.7 (2.7 ha) located in the Burdock area. The satellite facility is estimated to consume 2.9 acres (1.2 ha) located in the Dewey area.

By way of reference, permitted areas for past and current-ISL operations have varied in size. Facilities' size range from about 2,552 acres (1,034 ha) for the proposed Crownpoint facility in McKinley County, New Mexico, to over 16,000 acres (6,480 ha) for the Smith Ranch property in Converse County, Wyoming. However, much of the permitted area of a site is undisturbed, and surface operations (wells, processing facilities) affect only a small portion of it (NUREG-1910, 2008). The land will likely experience an increase in human activity also contributing little to land disturbance. The disturbance associated with drilling, laying of pipeline, and facility construction will be limited and temporary as vegetation will be re-established through concurrent reclamation. The construction of new access and secondary roads will be minimized to the extent possible.

5.7.2.1 Potential Land Use Impacts of Operations

The primary land use within the PAA is rangeland. Operation of the project facilities will restrict the use of land as rangeland for the duration of the project. Following production and restoration, the PAA will be returned to rangeland use.
The Proposed Action will temporarily impact recreational use, which is limited primarily to large game hunting, within the project boundary., Within the PAA, hunting is currently open to the public on approximately 5,689 acres (2,302 ha). Approximately 240 acres (97.12) are owned by the Bureau of Land Management (BLM); the South Dakota Game Fish and Parks (SDGFP) lease around 3,069 acres (1,241 ha) annually of privately owned land and currently designate this acreage as walk-in hunting areas.

Additional land use impacts will include the disruption to livestock grazing within the PAA. Approximately 9.4 acres (3.8 ha) will be removed from grazing on the BLM land. This disturbance will be temporary in the area until the area is released for unrestricted use. Potential impacts include surface soil contamination from leaks or spills in well fields or from pipelines, but site reclamation will ensure that such impacts are temporary. Given the relatively small size of the area impacted by operations the exclusion of grazing from well field areas over the course of the project is expected to have minimal impact on local livestock production.

5.7.2.2 Land Use Regulations

Compliance with land use regulations of Custer and Fall River Counties in South Dakota as well as the most current version of BLM's Resource Management Plan for South Dakota will be necessary. The PAA is not located within lands withdrawn from mineral exploration and development. The Proposed Action will be reviewed by the BLM Field Office in Belle Fourche SD to ensure that the Proposed Action is compatible with management objectives for the area lands.

5.7.3 Potential Transportation Impacts

5.7.3.1 Potential Access Road Construction Impacts

There are only a few residences in the vicinity of the proposed project. Most of the land in the surrounding 2.0 km radius of the project is devoted to rangeland. The Dewey Road is the primary access road into the Proposed Action Area; this road runs primarily in a north- south direction through the PAA (Figure 3.1-1). Dewey Road is a county road and is maintained by the county. Secondary roads within the PAA will be constructed from the Dewey Road to the CPP, SF and header houses to the extent necessary. The PA will include establishing roads to individual wells. Off-site transportation routes will include federal, state, and county roads.

5.7.3.2 Potential Traffic Impacts

The predominant land use in the area is rangeland; other land uses include grazing, crop land, hunting and wildlife habitat. Due to the low population density within the region, the limited use of large machinery and vehicles and the infrequent movement of transport vehicles to and from the project site, no significant noise or congestion impacts are anticipated within the surrounding 2.0-km area during operations. There will be some increased traffic, noise and dust on the county road between the site and Edgemont during construction activities. However, these impacts will be minimal and temporary.

Radioactive materials have been shipped safely in this country for more than 50 years. As with other shipments, radioactive materials shipments have been involved in accidents. However, no deaths or injuries have resulted from exposure to their radioactive contents (USDOT, 1999). Powertech (USA) will design training programs and standard procedures in accordance with Department of Transportation (DOT) regulations found in CFR Titles 49 and 10 and will strictly enforce them in order to maintain compliance and to keep a safe transportation record. Powertech (USA) intends to provide relevant state and local authorities with information concerning transportation emergency response procedures.

5.7.3.3 Material Shipments

All shipments of materials and supplies to, from and within the Proposed Action Area will be transported by only properly licensed and certified drivers and subject to both federal and state transportation regulations. Four classifications of shipments will be sent or received during pre-operational and operational phases of the project:

- Non-radioactive materials such as: Construction materials, office supplies, process chemicals, and other related materials from vendors concerning onsite activities.
- Shipments of loaded resin to the CPP and eluted (stripped) resin to SF's.
- Shipments of dried and packaged yellowcake to a conversion facility.
- Shipments of waste material to an appropriate licensed facility.

Impacts would differ according to material type, quantities, and concentrations. The separate scenarios are discussed below.

The following section discusses the transportation risks of the four materials classified above. Mitigation and monitoring to eliminate or reduce the potential environmental impacts of a transportation accident are discussed in Section 5.8.

5.7.3.3.1 Shipments of Process Chemicals and Fuel

Over the course of the operational life of the facility several shipments of chemical, fuel, and supplies will be made per working day. Process chemicals delivered to the project will include carbon dioxide, oxygen, salt, soda ash, barium chloride, hydrogen peroxide, sulfuric acid, hydrochloric acid, caustic soda (sodium hydroxide), and fuel. All applicable DOT hazardous materials shipping regulations and requirements will be followed during shipment of process chemicals and fuel to prevent a possible transportation accident. Powertech (USA) will develop procedures to ensure compliance with applicable regulation to mininmize impacts to human health and the environment. Analyses of documented accidents involving shipments have shown that secure containers have prevented spills (NMA, 2007).

5.7.3.3.2 Ion Exchange Shipments

The project will have resin stripping facilities; therefore only shipments involving the barren or eluted resin will be transported to the PAA. The consequences are likely to be lower for trucks transporting barren or eluted resin because the risk of contamination is minimal. Both barren and eluted resin shipments will be handled in accordance with NRC and DOT regulations. Powertech (USA) will transport loaded and eluted resin back and forth between the Dewey satellite and the Burdock CPP. This transportation will occur on-site at an estimated rate of one loaded resin truck from the SF to the CPP and one eluted from the CPP to the SF per day.

The same general shipping procedures outlined for the shipment of yellowcake will be followed for resin shipments.

The ion exchange resin will be shipped to and from the project in a tank truck. The NRC calculated the probability of an accident involving a truck transporting uranium-loaded resin from a satellite plant to a main processing plant at 0.009 in any year (U.S. Nuclear Regulatory Commission, 1997a).

The main environmental impacts from an accident involving the shipment of ion exchange resin would potentially be primarily impacts to the top soil in the area contaminated by the spill and the subsequent modification to the vegetation structure and the salvage of the top soil. This is scenario would only take place if drums were ruptured.

5.7.3.3.3

5.7.3.3.4 Yellowcake Shipments

The yellowcake will be loaded into a gasketed and sealed 55-gallon (208-L) drums which will be trucked to a conversion facility via qualified and certified carrier. Specific routes are to be determined by contract with the carrier. The carrier will meet all safety controls and regulations promulgated by 10 CFR 71.5. With a production rate of 1,000,000 lbs per year at the PAA, shipments are estimated to weigh approximately 40,000 lbs per load and would require an estimated 25 shipments per year. Smaller or partial loads could require additional shipments.

According to NUREG/CR 6733 earlier analyses concluded that the probability of a truck accident, involving the transport of yellowcake, for any given year was 11 percent for each uranium extraction facility. This calculation used average accident probabilities (4.0 × 10-7/km rural interstate, 1.4 × 10-6/km rural two-lane road, and 1.4 × 10-6/km urban interstate) that are considered conservative compared to other NRC transportation risk assessment (NUREG/CR 6733).

The worst case accident scenario involving yellowcake shipments would involve the release of yellowcake into the environment due to the breach of one or more drums containing yellowcake during transportation. In an accident involving a similar ISL facility and the shipment of yellowcake through Kansas (SRI International, 1979b), approximately 1,800 pounds or 4 percent of the yellowcake onboard the truck was spilled; no dose estimates were reported, the spill was quickly contained and all the yellowcake was thought to have been recovered.

Yellowcake shipments will be classified as Low Specific Activity (LSA) material and will be handled in accordance with NRC and DOT regulations. Powertech (USA) will develop an Emergency Preparedness Program that will be implemented should a transportation accident occur. The team training will provide technical instruction on field monitoring, sampling, decontamination procedures, communication, and other related skills necessary to safely handle a transportation emergency concerning shipments of yellowcake.

Before a shipment is approved for transportation, proper packaging including Marking/Labeling and Placarding must be accomplished within DOT regulations; Inspections of the vehicle and load will be performed; routing the shipment to minimize radiological risk and contacting Emergency Preparedness personnel are among the duties performed before a shipment would be approved to leave the facility.

5.7.3.3.5 Shipments of Waste Materials

Depending on classification of waste material the waste will be sent to different disposal sites. The categories are:

- Non-hazardous solid wastes shipped to a permitted landfill
- Hazardous solid or liquid wastes shipped to a permitted hazardous waste disposal facility
- 11e.(2) Byproduct material disposed of at a licensed or permitted facility

Most of the solid waste shipping will occur during the site reclamation and decommissioning phases. The probability of an accident while transporting 11e.(2) waste for any given trip is similar to the probability discussed in Section 5.7.3.3.3. The potential risks, however, for exposure are less because 11e.(2) waste is generally less radioactive than dried yellowcake and much of the waste will consists of solid material that in the event of an accident would be easy to contain. All applicable DOT shipping regulations and requirements will be followed before and during shipment of 11e.(2) wastes to prevent a possible transportation accident.

Liquid waste meeting the criteria of 11e.(2) will be disposed of via a waste disposal well (WDW) all applicable EPA and NRC regulations will be complied with. Transportation of liquid 11e.(2) will be accomplished via a pipeline or tanker truck from CPP area to the WDW.

5.7.3.3.5.1 Potential Post Operation Transportation Impacts

Before the on-site road reclamation begins, landowners will be contacted and given the option to retain the roads for their private use or have the roads reclaimed by Powertech (USA). If the roads are deemed beneficial to others (i.e., hunters, ranchers and residents) and the landowner agrees, the roads will not be reclaimed. Only roads related to the PA will be reclaimed.

5.7.3.3.5.2 Potential Cumulative Transportation Impacts

The cumulative volume of traffic associated with the PA is anticipated to be low, due to the relatively concentrated nature of the resources and the small workforce associated with ISL operations (NUREG-1910, 2008). Given this is the only ISL operation located in the state, and few industrial operations within the immediate region, therefore the cumulative transportation impacts will be insignificant.

5.7.4 Potential Geologic and Soil Impacts

5.7.4.1 Potential Geologic Impacts

Geologic impacts from the project are expected to be negligible or non-existent. The project is not expected to have a significant effect on ground subsidence or matrix compression because the net withdrawal of fluid (bleed) from the extraction zone is generally on the order of 3 percent or less, and the ISL process does not remove matrix material or structure. After restoration is complete, the groundwater levels are expected to return to pre-operational levels, and should therefore not have any significant effects on the quantity of groundwater.

Impacts are more likely to occur from other geologic factors such as earthquakes. As discussed in Section 7.6, the maximum magnitude earthquake estimated for the PAA is a VII on the Modified Mercalli Scale, corresponding to a Richter magnitude of 6.1

Due to the design of the project, no impacts are expected to subsurface geological strata. (NUREG-1910, 2008).

5.7.4.2 Potential Soil Impacts

There are two main drainage basins located in the PAA; each of the drainages have different soil types. The soil mapping unit descriptions are in Section 3.3. The Beaver Creek basin is composed of Haverson loam, and has 0-2 percent slopes throughout the drainage. The Cottonwood Gallery basin is composed of Barnum silt loam in the south half of the drainage and Barnum-Winetti complex, and has 0-6 percent slopes. The old mine pits were also classified as Barnum silt loam and Barnum-Winetti complex.

The ISL operation will disturb approximately 68 acres (27 ha) (facilities, piping, ponds, well fields and roads) in year one. Potential impacts include:

These impacts potentially could occur via:

- Compaction
- Loss of productivity
- Loss of soil
- Salinity
- Soil contamination
- Clearing vegetation
- Compaction
- Excavation
- Leveling
- Redistribution of soil
- Stockpiling

Severity of impacts to soil is dependent upon type of disturbance, duration of disturbance and quantity of acres disturbed. Construction and operation activities have the potential to compact soils. Soils most sensitive to compaction, clay loams, are not present within the PPA, however; due to the use of heavy machinery and high volume within certain area some soils have the potential for compaction. Compaction of the soil can lead to decreased infiltration thereby increasing runoff. Soils compacted during construction and operations will be restored (i.e., disced and reseeded) as soon as possible following use.

Based on the soil mapping unit descriptions, the hazard for wind and water erosion within the PAA varies from negligible to severe. The potential for wind and water erosion is mainly a factor of surface characteristics of the soil, including texture and organic matter content. Given the very fine and clayey texture of the surface horizons throughout the majority of the PAA, the soils are more susceptible to erosion from water than wind. See Table 7.5-7 for a summary of potential wind and water erosion hazards within the PAA.

During land application disposal, there could be potential impacts to the soil and crops from total dissolved solids (TDS) and electrical conductivity (EC) values in the water to be used to irrigate crops as shown in Table 5.7-1. These levels pose low to moderate risk to the growth of moderately sensitive crops such as alfalfa and corn. The SAR levels are low and pose little risk to the infiltration of rain or snowmelt. There could be some salt deposition at the surface, however maintaining maximum vegetative cover will reduce the possibility of undesirable species. During the irrigation season, water application rates will be adjusted to optimize both evaporation and crop production.

Table 5.7-1 AR, ESP and RSC Calculations for Dewey and Burdock End-of-Mining Ground Water Quality([a])

Constituent	Dewey					Burdock				
	(mg/L)	(meq/L)	ESP[(1)]	RSC[(2)]	SAR[(3)]	(mg/L)	(meq/L)	ESP[(1)]	RSC[(2)]	SAR[(3)]
CO_3	0.5	0.02				0.50	0.02			
HCO_3	25	0.41				25.00	0.41			
Cl	1,300	36.67				1,300	36.67			
SO_4	1,000	20.82				1,800	37.48			
Na	270	11.74				190	8.26			
Ca	730	36.43				970	48.40			
Mg	120	9.87	2.29	-45.87	2.44	220	18.09	0.85	-66.07	1.43
K	20	0.51				10	0.26			
Total Ion Bal.		0.54					0.29			
SAR (measured)	4.9					2.8				
pH (s.u.)	6.5-7.5					6.5-7.5				
TDS (mg/L)	4,500					4,500				
Elec. Cond. (µS/cm)	3,000					4,000				
As	0.01					0.01				
V	<10					6				

([a]) - Estimated by Powertech (USA) based on results of laboratory scale leach tests conducted on ore samples from the Fall River and Lakota sites, as well as from historical end-of-mining water quality data from other ISL sites in Wyoming and Nebraska, with adjustments as necessary to account for planned post-mining water treatment(s).

- ESP = Exchangeable Sodium Percentage. Empirical relationship from Withers and Vipond (1980).

$$ESP = \frac{100(-0.0126 + 0.01475 * SAR)}{1 + (-0.0126 + 0.01475 * SAR)}$$

- RSC = Residual Sodium Carbonate (meq/L).

$$RSC = ([CO_3] + [HCO_3]) - ([Ca] + [Mg])$$

- SAR = Sodium Adsorption Ratio.

$$SAR = \frac{[Na]}{\sqrt{([Ca] + [Mg]) / 2}}$$

Facility development could displace topsoil, which could adversely affect the structure and microbial activity of the soil. Loss of vegetation would expose soils and could result in a loss of organic matter in the soil. Excavation could cause mixing of soil layers and breakdown of the soil structure. Removal and stockpiling of soils for reclamation could result in mixing of soil profiles and loss of soil structure. Compaction of the soil could decrease pore space and cause a loss of soil structure as well. This could result in a reduction of natural soil productivity. Increased erosion and decreased soil productivity may cause a potential long-term declining trend in soil resources. Long-term impacts to soil productivity and stability could occur as a result of large-scale surface grading and leveling, until successful reclamation is accomplished. Reduction in soil fertility levels and reduced productivity could affect diversity of reestablished vegetative communities. Infiltration could be reduced, creating soil drought conditions. Vegetation could undergo physiological drought reactions (Lost Creek, 2007).

Overall, the potential environmental impacts to the soil within the PAA may be increased compared to areas outside the PAA but typically will not result from the ISL process itself, but rather from ancillary activities such as waste disposal and construction. In the past, ISL facilities adopt best construction practices to prevent or dramatically decrease erosion (NUREG-1910). Many facilities have been operated to minimize erosion and surface disturbance and then assiduously restored affected soils effectively leaving little impact on soils (NMA, 2007).

5.7.4.3 Monitoring Well Rings, Well Field and Associated Piping

The scale of monitoring well rings will have little impact on the amount of soil disturbance. Differences in disturbance to soil will depend on area of monitoring well ring and natural growth of vegetation within the specific well field. During construction of each well field, drilling activities will occur only on a small percentage of an ISL site at any one time (HRI, 1997a). The amount of land disturbed at any time typically will range from 100 to 400 acres (EPA 2007); however, some ISL sites may be larger or smaller. Disturbance associated with drilling and pipeline and facility installation normally will be limited, as the affected area can be reclaimed and reseeded in the same season. Vegetation normally will be re-established over these areas within 2 years (NMA, 2007).

Subsurface soils will be excavated and removed from their native location. Excavated soils (drill cuttings) are returned to mud pits as Technologically Enhanced Naturally Occurring Radioactive Material (TENORM). Naturally occurring radioactive material with radionuclide concentrations increased by or as a result of past or present human practices.

Movement of drilling and construction equipment and installation of wellheads, piping systems, and other facilities will disturb small areas of surface soil. Vehicle movement could cause compaction, rutting, and other disturbances to the surface soil and rocks. Depending on the intensity and duration of construction activities, compaction and erosion of surface soil could alter drainage and cause accelerated erosion and degradation of surrounding surface water resources. However, good management practices likely will minimize, if not eliminate, any such potential impacts (NMA, 2007).

5.7.4.4 Wastewater Retention Ponds

Only very shallow surface soils in the immediate area could be disturbed during construction of the waste retention ponds, though excavated soils from other parts of the site typically will be imported and used to construct the foundation and walls of the ponds. Surface soils in the area will be compacted from the overlying weight of the pond.

Movement of construction equipment could disturb small adjacent areas of surface soil, and vehicle movement to and within the construction site could cause compaction, rutting, and other disturbances to the surface soil and rocks. Depending on the intensity and duration of construction activities, compaction and erosion of surface soil could alter drainage and cause accelerated erosion and degradation of surrounding surface water resources. However, good management practices will likely minimize any such potential impacts (NMA, 2007).

Wastewater produced during operations typically will be handled in one or a combination of two ways: deep well injection or land application. Storage ponds of suitable capacity will be needed for deep-injection well disposal and land application. Where such wells are not available, land application is the only disposal option. The size of the storage ponds required and the land impacts are significantly different depending on the method of disposal utilized.

5.7.4.5 Waste Disposal Well

As deep-disposal wells are drilled, there will be disruption of soil, rock formation, and water flow processes; however, these potential impacts are minor and are similar to common drilling for water, oil and gas. EPA/state UIC regulations and permitting guidance require an evaluation of the seismic risk of a potential disposal well site, including evaluation of the potential pressure impacts to the injection zone. As such, current regulations are in place to ensure the seismic stability of the selected injection site. Changes caused by thermal (heat caused by drilling), chemical (possible reaction caused displaced chemicals during drilling), and mechanical alterations will be negligible and similar to most drilling projects. As the Class I or V UIC deep-disposal well permitting process is intended to ensure protection of USDWs, ISL solutions destined for deep-injection well disposal will require compliance with EPA/state UIC regulations and, as such, the potential impacts will be negligible (NMA, 2007).

5.7.4.6 Well Fields

In addition, the injection of treated groundwater as part of uranium recovery or as part of restoration of the production zone is unlikely to cause changes in the underground environment except to restore the water quality consistent with baseline or other NRC approved limits and to reduce mobility of any residual radionuclides. Further, industry standard operating procedures, which are accepted by NRC and other regulating agencies for ISL operations, include a regional pump test prior to licensing, followed by more detailed pump tests after licensing for each individual area where uranium will be recovered prior to its production. Any potential variations in hydrogeology, due to disruption of soil or rock formation will be assessed and taken into account prior to commencing operations to ensure that operations will not impact adjacent, non-exempt drinking water resources in the region. Powertech's (USA) well field designs are substantially similar if not identical to those assessed in NUREG-1910. As a result, the potential impacts on soils from well fields will be within the scope of NUREG-1910's analyses and conclusions.

5.7.4.7 Uranium Processing Facilities

Standardized ISL processing facilities as assessed in NUREG-1910 will not impact geology and soils at the site after the construction of the facilities. An impact will occur only if there is an accident or a malfunction that spills or emits processing chemicals, leach solutions, loaded IX resins or yellowcake products (i.e., slurry or dried concentrate) onto site surface soils. Powertech's (USA) uranium processing facility designs are substantially similar if not identical to those assessed in NUREG-1910. As a result, the potential impacts on soils from such facilities will be within the scope of NUREG-1910's analyses and conclusions.

5.7.4.8 Potential Decommissioning Impacts to Geology and Soils

Decommissioning of ISL facilities includes: (1) dismantling process facilities and associated structures, (2) removing buried piping, and (3) plugging and abandoning wells using accepted practices, (4) activities associated with land reclamation and cleanup of contaminated soils. Before decommissioning and reclamation activities begin, the licensee is required to submit a decommissioning plan to NRC for review and approval. The licensee's spill documentation, an NRC requirement, would be used to identify potentially contaminated soils requiring offsite disposal at a licensed facility. Any areas potentially impacted by operations would be included in surveys to ensure all areas of elevated soil concentrations are identified and properly cleaned up to comply with NRC regulations at 10 CFR Part 40, Appendix A, Criterion 6-(6). Most of the impacts to geology and soils associated with decommissioning are temporary and SMALL. Because the goal of decommissioning and reclamation is to restore the facility to 3 preproduction conditions to the extent practical, the overall long-term impacts to the geology 4 and soils would be SMALL (NUREG-1910, 2008). Powertech (USA)'s decommissioning plan has been prepared in accordance with NRC regulations and guidance as assessed in NUREG-1910. As a result, the potential impacts on soils from such activities will be within the scope of NUREG-1910's analyses and conclusions as the site can be released for unrestricted use.

5.7.5 Potential Water Resource Impacts

5.7.5.1 Potential Surface Water Impacts

The average annual runoff for this region is higher than that for the Wyoming West Region, therefore potential surface water impacts may be slightly higher in the Proposed Action Area (USGS, 2008 in NUREG-1910, 2008). The water quality of storm water is regulated under permits issued by South Dakota's Surface Water Quality Program in Pierre. Impacts to wetlands are negligible (See Section 5.4.4.2) and will be addressed through consultations and the permitting process (NUREG-1910, 2008). The surface water impacts overall would be small to moderate. All activities that could potentially affect surface water will be undertaken in such a way as to comply with applicable state and federal regulations and conditions of permit; through the use of best management practices and mitigation measures impacts to water quality will be reduced to small and/or moderate and determined by site specific conditions (NUREG-1910, 2008).

5.7.5.2 Potential Surface Water Impacts from Construction

Construction activities within the well fields, along the pipeline courses and roads, and at the process plant have the potential to increase the sediment yield of the disturbed areas. The impacts from increased sedimentation will be minimal because of the short-term nature of the disturbance (areas will be concurrently reclaimed) and the area of disturbance is small compared to the total drainage basin of Angostura Reservoir (total area 7143 mi2) and because of the lack of dependable surface water supplies (DENR, 2007). A slight increase in sediment yields and total runoff can be expected during final reclamation; however, well field decommissioning and reclamation activities via best management practices and mitigation measures utilized throughout the life of the project will help to reduce the impacts. No direct disturbance to any wetlands or water sources is planned at this time. If, in the future, the proposed action should involve an impact to a jurisdictional wetland area or water source, the appropriate actions will be taken in accordance with Section 404 of the Clean Water Act and ACE regulations.

"Potential indirect impacts of ISL operations could include increased sediment deposition in streams, which could alter stream morphology and degrade the suitability of channel substrate for aquatic organisms. However, as stated previously, this issue is addressed by NPDES storm water requirements, and good management practices likely will minimize, if not eliminate, any such potential impacts" (NUREG-1910, 2008). Indirect impacts to surface water will be limited to uncommon precipitation or runoff events (e.g., a flood event).

There were 20 potential wetland sites evaluated by the ACE; the determination rendered four of the 20 evaluated as Jurisdictional sites (see Appendix 5.4-H). Descriptions of the jurisdictional determination: Ephemeral Tributary to Beaver Creek, Ephemeral Tributary to Pass Creek, Pass Creek (NonRPW), Beaver Creek (Perennial RPW). Beaver Creek is the only perennial stream within the proposed PAA and the rest of the natural water flow is ephemeral. Of the jurisdictional determinations within the Proposed Action Area, impact is expected to be small and none are expected to experience direct impact from the pre-operational or operational activities. Erosion potential is present due to the possible construction of the wells near the drainage area; however, disturbance is expected to be mild and short-term.

An old mine pit located at Waypoint 37 was determined to be a non-wetland area. Although surface water was present, there was no hydrophytic vegetation or hydric soils. This old mine pit is also located along a disturbance area. The concentration of old mine pits along the eastern edge of the permit area contained small PUB wetlands (0.175 acres) that are a product of the old mine pits, that could be impacted by disturbance areas located along the old mine pits.

Mitigation measures employed in order to minimize potential impacts may include: best soil management practices (i.e., silt fencing, straw bales) if crossing the water body is necessary, timing of crossing will be evaluated, and only temporary crossing may be necessary, and type of equipment working near water body will be considered. Potential impacts to surface waters from the construction of an ISL facility would be expected to be SMALL based on the application of federal and state clean water regulations in conjunction with the use of best management practices (NUREG-1910, 2008).

ISL operations do not involved the consumption of surface waters. Nor do the operations proposed require a long- term discharge to surface waters. For these reasons, no significant impacts to surface water quantity and use are anticipated.

5.7.5.3 Potential Surface Water Impacts from Operations

Potential impacts from accidental spills or permitted temporary discharge to surface water may include the release of process materials into the environment or a release or spill from the operation or well field (e.g., handling of fuels, lubricant, oily wastes, chemical wastes, sanitary wastes, herbicides, and pesticides). Surface water monitoring and spill response procedures will limit the impact of potential spills to surficial aquifers. The impact that may result from a spill is dependent upon several considerations such as: size of spill, remediation success, designated use of the surface water, location of spill relative to surface water, and any relative contribution an aquifer discharge may have to the surface water (NUREG-1910, 2008). A Storm Water Pollution Management Plan (SWMP) will be part of the NPDES permit issued and will describe potential sources of storm water contamination from the facility. The SWMP will include routes by which spills may leave the facility and the best management practices to be implemented as preventative measures to control storm water contamination (NUREG-1910, 2008).

Most ISL operations extract slightly more groundwater than they re-inject into the uranium bearing formation. The groundwater extracted from the formation could result in a depletion of flow in nearby streams and springs if the ore-bearing aquifer is hydraulically connected to such features. However, because most, if not all ISL operations are expected to occur where the ore-bearing aquifers are confined, local depletion of streams and springs is unlikely, and potential impacts would be anticipated to be SMALL (NUREG-1910, 2008).

Any water disposed of via land application methods must be treated in compliance with any established state and federal established concentration levels for specified constituents. According to 10 CFR Part 20, the NRC requirement is that the public and occupation dose limits are met during and post land application. An accumulation of some constituents and dissolved solids may develop within the soils and may potentially have an indirect impact on surface water. The degree of the potential impacts again, would depend on factors such as actual evapotranspiration rates, irrigation rates, precipitation quantities and sorpitive properties of specific soils with respect to constituents considered (NUREG-1910, 2008). Permit requirements will be in place to assure mitigation should any accumulations of residuals remain upon completion of the operations. At that time the land application areas would be subject to land surveys during decontamination efforts. If accumulation occurs, that does not meet permit conditions is discovered, the areas in exceedance will be remediated to meet the NRC regulations, consequently; potential impacts from permitted land application will be SMALL (NUREG-1910, 2008).

5.7.5.4 Potential Groundwater Impacts from Production Operations

During ISL operations, the following is a list of potential impacts to groundwater: (1) Alteration of groundwater quality from the addition of the proposed lixiviant oxygen and carbon dioxide to the groundwater in the exempted aquifer, (2) the addition of chloride to the groundwater by displacement from the ion exchange resin during the uranium loading process, (3) and the interaction of these chemicals with the mineral and chemical constituents of the aquifer being mined, primarily the oxidation of the pyrite in the ore body to form solubilized sulfate ion. The result is that during the proposed action, the concentration of most of the naturally occurring dissolved constituents in the ore zone(s) will be higher than their concentrations in the pre production groundwater. The ISL process does not introduce constituents that are not already present within the groundwater. Procedures proposed in this application are designed to provide early detection of and to provide for remediation any excursions of leach fluids to adjacent non exempt USDWs. These procedures are consistent with those recommended in NUREG-1910 to address potential groundwater impacts; therefore will be no adverse impacts on human health and the environment from affected groundwater within the production zone.

5.7.6 Monitoring

To assess the potential impacts from production and restoration operations on local groundwater, the background water levels in regional monitoring wells installed by Powertech (USA) will be monitored before production and as required during operations.

5.7.6.1 Potential Impacts of Production on Ore Zone Groundwater Quality

Potential environmental impacts to groundwater are changes to water quality in well fields within the exempted aquifer. The impact, in and of itself, it is of limited significance, due to the fact that the groundwater quality is very poor prior to ISL operations; due to the presence naturally occurring radionuclides, heavy metals, and other constituents that exceed EPA and/or state drinking water limits. Accordingly, the exempted aquifer is not and can never serve as a USDW (HRI, 1997; NMA, 2007).

Powertech (USA) has proposed to use gaseous oxygen and carbon dioxide lixiviant. The interaction of the lixiviant with the mineral constituents of the exempted ore zone results in a slight increase in trace elements and primary constituents of sulfate, chloride, cations and TDS above pre production levels. There is no introduction of non-naturally occurring constituents from the leach fluids into the ore body.

The uranium present in the ore zone pre-operations is solubilized by oxidation via the ISL process. Uranium, when oxidized to the soluble valence, reacts with the bicarbonate ions to form a stable, soluble anion, uranyl bicarbonate. The dissolved oxygen in the leach fluid also oxidizes the pyrites (sulfides) to increase the concentration of sulfate (SO4) ions in solution. The loading of uranyl bicarbonate ions onto the resin displaces chloride ions into the leach solution. Therefore, the leach process which recycles groundwater back to the ore zone increases the concentration of sulfate and chloride anions into the leach solution. The increase in sulfate and chloride anions in the leach solution increases the concentrations of sodium, calcium, potassium and magnesium cations in solution. These cations are exchanged off the clays within the ore body to balance the ion charges in the leach solution. Since these cations and anions are the principal constituents of TDS, therefore the TDS increases.

5.7.6.2 Potential Groundwater Impacts from Land Application

The wastewater applied to the land will be treated to meet EPA Primary Drinking Water Standards and NRC effluent criteria for radionuclides as referenced in 10 CFR part 20 Appendix B. Therefore, potential adverse impacts to groundwater are not anticipated.

Data from test pits 1, 2 and 5 were used to develop the soil profile used in the SPAW modeling for the Dewey site. The logs for these test pits indicated that bedrock was encountered at depths of 9 feet, 11 feet, and 8.5 feet respectively below the ground surface. The composite soil profile used to model the soil at the Dewey site had a total depth of 9.83 feet. The results of the SPAW modeling indicated that the soil moisture content at the base of this soil profile was less than field capacity for all cases that were modeled (28 15-year simulations) and that there was no percolation beyond the base of the soil profile (Appendix 5.7-A). Therefore, it is assumed that there would be no lateral movement of water along the bedrock surface, and no vertical movement of water into the bedrock, and therefore no leaching of trace elements beyond the base of the soil profile.

Data from test pits 8, 9 and 10 were used to develop the soil profile used in the SPAW modeling for the Burdock site. The logs for these test pits indicated that bedrock was encountered at depths of 7 feet and 5 feet below the ground surface in test pits 8 and 9. Test pit 10 was excavated to a total depth of 12 feet, with a clayey silt layer from 2 feet to 12 feet below the ground surface. The composite soil profile used to model the soil at Burdock had a total depth of 8 feet. The results of the SPAW modeling indicated that the soil moisture content at the base of this soil profile was also less than field capacity for all cases that were modeled (28 15-year simulations) and that there was no percolation beyond the base of the soil profile. Again it is assumed that no lateral movement of water would occur along the bedrock surface, and that water would not move vertically into the bedrock, and therefore there would be no leaching of trace elements beyond the base of the soil profile.

Based on the above information, there will be no migration pathway of waste water constituents to groundwater beneath the land application sites, thereby eliminating any potential of exposure and risk to human health and the environment.

5.7.6.3 Potential Groundwater Impacts from Deep Well Disposal Below Production Aquifer

Deep well injection involves the pumping of waste fluids into a deep confined aquifer. Aquifer water quality in the deep confined aquifer is often poor (e.g., high salinity or total dissolved solids) and does not meet drinking water standards. Licensees must obtain an UIC permit from EPA or the appropriate state agency. The approval process verifies that site-specific and regional characteristics limit the potential for contamination of local drinking water sources. This is accomplished by the licensee providing data that the aquifer is hydraulically separated from the overlying aquifer systems. “Under these conditions, the potential environmental impacts would be SMALL” (NUREG-1910, 2008). NRC staff may also review the UIC application, even though the EPA or state give final approval. NRC has approved deep well injection for specific ISL sites as a method to dispose of particular process fluids such as reverse osmosis brine”.

The potential environmental impacts of injection of leaching solutions into deep aquifers below ore-bearing aquifers would be expected to be SMALL, if water production from deep aquifers is not economically feasible or the groundwater quality from these aquifers is not suitable for domestic or agricultural uses (e.g., high salinity), and they are confined above by sufficiently thick and continuous low permeability layers. The impacts of discharging wastes to deep disposal well during restoration are expected to be similar to the impacts of these waste management practices during operations-SMALL (NUREG-1910, 2008)

5.7.6.4 Potential Groundwater Impacts from Aquifer Restoration

Groundwater consumption is the primary impact of concern when considering aquifer restoration and waste management.

Groundwater transfer has minimal impact concerning groundwater consumption by replacing recovered well field groundwater with near baseline quality water. Whereas groundwater sweep has a larger impact since the process involves extracting the recovered well field water and pulling unaffected water into the aquifer to take its place. When utilizing RO, 70 to 99 percent of the water is suitable for reinjection into the formation, depending on whether a brine concentrate is used. This lowers groundwater consumptive use substantially during aquifer restoration.

All well fields do not undergo restoration simultaneously. A deliberate phased approach is utilized to keep groundwater impacts to a minimum throughout the life of the operation. Potential environmental impacts are affected by the restoration techniques chosen, the severity and extent of the contamination, and the current and future use of the production and surrounding aquifers in the vicinity of the ISL facility. The potential environmental impacts of groundwater consumption during restoration could be SMALL to MODERATE depending on site-specific conditions. Site-specific impacts also would depend on the proximity of water users' wells to the well fields, the total volume of water in the aquifer, the natural recharge rate of the production aquifer, the transmissivity and storage coefficient of the production aquifer, and the degree of isolation of the production aquifer from aquifers above and below (NUREG-1910, 2008).

Deep well injection is one of the most common methods to dispose of the more heavily concentrated wastewater. Brine water treated via RO may also be disposed of via deep well injection. Aquifers utilized for deep disposal must meet federal and state standards such as: the aquifer must have poor water quality, low water yields, or be economically infeasible for production. Underground injection of wastewater requires an EPA permit and approval from the NRC. Impacts from deep well disposal are expected to be SMALL (NUREG-1910, 2008).

5.7.6.5 Potential Impacts of Groundwater Consumption During Operations and Restoration

The majority of groundwater used in the ISL process will be treated and injected. Based on a median case of bleed of one percent of 2,000 gpm (20 gpm), the potential impacts from consumptive use of groundwater in the Fall River and Lakota aquifers are calculated below. There are separate calculations for the Fall River aquifer assuming pumping at the first proposed well field at the Dewey Site, and for the Lakota aquifer assuming pumping at the first proposed well field at the Burdock Site.

The potential impacts due to drawdown are calculated at the locations of the nearest wells outside the proposed Permit Boundary Area that are expected to remain active during the life of the Project

5.7.6.6 Drawdown Estimates

The Theis analytical solution includes the following assumptions (Driscoll, 1986):

The aquifer is homogeneous and isotropic (same hydraulic conductivity everywhere).

- The aquifer is confined with uniform thickness and has infinite extent.

- No recharge to the aquifer occurs.
- The pumping well is fully penetrating and receives water from the full thickness of the formation.
- All water removed from the well comes from aquifer storage which is discharged instantaneously when the head is lowered.
- The piezometric surface is horizontal prior to pumping.
- The well is pumped at a constant rate.
- The pumping well diameter is small so well bore storage is negligible.

Possible barrier boundaries for the aquifer system include the respective outcrops of the Fall River and Lakota formations generally east and north of the property boundary, as well as the Dewey Fault to the north and east of the property boundary. However, the Dewey Fault is considered likely to terminate both the Fall River and Lakota aquifers at some distance to the west. Therefore, just the outcrop was assumed to be a straight line barrier boundary and modeled with "image" pumping wells (e.g. Fetter, 1988) having the same pumping rates as the production wells for the Fall River and Lakota aquifers. A spreadsheet developed by the U.S. Geological Survey to calculate drawdown according to the Theis equation (Halford and Kuniansky, 2002) was used to make the confined aquifer prediction calculations.

5.7.6.7 Drawdown Impact – Fall River Aquifer

The following is a summary of available aquifer parameter (transmissivity, storativity) determination in successful pumping tests.

- 1979 TVA tests at Burdock area (Bogg and Jenkins, 1980):
  - Formation transmissivity: 54 ft^2/day
  - Formation storativity: 1.4 x 10^{-5}
- 2008 Powertech (USA) tests at Dewey area (Knight Piésold, 2008):
  - Formation transmissivity: 255 ft^2/day
  - Formation storativity: 4.6 x 10^{-5}

To quantify the impact of the Project on the Fall River Formation aquifer the following assumptions were used together with the range of aquifer parameters above:

- Production/restoration: 8 years
- Average net consumptive use: 20 gpm
- Location of pumping centroid: NW ¼ of Section 32, T6S, R1E
- Distance from pumping well to barrier boundary (Fall River outcrop): 14,610 ft
- Observation radius: 15,075 feet (nearest domestic well, Hydro ID = 18), SW ¼ of SW ¼ of Section 9, T7S, R1E
- Image well observation radius: 39,350 ft

For the 1979 TVA test parameters, the calculated drawdown at the nearest domestic well after 8 years of pumping at 20 gpm due to the pumping well alone is 26.8 feet. The calculated drawdown at the nearest domestic well due to the image well is 16.0 feet. Thus the estimated drawdown at the nearest domestic well is 42.8 feet after 8 years of continuous pumping at a rate of 20 gpm.

For the 2008 Powertech (USA) test parameters, the calculated drawdown at the nearest domestic well after 8 years of pumping at 20 gpm due to the pumping well alone is 6.1 feet. The calculated drawdown at the nearest domestic well due to the image well is 3.8 feet. Thus the estimated drawdown at the nearest domestic well is 9.9 feet after 8 years of continuous pumping at a rate of 20 gpm.

Therefore, based on available pumping test data, the range of possible drawdown estimates at the nearest domestic well, located 15,075 feet from the approximate center of pumping is 9.9 to 42.8 feet.

5.7.6.8 Drawdown Impact – Lakota Aquifer

The following is a summary of available aquifer parameter (transmissivity, storativity) determination in successful pumping tests.

- 1979 TVA tests at Burdock area (Bogg and Jenkins, 1980):
  - Formation transmissivity: 190 ft^2/day
- Formation storativity: 1.8 x 10-4
- 1982 TVA tests at Dewey area (Boggs, 1983):
  - Formation transmissivity: 590 ft^2/day
  - Formation storativity: 1.0×10^{-4}
- 2008 Powertech (USA) tests at Burdock area (Knight Piésold, 2008):
  - Formation transmissivity: 150 ft^2/day
  - Formation storativity: 1.2×10^{-4}

To quantify the impact of the Project on the Lakota Formation aquifer the following assumptions were used:

- Production/restoration: 8 years
- Average net consumptive use: 20 gpm
- Location of pumping centroid: SW ¼ of Section 11, T7S, R1E
- Distance from pumping well to barrier boundary (Lakota outcrop): 17,610 ft
- Observation radius: 10,915 feet (nearest domestic well, Hydro ID = 13) NE ¼ of NE ¼ of Section 4, T7S, R1E
- Image well observation radius: 36,170 ft.

For the 1979 TVA test parameters, the calculated drawdown at the nearest domestic well after 8 years of pumping at 20 gpm due to the pumping well alone is 6.6 feet. The calculated drawdown at the nearest domestic well due to the image well is 2.9 feet. Thus the estimated drawdown at the nearest domestic well is 9.5 feet after 8 years of continuous pumping at a rate of 20 gpm.

For the 1982 TVA test parameters, the calculated drawdown at the nearest domestic well after 8 years of pumping at 20 gpm due to the pumping well alone is 3.0 feet. The calculated drawdown at the nearest domestic well due to the image well is 1.8 feet. Thus the estimated drawdown at the nearest domestic well is 4.9 feet after 8 years of continuous pumping at a rate of 20 gpm.

For the 2008 Powertech (USA) test parameters, the calculated drawdown at the nearest domestic well after 8 years of pumping at 20 gpm due to the pumping well alone is 8.7 feet. The calculated drawdown at the nearest domestic well due to the image well is 3.9 feet. Thus the estimated drawdown at the nearest domestic well is 12.6 feet after 8 years of continuous pumping at a rate of 20 gpm.

Therefore, based on available pumping test data, the range of possible drawdown estimates at the nearest domestic well, located 10,915 feet from the approximate center of pumping is 4.9 to 12.6 feet.

5.7.6.9 Potential Impacts from Simultaneous Operational and Restorational Groundwater Consumption

5.7.6.9.1 Operational Water Use

During ISL operations (including both production and restoration) nominal bleed rates of .5-1 percent are expected to be maintained over the life of the project. Instantaneous rates may vary in the range of 0.5 percent to 3 percent for short durations, from days to months. All effluent systems for treating bleed streams are designed for continuous operation at the maximum bleed rate of 3 percent. However, over the life of the project, a reasonable estimate of .5-1 percent, or slightly less, bleed is believed appropriate and sufficient to maintain a the cone of depression necessary within any production or restoration activity In situ mining circulates significant quantities of water through the ore zone but consumes only a small fraction of that amount because most water is reinjected back into the deposit. During operations, 0.5 to 3 percent of the solution extracted from the aquifer will be “bled” from the system to ensure a cone of depression is maintained and that no leach fluids are released from the production area.

It is anticipated that no more than two well fields, typically one at the Dewey site and one at the Burdock site will be in production at one time, with another two in restoration. Reclamation will begin as soon as each mining unit has been depleted of uranium, beginning approximately two years after the start of operations. When one well field is depleted, it will be reclaimed at the same time production continues in another well field along the ore front.

5.7.6.9.2 Water Requirements for the Proposed Action Facilities

Water requirements of the CPP and other facilities are estimated to have a maximum requirement of 65 gpm. As this requirement is relatively large, it is expected that most of this water will be derived from a water supply well in the Madison formation. Some of this water may be withdrawn from the Inyan Kara formation, but if so, it will not occur in a fashion to affect any well field operations.

5.7.6.9.3 Water Usage with Reverse Osmosis and without Reverse Osmosis

Total net water use for production operations (as wellfield purge) will be in the range 20-120 gpm from the Inyan Kara. Each production site will consume between 10 and 60 gpm as well field purge. During restoration operations, water consumption will be greater from the Inyan Kara. However, net withdrawal from the Inyan Kara formation will also remain at the range of 0.5 to 3% of total restoration flow during groundwater treatment via RO method of restoration (Table 3.4-1). It is expected that the restoration activities will also be split between the two sites. Net withdrawal during these restoration operations (as well field purge) is expected to be a total of 2.5 to 15 gpm from the Inyan Kara. At each site, Dewey and Burdock, 1.25 to 7.5 gpm will be the net withdrawal during restoration operations. Net water usage from the Maddison using a (RO) unit to restore groundwater following production, approximately 167 gpm of the 500 gpm (without RO utilization; Table 3.4-2), will need to be made up with Madison aquifer water.

The actual flow rates of water leaving the Inyan Kara formation during restoration operations is expected to be in the range of 150-500 gpm. Nearly all of this water will be “made-up” by injection of water from these two sources:

Madison formation

The Madison aquifer is a source of fresh water and could potentially be utilized for the Proposed Action. Powertech (USA) would utilize the Madison Limestone, which occurs at depth throughout the entire project boundary, as a source of fresh make-up water for restoration purposes. As described below, it is very likely that the Madison aquifer can provide a source of water at the desired rate and quality sufficient for the needs of Powertech (USA) to ensure timely and successful ISL restoration goals. Depending on the exact aquifer restoration process Powertech (USA) may need to produce up to 500 gpm from the Madison aquifer. In the case of land application disposal of water during restoration, 500 gpm of make-up water will be required from the Madison aquifer. Utilizing RO, approximately one-third (or 167 gpm) of the 500 gpm will need to be made up with Madison aquifer water.

Inyan Kara formation
This is providing that make-up water is withdrawn from wells that are located far enough from operating well fields so as to not affect the cone of depression within the operating well fields.

The actual net difference between fluid produced and fluid injected must be maintained at a rate equivalent to the 0.5-3 percent bleed rates described above. With RO process used for treating well field bleed streams, permeate will be reinjected and will substantially lower the requirement for makeup waterform the Madison; such use of RO typically reduces make-up water requirements to approximately 1/3 of the water that would be required without RO (Table 3.4-2).

5.7.7 Potential Groundwater Quality Impacts from Accidents

5.7.7.1 Potential Excursions

Monitoring wells within the monitoring well ring are designed and installed to detect an excursion of leach fluids outside the well field within the aquifer exempted area. Neither historical excursions nor excursions within active ISL projects have "resulted in any significant adverse impacts to USDWs" (NMA, 2007). This demonstrates the protective capabilities of operators to detect and control excursions. Operators are mandated by permitting conditions to employ practices to protect adjacent, non-exempted aquifers. With that stated, importance is placed upon the understanding that the UIC Class III permit issued by the EPA and the uranium recovery license issued by the NRC are written and enforced to protect USDWs. The permit and license also ensures the operational processes such as: monitoring, pump tests, and maintenance of well field bleed are all geared toward protecting USDWs (NMA, 2007).

Well field imbalance is the most common cause of excursions. Imbalance can cause lixiviant to migrate outside the well field pattern toward the monitoring well ring; therefore it is crucial to characterize the groundwater within each separate well field before lixiviant is introduced into the groundwater. This well field specific groundwater data is then used to establish UCLs used for determination of properly functioning well field. One example of how an excursion is declared is "if any two excursion indicators in any monitor well exceed their respective UCLs, or a single excursion indicator exceeds its UCL by 20 percent (NMA, 2007; NUREG-1910, 2008).

Common procedure during routine sampling of monitoring wells is:

- If two of the three UCL values are exceeded in a monitor well, or if one UCL value is exceeded by 20 percent, the well will be re-sampled within 48 hours and analyzed for the excursion indicators. If the second sample does not exceed the UCLs, a third sample will be taken within 48 hours. If neither the second or third sample results exceeded the UCLs, the first sample will be considered in error.
- If the second or third sample verifies an exceedance, the well in question is placed on excursion status. Upon verification of the excursion, NRC Project Manager is notified by telephone or email within 48 hours and notified in writing within thirty (30) days.
- If an excursion is verified, the following methods of corrective action will be instituted (not necessarily in the order given) dependent upon the circumstances:
  - A preliminary investigation will be completed to determine the probable cause.
  - Extraction and/or injection rates in the vicinity of the monitor well will be adjusted as necessary to generate an effective net over-recovery, thus forming a hydraulic gradient toward the production zone.

  - Individual wells will be pumped to enhance recovery of leach fluids.
  - Injection into the production zone area adjacent to the monitor well may be suspended, while extraction continues, thus increasing the overall bleed rate and the recovery of ore zone solutions.
- In addition to the above corrective actions, sampling frequency of the monitor well on excursion status is increased to weekly. An excursion will be considered resolved when the concentrations of excursion indicators do not exceed the criteria defining an excursion for three consecutive one-week samples. Accordingly, while a real potential short-term impact, excursions during operations can be identified and controlled such that impacts are expected to be minimal.
- Impacts of excursions include the potential to contaminate groundwater outside of the well field or in aquifers above or below the production zone. However, it is noted that, in spite of excursions at virtually every operating ISL site, no significant, adverse impacts to USDWs have been documented throughout the history of ISL operations in the United States, which indicates that operators have the capability to recover errant solutions (NMA, 2007).

There are two types of excursions: vertical and horizontal. A vertical excursion is movement of solution into overlying or underlying aquifers. A horizontal excursion is a lateral movement of leach fluids outside the ore zone of the ore-body aquifer.

Maintaining injection pressures below casing and formation rupture pressures prevent the well casing from rupturing and potentially causing a vertical excursion. Well field operating pressures are monitored at the header houses via instrumentation equipped with alarms and interlocks to prevent an excursion due to excessive pressure. Consistent monitoring of well field pressures minimizes the potential for impacts to shallow and deep aquifers. MIT's have all but eliminated potential impacts from excursions to shallow aquifers (NMA, 2007).

In general, the potential environmental impacts of vertical excursions to groundwater quality in surrounding aquifers would be SMALL, if the vertical hydraulic head gradients between the production aquifer and the adjacent aquifer are small, the vertical hydraulic conductivity of the confining units is low, and the confining layers are sufficiently thick. To limit the likelihood of vertical excursions, licensees must conduct MIT to ensure that lixiviant would remain in the well and not escape into surrounding aquifers. Licensees also must conduct pre-operational pump tests to ensure adequate confinement of the production zone. In addition, licensees must develop and maintain programs to monitor above and below the ore-bearing zone to detect both vertical and horizontal excursions and flow rates, and must have operating procedures to analyze an excursion and determine how to remediate it (NUREG-1910, 2008).

During normal ISL operations, inward hydraulic gradients are maintained by production bleed such that groundwater flow is towards the production zone from the edges of the well field. This inward gradient prevents the chance of a horizontal excursion occurring. To reduce the likelihood and minimize the consequences of potential horizontal excursions, a ring of monitoring wells is installed encircling the well field pattern to enable early detection of excursions. Monitoring will be conducted for both vertical and horizontal excursions. Thus, potential *non*-radioactive contamination of groundwater beyond the production zone can have short-term impacts, but such impacts likely will be minimal and readily controllable (NMA, 2007).

5.7.7.2 Potential Spills

Types of spills that could potentially impact groundwater during operations include: a leak in a storage pond, a release of pregnant and/or barren lixiviant, a release of injection or production solutions from associated piping, spills and potential well rupture. Potential impacts of contamination to shallow aquifers and surrounding soils may result from one or a combination of these types of spills. The likelihood of spills is minimized by way of rigorous safety training, employing all necessary preventative procedures such as maintaining injection pressures below casing and formation rupture pressures, monitoring pressure in the header houses with instrumentation equipped with alarms and interlocks for early warning, and maintaining operating pressures so as to minimize the likelihood for potential impacts to shallow aquifers.

5.7.8 Potential Ecological Resource Impacts

Potential impacts to ecological resources from construction, operations, aquifer restoration and decommissioning are expected to be SMALL (NUREG-1910, 2008; BKS, 2007; ICF Jones and Stokes 2008).

Despite the relatively limited surface disturbance associated with ISL production, operations can have potential direct and indirect impacts on local wildlife populations. These potential impacts can be both short-term and long-term (persisting beyond successful completion of reclamation). However, the latter category is not expected to be substantial due to the relatively limited habitat disturbance associated with this industry and this PAA (NUREG-1910, 2008). The direct impacts of ISL production on wildlife include: injuries and mortalities caused by collisions with project-related traffic or habitat removal actions such as topsoil stripping, particularly for smaller species with limited mobility such as some rodents and herptiles; and restrictions on wildlife movement due to construction of fences (ICF Jones and Stokes, 2008). The likelihood for the impacts resulting in injury or mortality potentially would be greatest during the construction phase due to increased levels of traffic and physical disturbance during that period. Speed limits will be enforced during all construction and maintenance operations to reduce impacts to wildlife throughout the year, but particularly during the breeding season.

As indicated, most of the habitat disturbance associated with the ISL process itself will consist of scattered confined drill sites for well heads that will not result in large expanses of habitat being dramatically transformed from its original character, as is the case with other surface mining operations (NUREG-1910, 2008). Therefore, most indirect impacts would relate to the displacement of wildlife due to increased noise, traffic, or other disturbances associated with the development and operation of the project, as well as from small reductions in existing or potential cover and forage due to habitat alteration, fragmentation, or loss. Indirect impacts typically persist longer than direct impacts. However, because ISL production results in fewer large-scale habitat alterations, the need for reclamation actions that can also result in dramatic differences between pre-construction and post-construction vegetative communities is also reduced.

Multiple site visits and targeted surveys conducted over the last year, combined with existing agency databases that encompass the PAA and input from local residents, indicate that the PAA and surrounding vicinity is occupied by a wide variety of common wildlife and fish species, with only a few species of particular concern occurring in the area. The most notable species of interest is the bald eagle, which is still considered threatened at the state level. Bald eagle winter roost sites and a successful nest site were documented within the PAA during surveys conducted in 2007 and 2008. Two other species tracked by the SDNHP were confirmed or suspected to have nested in the PAA in 2008, the long-eared owl and long-billed curlew, respectively. Seven additional SDNHP species were documented in or near the PAA during baseline surveys, and one state threatened species was documented several miles northwest of the area, in extreme eastern Wyoming. However, those observations consisted of birds flying over the area, or sightings made in the surrounding perimeter. No grouse leks have been recorded within 6 miles of the PAA during agency or project-specific surveys completed in recent years.

Suitable habitat for all three nesting SDNHP species (bald eagle, long-eared owl, long-billed curlew) occurs in the PAA. However, the nature of ISL production and the presence of apparently suitable (due to low density of other nesting individuals) alternate nesting habitat throughout the PAA and perimeter combine to minimize the potential for both direct and indirect impacts for those species, and others that require similar habitats. One of those species, the long-eared owl, nested within 75 m, but largely beyond view of, an existing gravel county road, suggesting the pair has at least some level of tolerance for vehicular traffic near active nest sites. Other wildlife species of concern, such as other nesting raptors, that occur in the area may also experience direct and/or indirect impacts from increased travel and noise in the area during project construction and operation. However, the presence of potential alternate nesting and foraging habitat in the immediate vicinity, the mobility of those species, and the location of most nest sites relative to planned disturbance combine to reduce impacts to most nesting SDNHP birds as well as other species of interest.

Some vegetative communities currently present in the PAA can be difficult to reestablish through artificial plantings, and natural seeding of those species would likely take many years. However, the current habitat of greatest concern (Big Sagebrush Shrublands) occurs only in scattered stands that are relatively small and widely-spread across the PAA. Results from lek searches, breeding bird surveys, and small mammal trapping, as well as regular site visits in all seasons over the last year, strongly suggest that sage obligates other than pronghorn occur in limited numbers in the PAA, if at all. The vegetative communities (Cottonwood Gallery and Ponderosa Pine) that indicated the strongest associations between terrestrial species and habitats during baseline surveys will not be physically impacted by construction or operation of the proposed ISL Uranium project. It is possible that the potential implementation of center-pivot irrigation using well field bleed and/or restoration water may enhance nesting, brood-rearing, and/or foraging habitat for some species. Consequently, although individual animals associated with some specific habitats could be impacted by the proposed ISL operations, the relatively small percentage of projected surface disturbance within the PAA relative to its overall size, and the low density of nesting efforts relative to habitat presence in that area, suggest that their populations as a whole will experience insignificant impacts from the project. Advanced planning of construction siting and activities in concert with continued monitoring can further reduce impacts and assist with the development of mitigation options, if necessary. Potential impacts to these species and others are discussed in greater detail in the following sections.

5.7.8.1 Vegetation

Well field and production facilities will be constructed within Big Sagebrush Shrubland, Greasewood Shrubland, Ponderosa Pine Woodland, and Upland Grassland vegetation communities. Direct impacts include the short-term loss of vegetation (modification of structure, species composition, and areal extent of cover types). Indirect impacts may include the short-term and long-term increased potential for non-native species invasion, establishment, and expansion; exposure of soils to accelerated erosion; shifts in species composition or changes in vegetative density; reduction of wildlife habitat; reduction in livestock forage; and changes in visual aesthetics. An estimated 295.17 acres within the following four communities: Big Sagebrush Shrubland, Greasewood Shrubland, Ponderosa Pine Woodland, and Upland Grassland would be affected by the construction disturbance under current development plans.

Construction activities and increased soil disturbance could stimulate the introduction and spread of undesirable and invasive, non-native species within the PAA. Non-native species invasion and establishment has become and increasingly important result of previous and current disturbance in South Dakota. No threatened or endangered vegetation species were observed within the PAA; therefore, no impacts are anticipated.

Mitigation measures to lessen impacts on native vegetation and control State-designated noxious weeds are discussed in Section 5.8.6.

5.7.8.2 Wildlife and Fisheries

5.7.8.2.1 Big Game Mammals

Big game could be displaced from portions of the PAA to adjacent areas, particularly during construction of the well field and facilities, when disturbance activities would be greatest. Disturbance levels would decrease during actual extraction operations, and would consist primarily of vehicular traffic on new and existing improved and unimproved (two-track) roads throughout the PAA. Similar disturbance is already present in the area due to existing ISL exploration, ranching, and railroad operations. Pronghorn antelope would be most affected, as they are more prevalent in the area. However, no areas classified as crucial pronghorn habitat occur on or within several miles of the PAA, and this species is not as common in the general area as elsewhere within the region due to the limited presence of sagebrush in the area. Mule deer would not be substantially impacted given their somewhat limited use of these lands, the paucity of winter forage and security cover, and the availability of suitable habitat in adjacent areas. SDGFP does not consider the PAA to be within the crucial habitat range of any other big game species. Sightings of those species in that vicinity are often seasonal and less common.

5.7.8.2.1.1 Other Mammals

Medium-sized mammals (such as lagomorphs, canids, and badgers) may be temporarily displaced to other habitats during the initial ISL production activities. Direct losses of some small mammal species (e.g., voles, ground squirrels, mice) may be higher than for other wildlife due to their more limited mobility and likelihood that they would retreat into burrows when disturbed, and thus be potentially impacted by topsoil scraping or staging activities. However, given the limited area expected to be disturbed by the project, such impacts would not be expected to result in major changes or reductions in mammalian populations for small or medium-sized animals. "Displaced species may re-colonize in adjacent, undisturbed areas or return to their previously occupied habitats after construction ends and suitable habitats are reestablished" (NUREG-1910, 2000). Few bats were recorded in the area despite extra efforts to observe them during the baseline surveys. Those that were seen were near water bodies near treed habitats which are not currently scheduled for disturbance. The mammalian species known to be, or potentially, present in the PAA have shown an ability to adapt to human disturbance in varying degrees, as evidenced by their continued presence in other mining, industrial and residential areas of similar, or greater, disturbance levels elsewhere in the region. Additionally, small mammal species in the area have a high reproductive potential and tend to re-occupy and adapt to altered and/or reclaimed areas quickly.

5.7.8.2.1.2 Upland Game Birds

ISL production in the PAA would potentially impact the foraging and nesting habitat of mourning doves, though such disturbance is not expected to have any marked impacts on this species. No woody corridors will be disturbed by the proposed activities, and additional trees are present in the cottonwood gallery along the Cheyenne River, located approximately 2 miles south of the PAA, where production is not projected to occur in the near future. Additionally, doves are not restricted to treed habitats, nor are they subject to any special mitigation measures for habitat loss.

Annual monitoring surveys conducted by SDGFP biologists and a year-round baseline study for the project have demonstrated that sage-grouse do not currently inhabit that area, and have not for many years. As described previously, those surveys encompassed the entire PAA (including the September 2008 configuration) and the vast majority of its 2.0 km (1.2 mi) perimeter, particularly as part of this baseline project. The nearest known sage-grouse lek is approximately 6.0 miles north of the PAA (SDGFP records). Given the lack of sage-grouse observations in the area, and the scattered stands of marginal quality sage-grouse habitat, the proposed project will not result in negative impacts to existing or potential sage-grouse leks, or important sagebrush habitats.

5.7.8.2.1.3 Other Birds

The project could impact nine avian species tracked by SDNHP that are known to, or could potentially occur as seasonal or year-round residents. Direct impacts could include injury or mortality due to encounters with vehicles or heavy equipment during construction or maintenance operations. Indirect impacts could include habitat loss or fragmentation, and increased noise and activity that may temporarily deter use of the area by some species. Surface disturbance would be relatively minimal and could be greatest during construction. Enforced speed limits and use of common right-of-way corridors will reduce impacts to wildlife throughout the year, particularly during the breeding season.

5.7.8.2.1.4 Raptors

ISL production in the PAA would not impact regional raptor populations, though individual birds or pairs may be affected. Production activity could cause raptors to abandon nest sites proximate to disturbance, particularly if activities encroach on active nests during a given breeding season. Within the current mine plan there are no planned activities that would encroach on identified raptor nests.

Other potential direct impacts would be injury or mortality due to collisions with mine-related vehicular traffic. Construction activities that occur within or near active raptor territories could also cause indirect impacts such as reduction or avoidance of foraging habitats for nesting birds. However, surface disturbance will only occur in a small percentage of the overall PAA, and the low density of nesting raptors relative to the apparent availability of suitable habitat suggests that alternate nesting habitat is available for all known nesting raptor species in the PAA.

Eight intact raptor nests were documented within the project survey area (PAA and 2.0 km perimeter) during 2008; the mid-July 2007 start date for this project precluded nesting data from being collected last year. Six of the eight nest sites are within the proposed PAA, with the remaining two located in the one-mile perimeter. USFWS guidelines recommend a non-disturbance buffer of 0.25 to 1.0 mile around active raptor nests for species known to nest, or suspected of nesting, in the PAA (USFWS, 1998). Buffer recommendations are lowest for the two owl species in the area, as they are typically more tolerant of human activities near active nest sites. The bald eagle has the greatest buffer distance around active nests, while a 0.5-mile buffer is recommended for red-tailed hawks and merlins. Nests of most other raptor species, including all others observed, but not documented nesting, in the proposed action area are typically buffered by a radius of 0.25 to 0.50 mile.

Except for the bald eagle, the same species that nest in the PAA are known to regularly nest and fledge young at or near other surface mines throughout the region, including ISL projects. Those efforts have succeeded due to a combination of raptors becoming acclimated to the relatively consistent levels of disturbance and gradual encroachment of mine operations, and successfully executed state-of-the-art mitigation techniques to maintain viable raptor territories and protect nest productivity. Some individuals nest on active mine facilities themselves, including both great horned owls and red-tailed hawks. The lack of bald eagle examples is more likely related to the general absence of nesting bald eagles in the vicinity, rather than an increased sensitivity to mine activities. Bald eagles will be discussed further in the T&E section later in this document. Due to the paucity of river cliffs in the PAA, falcons and other raptors known to nest in that habitat are not as abundant as those that nest in trees or even on the ground.

Based on the location of known nest sites relative to future construction sites, no raptor nests will be physically disturbed by the project during either construction or operations. Additionally, Powertech (USA) has incorporated the baseline wildlife information into their planning process and sited all plant facilities (areas of greatest sustained future disturbance) outside the recommended buffer zone for all raptor nests in the PAA, including the bald eagle nest site. Some new infrastructure will be located within the suggested buffer areas. However, pipelines will be buried, and new overhead power lines will be constructed using designs and specifications to reduce injuries and mortalities on overhead power lines. Center-pivot structures can be put into place prior to the nesting season, and run automatically with little human contact once they are turned on. Additionally, new roads, power lines, and pipelines will be constructed in the same corridors to the extent possible to reduce overall disturbance, and in existing corridors when available to minimize new surface disturbance.

5.7.8.2.1.5 Waterfowl and Shorebirds

Construction and operation of the proposed project would have a negligible effect on migrating and breeding waterfowl and shorebirds. Existing habitat is limited and seasonally available in the PAA, so it does not currently support large groups or populations of these species. Multiple approaches are being considered to minimize impacts to wildlife that may be associated with the operation of ponds. Any new treated water sources could enhance current habitat conditions for these species, though such effects may be temporary in nature. Water quality within the ponds likely will not have any significant adverse impacts upon avian species because it is basically fresh water.

5.7.8.2.1.6 Reptiles, Amphibians, and Fish

As with waterfowl, potential habitat for aquatic and semi-aquatic amphibians and reptiles, is limited within the proposed PAA, and occurs primarily along Beaver Creek in the western portion of the area. Other water bodies are ephemeral, and thus offer only short-term habitat. Activities associated with the project are not expected to disturb existing surface water or alter the topography in the area. Those species residing in rocky outcrops located in potential disturbance areas could be impacted by construction and maintenance operations. However, few non-aquatic herptile species were observed in the PAA and surrounding perimeter. Any impacts that occur could affect individuals, but would not likely impact the population as a whole.

5.7.8.2.1.7 Fish and Macroinvertebrates

The planned locations for new facilities and infrastructure do not overlap any perennial aquatic features, no loss of aquatic habitat would occur as the result of their construction. The risk of impaired water quality will be reduced or avoided through project siting, and implementation of standard construction erosion and sediment control measures. The location of production facilities (processing plants, pipelines, new roads and power lines), as well as the proposed land application sites (center pivot irrigation sites) will avoid direct impacts to perennial streams.

Due to the arid climate and proposed location of new mine facilities, operation of the well fields is not expected to alter aquatic habitat or water quality in perennial streams. No surface water will be diverted for use in the operation, and no process water will be discharged into aquatic habitat.

Pass creek provides only seasonal drainage and does not support fish or significant amphibian habitat. The proposed processing sites and land application sites are intentionally located away from Beaver Creek, Pass Creek and other aquatic habitat, the primary aquatic habitat in the project vicinity. Therefore, aquatic habitat will not be directly affected by the well field operations or land application sites.

5.7.8.3 Threatened and Endangered, or Candidate Species and Species Tracked by SDNHP

5.7.8.3.1 Federally Listed Species

As described in the preceding sections of this document, no federally listed vertebrate species were documented in the project survey area (current PAA and 2.0 km perimeter) during the year-long survey period, or during previous targeted surveys conducted for the original claims (TVA 1979). Additionally, the USFWS has issued a block clearance for black-footed ferrets in all black-tailed prairie dog colonies in South Dakota except northern Custer County, and in the entire neighboring state of Wyoming. That clearance indicates that ferrets do not currently, and are not expected to, occupy the PAA. Only one small black-tailed prairie dog colony was present in the PAA itself during the 2007-2008 baseline surveys, and local landowners are actively working to remove the animals from their lands. Consequently, the proposed project will have no direct, indirect, or cumulative effects on black-footed ferrets.

5.7.8.3.2 State Listed Species

ISL within the project is not likely to adversely affect, bald eagles, the only state listed species known to inhabit the PAA. Bald eagles were documented at winter roosts and an active nest within the PAA for this project. However, most roost sites and the lone nest site are at least 1.0 mile from the nearest planned facility associated with this project. Additionally, no more than two or three bald eagles were observed during any given winter survey. This is despite the numerous available (and unoccupied) mature trees along Beaver Creek, Pass Creek, and the pine breaks located in and near the PAA. Three proposed land application sites (center pivot irrigation systems) would currently fall within the one-mile buffer of the bald eagle nest. However, those systems are typically automated, and the minimal disturbance associated with potential maintenance of those systems should not be significant enough to impact nesting or roosting bald eagles along Beaver Creek.

Direct impacts to bald eagles could include the potential for injury or mortality to individual birds foraging in the PAA due to electrocutions on new overhead power lines. Although not expected, disturbance activities near an active nest could result in abandonment and, thus, the loss of eggs or young. The increased human presence and noise associated with construction activities, if conducted while eagles are wintering within the area, could displace individual eagles from using the area during that period.

Given the low number of wintering and nesting bald eagles in the PAA, potential impacts of the proposed project would be limited to individuals rather than a large segment of the population. The use of existing or overlapping right-of-way corridors, along with best management practices will minimize potential direct impacts associated with overhead power lines. If necessary, the majority of other potential impacts could be mitigated if construction activities were conducted outside the breeding season and/or winter roosting months, or outside the daily roosting period, should eagles be present within one mile of construction. Any bald eagles that might roost or nest in the area once the mine is operational would be doing so in spite of continuous and on-going human disturbance, indicating a tolerance for such activities.

Indirect impacts as a result of noise and human presence associated from mine related operations could include area avoidance by avian species. Potential winter foraging habitat could be further fragmented by linear disturbances such as overhead power lines and new roads associated with the project. Given the size of the proposed project, those disturbances would occur within narrow corridors over relatively short distances. Nevertheless, the use of common right-of-way corridors to consolidate new infrastructure will reduce these potential indirect impacts.

The only other state-listed species recorded in the general area was the river otter. An otter carcass was discovered lodged in debris in the stream channel at fisheries sampling station BVC04 in mid-April 2008. That site is approximately 12 river miles upstream from the PAA boundary in eastern Wyoming. The carcass had washed away by the July 2008 fisheries sampling session. The monthly sampling at BVC04 during the monitoring period, confirmed no additional observations of otters. Likewise, no evidence of otters was report by biologists along any drainage elsewhere in the PAA (proposed permit area and 2.0 km perimeter) during the year-long baseline survey period (mid-July 2007 through early August 2008). Given the fact that no stream channels will be physically impacted in the PAA, the lack of otter sightings or sign in the PAA itself, and the stringent water processing and water quality monitoring that will occur, this project is not likely to directly or indirectly impact river otters.

5.7.8.3.3 Species Tracked by SDNHP

Ten terrestrial species tracked by the SDNHP were recorded during baseline surveys for the uranium project, including the bald eagle. Seven of the ten were observed within the PAA, and three were seen in the 2.0 km perimeter. One additional species, the plains topminnow, was observed in Beaver Creek and the Cheyenne River, at least 1.0 mile outside the PAA. Three SDNHP species are known or suspected to have nested in the PAA in 2008. However, two of the three nest sites are at least 1.0 mile from the nearest planned new facility, and all three were closer to existing disturbances in 2008 than they would be to new activities outside those existing areas.

The seven SDNHP species recorded in or flying over the PAA could potentially experience the same type of direct and/or indirect impacts from construction and operation of the Proposed Action as those described previously for other species: e.g., injury, mortality, avoidance, displacement and increased competition for resources. Those potential impacts will be minimized by the timing, extent, and duration of the proposed activities. Enforced speed limits during all phases of the project will further reduce potential impacts to wildlife throughout the year, particularly during the breeding season. Once facilities and infrastructure are in place, and hunting pressures decrease, animals remaining in the PAA could demonstrate an acclimation to those disturbances.

5.7.9 Potential Air Quality Impacts

5.7.9.1 Potential Air Quality Impacts of Construction

ISL process facilities do not typically affect air quality drastically (NUREG-1910, 2008). The impacts due to construction are classified as SMALL if 1) the gaseous emissions are within regulatory limits;

2) the air quality in the region of influence is in compliance with the National Ambient Air Quality Standards (NAAQS); and 3) the facility is not classified as a major source according to the New Source Review or operating permit programs. Because of the isolated location (13 miles northwest of Edgemont) and the atmospheric conditions of the PAA, the cumulative air quality impacts will be negligible.

The construction phase of ISL projects generally produces non-radiological gaseous emissions including fugitive dust and combustion emissions. Diesel emissions from construction equipment comprise the majority of the combustion emissions and are considered to be small, short-term effects.

Potential air quality impacts during construction activities at the project will include emissions from heavy equipment, vehicle and drill rig exhaust, dust from traffic, and dust from disturbing soil during drilling and ground-clearing activities. Mobile sources of emissions will be diesel engines on the drill rigs and diesel water trucks. All vehicles on-site will meet Environmental Protection Agency (EPA) and Department of Transportation (DOT) vehicle emission standards.

The greatest amount of dust will be generated from vehicular traffic on the unpaved roads; therefore, speed limits will be imposed for employee vehicles and transport trucks in order to mitigate the amount of dust generated from unpaved roads. Employee car pooling will be encouraged, which will keep the vehicular traffic at a minimum. Temporarily disturbed areas will be reseeded and restored as soon as possible to minimize erosion of soil and fugitive dust emissions.

5.7.9.2 Potential Air Quality Impacts of Operation

As a general matter, ISL operations are not major point source emitters and are not expected to be classified as major sources of emissions (NUREG-1910, 2008). Emissions may be introduced during the operation phase of an ISL project including the release of pressurized vapor from well field pipelines. Other additional possible emissions include those that may be emitted during resin transfer or elution. Naturally occurring radon gas may also be released when the well pipeline system is vented. Non-radiological emissions from pipeline system venting, resin transfer, and elution are expected to have a minimal impact on air quality at the site due to the low volume of effluent produced and the rapid dispersion of the emissions (NUREG-1910, 2008).

Due to the utilization of the pressurized down-flow IX columns there are virtually no releases of radon to the atmosphere. Indeed, none of the IX process circuit is open to the atmosphere except for short periods during transfer of resin. During resin transfer, fans vent radon released from the resin transfer process from the CPP to the outside atmosphere.

Yellowcake drying operations can also produce gaseous effluents. The project yellowcake will be dried at approximately 450 °F in a rotary vacuum drying process. The impacts related to yellowcake drying will be to be SMALL because vacuum driers basically release no gaseous effluents other than water vapor (NUREG-1910, 2008).

Fugitive dust and emissions from on-site traffic associated with operations and maintenance will also be expected, but will amount to less than was produced during construction of the facilities at the site, so impacts are expected to be SMALL (NUREG-1910, 2008).

Impacts during aquifer restoration and decommissioning phases to air quality are expected to be similar (SMALL) to impacts during operations (NUREG-1910, 2008).

Section 5.8.7 discusses the mitigation measures for air quality impacts.

5.7.10 Potential Noise Impacts

5.7.10.1 Potential Noise Impacts of Construction

Because of the remote location of the project site and lack of sensitive receptors, noise impacts are not expected to increase beyond ambient levels due to plant operations. Likewise, no detrimental off-site noise impacts are anticipated due to the increase in commuter and truck traffic volumes or from construction. Noise levels generated during operation of the ISL project are not expected to result in any significant impacts to violate any noise standards. Open rangeland and pastureland are the primary land uses within the PAA and the surrounding 2.0-km area.

Outdoor noise levels at the nearest off-site receptors will be well within the 55-dBA daytime guideline, to protect against activity interference and annoyance (EPA, 1978). Noise levels during mine unit construction should cause no off-site impacts, since the PAA is not in close proximity to off-site receptors and will occur only during daylight hours.

Section 5.8.8 discusses the mitigation measures for noise impacts.

5.7.10.2 Potential Noise Impacts of Operations

Because of the remote location and lack sensitive receptors noise potential impacts are not expected to increase beyond ambient levels due to plant operations. Likewise, no detrimental off-site noise impacts are anticipated due to the increase in commuter and truck traffic volumes or from construction. Noise levels generated during operation and reclamation of the project are not expected to result in any significant potential impacts that would violate any noise standards. Exposure limits during operations will meet OSHA current permissible exposure limit for workplace noise (29 CFR 1910.95).

Outdoor noise levels at the nearest off-site receptors will be well within the 55-dBA daytime guideline, to protect against activity interference and annoyance (EPA, 1978). Noise levels during process operation and reclamation should cause no off-site impacts, since the PAA is not in close proximity to off-site receptors and will occur only during daylight hours.

Section 5.8.8 discusses the mitigation measures for noise impacts.

5.7.11 Potential Historic and Cultural Resources Impacts

A Level III Cultural Resources Evaluation was conducted in the PAA (Appendix 5.7-B). Personnel from the Archaeology Laboratory, Augustana College (Augustana), Sioux Falls, South Dakota, conducted on-the-ground field investigations between April 17 and August 3, 2007.

Augustana documented 161 previously unrecorded archaeological sites and revisited 29 previously recorded sites during the current investigation. Expansion of site boundaries during the 2007 survey resulted in a number of previously recorded sites being combined into a single, larger site. Twenty-eight previously recorded sites were not relocated during the current investigation. Excepting a small foundation, the non relocated sites were previously documented as either prehistoric isolated finds or diffuse prehistoric artifact scatters.

Prehistoric sites account for approximately 87 percent of the total number of sites recorded. Historic sites comprise approximately 5 percent of total sites recorded, while multi-component sites (prehistoric/historic) comprise the remaining 8 percent. Ten of the sites documented have only prehistoric and historic components.

The small number of Euro-American sites documented was not unanticipated given the peripheral nature of the PAA in relation to the Black Hills proper. The disparity existing between the number of historic and prehistoric sites observed in the PAA is also not unexpected; however, the sheer volume of sites documented in the area is noteworthy. The land evaluated as part of the Level III cultural resources evaluation has an average site density of approximately 1 site per 8.1 acres. Even greater site densities were reported in 2000 during the investigation of immediately adjacent land parcels for the Dacotah Cement/BLM land exchange (Winham et al., 2001). This indicates that the proposed Permit Area is not unique, in regards to the number of documented sites, and is typical of the periphery of the Black Hills.

As construction takes place any previously undetected historical or cultural resources will be reported to the proper agency. The site will be evaluated and released by the proper agency before construction continues within the specific area. The phased approach that Powertech (USA) proposes will increase the likelihood of safeguarding historical and/or cultural resources. Another example of phasing is a license condition that requires cessation of any site activities and the conduct of a cultural resources inventory if previously undetected historic or cultural properties are discovered during the development and construction of wellfields. Thus, “phasing” is an essential and integral component of *all aspects* of ISL uranium recovery projects (NMA, 2007).

Powertech (USA) has executed a Memorandum of Agreement, (MOA), attached as Appendix 5.7-C to this document with the State Archeologist to ensure to preservation of any historical sites that may be present within the PAA. The MOA outlines all actions needed to ensure no significant historic, cultural, or archeological resources will be damaged during production activates.

Section 5.8.9 discusses the mitigation measures for historic and cultural resources impacts.

5.7.12 Potential Visual/Scenic Resources Impacts

Potential short term impacts to the visual resources produced during construction will come from the addition of access roads, electrical distribution lines, header houses as well as drilling. Temporary impacted areas will be reclaimed upon completion of construction and debris created during construction will be removed as soon as possible to limit the areal extent affected during construction. The sources of potential long-term impacts to the visual resources will be the presence of the central plant, wellhead covers, access roads, a pipeline, holding ponds, and several ancillary buildings. These potential long-term visual impacts will remain present until the completion of restoration and reclamation, which will efface the presence of the visual impacts associated with the proposed action.

The proposed action will result in temporary, minor impacts to visual and scenic resources. The project will maintain the visual resource classification of the area. According to NUREG-1569, if the visual resource evaluation rating is 19 or less, no further evaluation is required. Based on the visual resource inventory conducted in June 2008, the total score of the two Scenic Quality Rating Units within the Proposed License Area were 11 and 13; therefore, no further evaluation of the existing scenic resources or future changes to the scenic resources of the area due to the proposed action will be required.

To minimize potential impacts to visual and scenic resources, building materials and paint will be selected that complement the natural environment, according to BLM guidelines. Construction and placement of structures will take into consideration the topography in order to conceal wellheads, plant facilities, and roads from public vantage points. In order to mitigate the visual impacts of roads constructed, the topography that the road follows as well as the area of disturbance will be considered.

Impacts during aquifer restoration and decommissioning phases to visual resources are expected to be the same or less (SMALL) to impacts during operations (NUREG-1910, 2008).

Section 5.8.10 discusses the mitigation measures for visual/scenic resources impacts.

5.7.13 Potential Socioeconomic Impacts

Although a proposed facility size and production level can vary, the peak annual employment at an ISL facility range up to about 200 people, including construction (Freeman and Stover, 1999; NUREG-1508, 1997; Energy Metals Corporation, U.S., 2007) as stated in NUREG-1910. In general the number people associated with an ISL facility workforce could be as many as 500 (i.e., 200 workers times 2.5 persons per household) (NUREG-1910, 2008). The following section highlights potential socioeconomic impacts of the proposed project to Custer and Fall River Counties. A cost-benefit analysis for the proposed action is presented in Section 7.0. Overall, potential socioeconomic impacts from ISL facilities in the proposed project region would range from SMALL to MODERATE (NUREG-1910, 2008).

5.7.13.1 Construction

Assuming a peak workforce of about 86 payroll employees, the influx of workers is expected to result in a small to moderate impact in Custer and Fall River Counties because of the short duration of construction phase (18-24 months) and the small size of the workforce compared to the regional labor pool of 9,202 people working full and/or part-time jobs (SD-REAP, 2008). The impacts of worker influx will be mitigated by preferentially sourcing the labor force from the within the surrounding region.

The potential direct, indirect and induced effects on Custer and Fall River Counties' employment are shown on Table 5.7-2. The direct employment effects refer to the employment directly generated by the project. For the initial construction phase beginning in year one, the IMPLAN model estimated 171 additional non-payroll workers hired in Custer and Fall River Counties based on the estimated 86 payroll workers engaged directly in construction activities and the $45.8 million in non-payroll capital expenditures incurred by the project per year.

Table 5.7-2 Employment Effects of the Project in Custer and Fall River Counties

Years	Employment			
	Direct	**Indirect**	**Induced**	**Total**
1-2	86	45	126	257
3-9	84	36	35	155
10-17	18	3	3	24

Potential indirect effects pertain to the inter-industry effects from the direct effects and could include increased labor demands, goods and services required to support the ISL project (e.g. retail and restaurant staff). In addition, new workers living within Custer and Fall River Counties would spend their income locally, which would induce additional income and employment. The sum of potential direct, indirect and induced effects represents the total potential employment impacts of the project. These results indicate that the project has the potential to create a total of 257 jobs during the construction stage.

5.7.13.2 Operations Workforce

Assuming an operation phase workforce of about 84, the influx of workers is expected to result in a small to moderate impact in Custer and Fall River Counties, because of the small size of the workforce compared to the regional labor pool of 9,202 people working full and/or part-time jobs (SD-REAP, 2008). The impacts of worker influx will be mitigated by preferentially sourcing the labor force from the within the surrounding region.

For the operation phase of the project, the IMPLAN model estimated 71 additional non-payroll workers will be hired in Custer and Fall River Counties based on the estimated 84 payroll workers engaged directly in the operation activities and the $21.2 million in non-payroll capital expenditures incurred by the project per year. The economic impacts of these newly created 155 jobs during the operation phase of the project are not limited to Custer and Fall River Counties, but will likely affect the surrounding Counties of Weston, Niobrara, and Pennington because of increased commerce and capital exchange within the region.

5.7.13.3 Potential Effects to Housing

Because of the project's close proximity to the more populated communities of Custer City and Hot Springs, South Dakota and Newcastle, Wyoming with a combined population greater than 9,000 people, it can be assumed that much of the workforce would come from these localities. The remaining workforce would likely relocate from the surrounding area (e.g., South Dakota, Nebraska and Wyoming). The IMPLAN model results show that during the two year constructional stage, the Proposed Action has the potential to sustain the creation of 257 new jobs for two years. During the following 7 year operation stage the project has the potential to sustain the creation 155 jobs for seven years, and 24 jobs over the final seven years.

In the unlikely event that the entire direct payroll and non-payroll workforce relocated to Custer and Fall River counties, the population increase for the three stages of operations would be 619, 374 and 58, based on the average family size in South Dakota of 2.41 as of 2006. This increase in population would account for an increase of 6.9 percent (total population 15248) in the total population of Custer and Fall River counties. This is a very conservative estimate because it is likely that a large percentage of the workforce for operation and reclamation will be sourced from the existing workforce, thereby reducing the total population increase substantially. The impacts associated with an increase in population are expected to be dispersed because of the remoteness of the project site and the phased nature of construction, operation and reclamation. While this is a moderate increase in the overall percentage of the local population, this influx of immigration could be partially mitigated by implementing a preferential hiring scheme and using regional educational/training institutions to help train workers and to ensure that as many of the local residents are hired as possible.

5.7.13.4 Potential Effects to Services

There are several schools located within Custer and Fall River Counties. The Custer School District includes: Custer Elementary, Hermosa Elementary, Fairburn Elementary, Spring Creek Elementary, Custer Middle, and Custer High School. Total enrollment for the Custer School District is 991 students with a student to teacher ratio of 12.1 to 1. The Hot Springs School District includes: Hot Springs Elementary, Hot Springs Middle and Hot Springs High School. Total enrollment for the Hot Springs School District is 873 students with a student to teacher ratio of 12.9 to 1. The Edgemont School District includes: Edgemont Elementary, Edgemont Junior High and Edgemont High School with a total enrollment of 138 students and a student to teacher ratio of 8.8 to 1.

Families moving into the aforementioned school districts near the project site as a result of the project are not expected to strain the current school system because they presently under-capacity as shown by the combined student teacher ratio for the three school districts of 12.1:1 as compared to the State wide student teacher ratio of 13.4:1 and the national average of 15.7:1.

The costs associated with increased demand of public facilities and services are expected to be minimal. The need for additional water supply and waste disposal facilities are expected to be minimal based on adequate existing capacity. Existing emergency response and medical treatment facilities are capable of responding to any possible incident at the project site; therefore the basic services required to support the project already exist. Since the majority of the workforce will be local there are no significant changes or stresses anticipated for other public services, such as police, health care, or utilities.

5.7.13.5 Economic Impact Summary

According to the Cost-Benefit Analysis in Section 7, the most significant benefits of the Proposed Action are its potential to sustain the creation of 257 new jobs during construction, 155 jobs during operation, and 24 jobs during reclamation, all of which include the direct, indirect and induced effects on the local economies. In addition, an estimated $91.6 million during construction will be spent on non-payroll expenditures, $148.4 million during operation and 14.0 million during reclamation; and approximately $35.1 million in state and local tax revenue and $186.7 million in value added benefits are expected to be generated over the life of the Proposed Action (Table 5.7-3).

Table 5.7-3 summarizes the associated short-term and long-term cost of the Proposed Action. Impacts to the regional housing market should be minimal because of the large percentage of local workers, impacts to schools and public facilities should be negligible because of their present ability to absorb any associated regional influx, and the impact of noise and additional traffic presents little or no change compared to the no action alternative. Due to the remote location of the project Site and minimal surface disturbance, impacts to recreational activities and aesthetic values within the area should be negligible.

This CBA indicates that the construction and operation costs including capital costs of this project will result in positive economic benefits to the local and regional economy by the creation of hundreds of jobs and millions of dollars in tax revenue over the life of the project. The development the ISL project should present Custer and Fall River counties with net positive gain when compared to the no action alternative.

Table 5.7-3 Summary of Benefits and Costs for the Proposed Action

Benefits	Costs
▪ **Value Added** $186,697,204 ▪ **Tax Revenue** $35.1 million ▪ **Potential to create temporary and permanent jobs** 257 jobs over two years during construction 155 jobs over seven years during operation 24 jobs over eight years during reclamation ▪ **Increased knowledge of the local environment and natural resources**	▪ **Housing Impacts** Little or no change ▪ **Schools and Public Facilities** Negligible ▪ **Noise and Congestion** None ▪ **Impairment of Recreation and Aesthetic Values** Negligible ▪ **Land Disturbance** Minor ▪ **Groundwater Impacts** Controlled through mitigation ▪ **Radiological Impacts** Controlled through mitigation

5.7.14 Potential Environmental Justice Impacts

The U.S. Census 2000 Decennial Population program provides information about race and poverty characteristic for Census Tracts for the areas surrounding the PAA. The 2000 Census Tract data for South Dakota was used to compare the demographic data for the counties surrounding the PAA. These data were also used to determine if there was a disproportionate percentage of minorities or low-income populations that might be affected by the PAA relative to the State.

As shown in Table 5.8-4, minorities make up less than 7.0 and 11.0 percent of the total population for Custer and Fall River Counties, respectively, which is less than the state average of 12.0 percent. No concentration of minorities was identified to reside near the PAA, which is located in a rural area, while most of the minority population lives urban centers such as Custer City (Census Tract 9952) or Hot Springs (Census Tract 9942).

Census Tract information regarding median household incomes and poverty statistics for Custer and Fall River counties is only available from the decennial federal census. Median household income levels were $36,303 for Custer County and $29,631 for Fall River County compared with $35,282 for the State average. The two census tracts within Fall River County (9941 and 9942) are below the State average for median household income levels, but they are all well above the 2000 poverty level of $17,603 for a family of four, while the average of Custer Counties two census tracts was well above the State's average. The poverty rate in Custer County was 9.4 percent and 13.6 percent in Fall River County. Compared to the state-wide average of 13.2 percent, Fall River's poverty rate is only slightly higher, while Custer County is well below the state-wide; therefore, there is not a disproportionate concentration of low-income populations within the study area compared to the State as a whole (USCB, 2000).

Table 5.7-4 Race and Poverty Characteristics for Areas Surrounding the Proposed Action

	Custer County CT - 9951	Custer County CT- 9952	Custer County	Fall River County CT - 9941	Fall River County CT - 9942	Fall River County	State of South Dakota
White, non-Hispanic Population	95.0	90.8	93.4	92.4	87.5	89.3	88.0
Total Racial Minority Population	5.0	9.2	6.6	7.6	12.5	10.7	12.0
White, Hispanic Population	1.4	1.7	1.5	1.3	2.0	1.7	1.4
Native American Population	2.1	4.8	3.1	4.1	7.2	6.1	8.3
Median Household Income in 1999 dollars	$37,083	$34,837	$36,303	$31,759	$27,337	$29,631	$35,282
Percent Below Poverty Level	10.0	8.4	9.4	13.3	13.8	13.6	13.2
Total Population	4,517	2,758	7,275	2,767	4,686	7,453	754,844

It is possible that some low-income individuals or minorities may reside within the study area, but not disproportionately compared with the state-wide averages. Also, since the proposed project is not expected to generate any significant adverse environmental impacts to the area's natural resources, there will not be any disproportionate environmental consequences to minority groups or low income populations.

5.7.15 Potential Public and Occupational Health Impacts

Powertech (USA) is required to implement radiological monitoring and safety programs that comply with 10 CFR Part 20 requirements to protect the health and safety of workers and the public. Powertech (USA) will employ the principles of ALARA at all times concerning activities covered under the NRC license. NRC will periodically inspect Powertech (USA) programs to ensure compliance (NUREG-1910, 2008).

5.7.15.1 Potential Nonradiological Impacts

The area within an 80-kilometer (50-mile) radius surrounding the PAA includes portions of counties within western South Dakota, eastern Wyoming, and northeastern Nebraska. The nearest resident is located approximately 1.4 km from the center of the proposed project in the south sector (Figure 5.7-1).

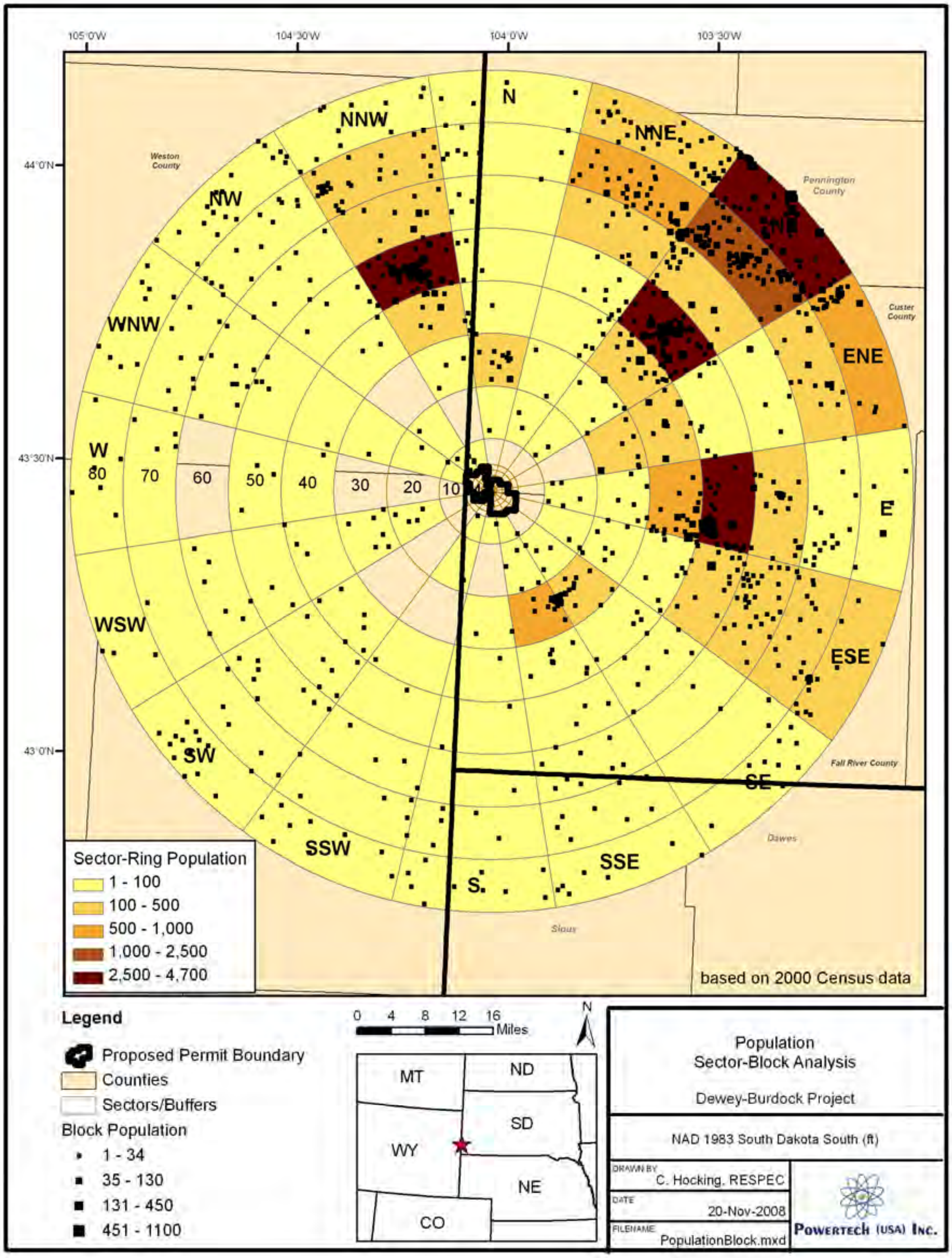


Figure 5.7-1 Population Sector Block Analysis

5.7.15.1.1 Potential Chemical Impacts

In general, most ISL facilities utilize chemicals during the extraction process and during restoration of groundwater quality. Bulk chemicals will be stored on-site in areas at a distance from the processing facilities that will pose no significant hazard to the public or workers' health and safety. Powertech (USA) will have strict standard operating procedures regarding receiving, storing, handling, and disposal of chemicals to ensure the safety of the public and workers. Industrial safety aspects associated with the use of chemicals will be regulated by several agencies including the EPA, SD DENR and OSHA.

Process-related chemicals stored on-site will include anyhydrous ammonia, carbon dioxide, hydrogen peroxide, oxygen, sodium carbonate and sodium chloride, barium chloride, and sulfuric acid and hydrochloric acid. Risk assessments completed by the NRC in NUREG-6733 for ISL facilities identified anhydrous ammonia and bulk acid (sulfuric and hydrochloric) storage as the most chemicals with the greatest potential for impacts to chemical safety.

Potential health and safety impacts could result from an accidental release of these chemicals. Releases of these chemicals at levels greater than the reportable quantity level under the Community Right to Know Act (40 CFR 355) will be reported to the National Response Center, EPA, SDDENR, and NRC. Specific quantities or uses of chemicals that require certain controls, procedures, or safety measures are defined by statutes:

- 29 CFR Part 1910.119 and 1910.120
- 40 CFR Part 68, 302.4, and 355

Compliance with these necessary requirements will reduce the likelihood of a release. Offsite impacts would be SMALL, while impacts to workers involved in response clean up could be MODERATE. Any such impacts will be mitigated by implementing procedures and training requirements (NUREG-1910, 2008).

Restoration activities will at times overlap with some operational activities such as operation of well fields, wastewater treatment, and disposal. The occupational health and safety impacts are expected to be less than operational impacts due to the absence of some operational activity, such as yellowcake drying operations and IX. Therefore, aquifer restoration is expected to have a SMALL impact to workers and the general public (NUREG-1910, 2008).

5.7.15.2 Potential Radiological Impacts

Potential radiological impacts:

- Well fields
- Processing facilities
- Unplanned release
- Land application

Using the required RESRAD and MILDOS models, the potential radiological impacts were assessed.

5.7.15.2.1 Exposure Pathways

The potential exposure pathways from all potential sources on-site are presented on Figure 5.7-2. Atmospheric Rn-222 is one pathway for impacts on human and environmental media. Radon-222 has a relatively short half-life (3.2 days) and its decay products are short lived, alpha emitting, nongaseous radionuclides. These decay products have the potential for radiological impacts to human health and the environment. As Figure 5.7-2 shows, all potential exposure pathways, with the possible exception of absorption, can be important depending on the environmental media impacted. All of the pathways related to air emissions of radionuclides are evaluated by MILDOS-AREA.

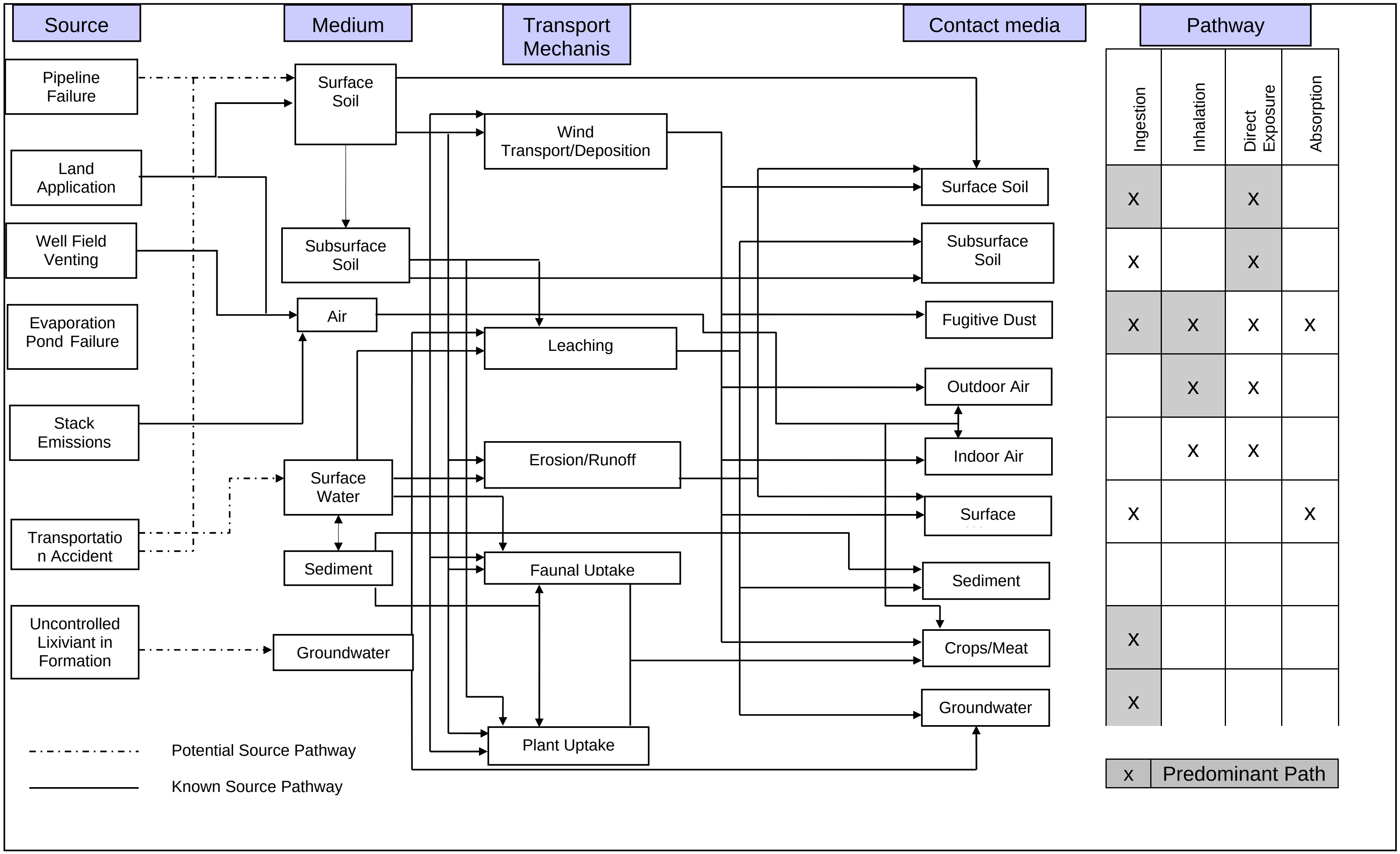


Figure 5.7-2 Human Exposure Pathways

5.7.15.2.2 Exposures from Water Pathways

The leach fluids in the ore zone will be controlled and monitored to ensure that there is no migration to surface waters or adjacent non-exempt USDWs.

Two methods of waste disposal at the facility are being considered: Either treatment to remove radium and subsequent injection in a Class I or V disposal well, or by the same treatment followed by land application.

The uranium IX, precipitation, drying and packaging facilities will be located on curbed concrete pads to prevent any liquids from entering the environment. Solutions used to wash down equipment drain to a sump and are either pumped back into the processing circuit or to wastewater treatment and disposal. The pads will be of sufficient size to contain the contents of the largest tank in the event of a rupture.

5.7.15.2.3 Exposures from Air Pathways

Sources of radionuclide emissions are Pb-210, natural uranium, Ra-226, and Th-230 released into the atmosphere from the land application areas. The land application areas could also be a source of Rn-222. Since the radium is precipitated before water is used in land application, this further reduces the potential impact to human health and the environment. The total effective dose equivalent (TEDE) to nearby residents in the region and at the facility boundaries was estimated using MILDOS-AREA. The parameters used to estimate releases are provided in Table 5.7-5.

Table 5.7-5 Parameters Used to Estimate Radionuclide Releases from the Project Site

Parameter	Value	Unit	Variable Name	Source
Rate of land application - Dewey	3.05E-03	$m\ d^{-1}$	AR_{Dewey}	Application
Rate of land application - Burdock	2.29E-03	$m\ d^{-1}$	$AR_{Burdock}$	Application
Area of land application - Dewey	1.82E+06	m^2	LA_{Dewey}	Application
Area of land application - Burdock-1	1.01E+05	m^2	$LA_{Burdock-1}$	Application
Area of land application - Burdock-2	1.82E+06	m^2	$LA_{Burdock-2}$	Application
Area of land application - Burdock-3	5.06E+05	m^2	$LA_{Burdock-3}$	Application
Time of land application in a year	136	d	t_d	Application
Years of land application	15	y	t_y	Application
Concentration of natural uranium in water	300	$pCi\ L^{-1}$	$[U\text{-}nat]_{water}$	Application (NRC effluent values)
Concentration of thorium-230 in water	100	$pCi\ L^{-1}$	$[Th\text{-}230]_{water}$	Application (NRC effluent values)
Concentration of radium-226 in water	60	$pCi\ L^{-1}$	$[Ra\text{-}226]_{water}$	Application (NRC effluent values)
Concentration of lead-210 in water	10	$pCi\ L^{-1}$	$[Pb\text{-}210]_{water}$	Application (NRC effluent values)
Density of soil - Dewey	1.28	$g\ cm^{-3}$	$_{Dewey}$	Application
Density of soil - Burdock	1.24	$g\ cm^{-3}$	$_{Burdock}$	Application
Depth of contamination	0.15	m	x	Assumption
Distribution coefficient of natural uranium in loam soil	15	$cm^3\ g^{-1}$	$K_{d,U\text{-}nat}$	"Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil" by Yu et al.
Distribution coefficient of thorium-230 in loam soil	3300	$cm^3\ g^{-1}$	$K_{d,Th\text{-}230}$	"Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil" by Yu et al.
Distribution coefficient of radium-226 in loam soil	36000	$cm^3\ g^{-1}$	$K_{d,Ra\text{-}226}$	"Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil" by Yu et al.
Distribution coefficient of lead-210 in loam soil	16000	$cm^3\ g^{-1}$	$K_{d,Pb\text{-}210}$	"Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil" by Yu et al.
Soil volume water content - Dewey	0.91	unitless	w_{Dewey}	Application
Soil volume water content - Burdock	0.80	unitless	$w_{Burdock}$	Application
Rate of resuspension of radionuclides in surface soil	4E-06	h^{-1}	ARR	DOE Handbook "Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities" by the US Department of Energy

5.7.15.2.4 Source Term Estimates

The source terms used to estimate natural uranium, Pb-210, Ra-226, and Th-230 releases from the land application areas are calculated. The parameters used to estimate releases are provided in Table 5.7-5. In cases where site-specific information was not available, conservative values based on published information were used.

For purposes of modeling in MILDOS-AREA, the land application areas are consolidated into clusters. All the land application areas in Dewey are grouped into one cluster called “Dewey”. The land application areas in Burdock are sorted into three clusters. One cluster, “Burdock-1”, consists of one land application area northwest of the main plant. Another cluster, “Burdock-2”, consists of twelve land applications areas between the main plant and the Burdock-1 cluster. The last cluster, “Burdock-3”, consists of three land application areas southwest of the main plant. The locations of the sources representing the clusters are the centroids of the clusters.

The land application areas in Dewey have different soil properties than the land application areas in Burdock. As a result, the source terms for releases of the radionuclides are calculated separately for clusters in Dewey and Burdock. The radionuclide release rates are calculated using Equation 5.1 (from DOE Handbook “Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities” by the US Department of Energy, modified by adding a factor converting h^{-1} to y^{-1}):

$$ST_{cluster,\ nu} = MAR_{cluster,\ nu} * DR * ARR * RF * LPF * 8760 \qquad \text{(Equation 5.1)}$$

Where:

ST	=	Radionuclide (nu) release rate (Ci y^{-1})
MAR	=	Amount of radionuclide in soil (Ci)
DR	=	Fraction of radionuclides available for resuspension
ARR	=	Rate of resuspension of radionuclides in surface soil (h^{-1})
RF	=	Respirable fraction of resuspended radionuclides in surface soil
LPF	=	Fraction of resuspended radionuclides passing through filtering, if any
cluster	=	Dewey, Burdock-1, Burdock-2, or Burdock-3
8760	=	Factor to convert h^{-1} to y^{-1}

In order to be conservative, all of the radionuclides in the soil of the land application clusters are assumed to be available for resuspension and there is no filtering. Therefore, both DR and LPF are assumed to be 1.

In the DOE Handbook “Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities”, the listed ARR for a homogenous bed of powder exposed to ambient conditions is 4E-05 hr^{-1}. However, that value is for “freshly deposited material” and “it would be inappropriate to use” this value for “releases for long-term contamination (i.e. months to years).” The experiment from which the ARR of 4E-05 hr^{-1} was found measured a range of ARR’s of 4E-05 hr^{-1} to 4E-07 hr^{-1}. For calculations in this application, the mid-range value of 4E-06 hr^{-1} was used for the ARR.

Since land application is proposed to occur on several areas spread across the site, calculations of source terms are performed separately for Dewey and Burdock.

The radionuclide soil inventories resulting from land application are calculated using Equation 5.2:

$$\mathrm{MAR}_{\mathrm{cluster,nu}} = [\mathrm{nu}]_{\mathrm{soil,\,cluster}} * \mathrm{M}_{\mathrm{cluster}} * 10^{-12} \quad \text{(Equation 5.2)}$$

Where:

$[\mathrm{nu}]_{\mathrm{soil}}$ = Concentration of radionuclide (nu) in soil (pCi g^{-1})

M = Mass of soil with radionuclide (g)
10^{-12} = Factor to convert pCi to Ci

The mass of soil contaminated in the land application at Dewey is different from the mass of soil contaminated in the land application at Burdock due to different soil densities.

The mass of soil contaminated in each land application cluster is calculated using Equation 5.3:

$$\mathrm{M}_{\mathrm{cluster}} = \rho_{\mathrm{area}} * \mathrm{x} * \mathrm{LA}_{\mathrm{clsuter}} * 10^{6} \quad \text{(Equation 5.3)}$$

Where:

= Density of soil (g cm^{-3})

area = Dewey or Burdock

x = Depth of contamination (m)

LA = Area used in land application (m^2)

10^6 = Factor to convert cm^{-3} to m^{-3}

The concentrations of the various nuclides in the land application soils at Dewey and Burdock are calculated using Equation 5.4 (from "MILDOS-AREA: An Update with Incorporation of *In Situ* Leach Uranium Recovery Technology" by Faillace et al.):

$$[\mathrm{nu}]_{\mathrm{soil,\,cluster}} = \frac{[\mathrm{nu}]_{\mathrm{water}} * \mathrm{V}_{\mathrm{cluster}} * \mathrm{R}_{\mathrm{s,area,nu}} * 10^{-3}}{\mathrm{LA}_{\mathrm{cluster}} * \mathrm{x} * \rho_{\mathrm{area}}} \quad \text{(Equation 5.4)}$$

Where:

$[nu]_{water}$ = Concentration of radionuclide in treated water (pCi L^{-1})

V = Volume of treated water used in land application (m^3)

R_s = Fraction of radionuclide in treated water retained in soil

10^{-3} = Factor to convert L^{-1} to cm^{-3}

The volume of treated water used in land application is calculated using Equation 5.5:

$$V_{cluster} = AR_{area} * t_d * t_y * LA_{cluster} \quad \text{(Equation 5.5)}$$

Where:

AR = Rate of land application (m d^{-1})

t_d = Time of land application in a year (d y^{-1})

t_y = Time of land application (y)

The area of land application is calculated in Equation 5.6:

The fraction of radionuclide in treated water retained in soil is calculated using Equation 5.6 (from "MILDOS-AREA: An Update with Incorporation of *In Situ* Leach Uranium Recovery Technology" by Faillace et al.):

$$R_{s,\,area,\,nu} = 1 - \frac{1}{R_{d,area,nu}} \quad \text{(Equation 5.6)}$$

Where:

R_d = Retardation factor

The retardation factor is calculated using Equation 5.7 (from "MILDOS-AREA: An Update with Incorporation of *In Situ* Leach Uranium Recovery Technology" by Faillace et al.):

$$R_{d,\,area,\,nu} = 1 + \frac{\rho_{area} * K_{d,\,nu}}{w_{area}} \quad \text{(Equation 5.7)}$$

Where:

K_d = Distribution coefficient (cm^3 g^{-1})

w = Soil volume water content

Using the parameters in Table 5.7-5 and Equations 5.1-7, the release rates are calculated for natural uranium (U-Nat), thorium-230 (Th-230), radium-226 (Ra-226), and lead (Pb-210) and shown in Table 5.7-6.

Table 5.7-6 **Estimated Soil Concentrations (pCi g^{-1}) and Release Rates (Ci y^{-1}) from the Project Site**

Location	X (km)	Y (km)	U-Nat		Th-230		Ra-226		Pb-210	
			Soil Conc.	Rel. Rate	Soil Conc.	Rel. Rate	Soil Conc.	Rel. Rate	Soil Conc.	Rel. Rate
Land Application - Dewey	-5.67	4.09	9.28	0.114	3.24	0.0397	1.94	0.0238	0.324	0.00397
Land Application - Burdock-1	-1.48	2.31	7.22	0.00476	2.51	0.00165	1.51	0.000992	0.251	0.000165
Land Application - Burdock-2	-0.90	1.10	7.22	0.0857	2.51	0.0298	1.51	0.0179	0.251	0.00298
Land Application - Burdock-3	-1.57	-1.50	7.22	0.0238	2.51	0.00828	1.51	0.00497	0.251	0.000828

5.7.15.2.5 Source Term Estimates – Rn-222

Sources of radon emanation are the land application areas, the well fields, the CPP, and resin transfers in the SF. The well fields consist of production well fields, restoration well fields, and new well fields. In order to be conservative, the well field in Dewey closest upwind to a receptor (Mining Unit 5) was modeled in MILDOS-AREA. Likewise, the mining unit in Burdock closest upwind to a receptor (Mining Unit 2) was modeled in MILDOS-AREA.

5.7.15.2.6 Land Application Releases

In addition to natural uranium, Ra-226, Pb-210, and Th-230; the land application areas are also sources of Rn-222. The radon source term is calculated using Equation 5.8 and the parameters listed in Table 5.7-6:

$$ST_{cluster} = J_{cluster} * A_{cluster} * 3.15 * 10^{-5} \qquad \text{(Equation 5.8)}$$

Where:

J = Radon flux (pCi m^2 s^{-1})

3.15 * 10^{-5} = Factor to convert pCi s^{-1} to Ci y^{-1}

The radon flux is calculated using Equation 5.9 (from RG 3.64):

$$J_{cluster} = [\text{Ra - 226}]_{soil,cluster} * \rho_{area} * E_{area} * \sqrt{\lambda * D_{area}} * 10^4 * \tanh\left(x * \sqrt{\frac{\lambda}{D_{area}}}\right) \qquad \text{(Equation 5.9)}$$

Where:

E = Radon emanation coefficient

= Radon-222 decay constant (2.1E-06 s^{-1})

D = Radon diffusion coefficient (cm^2 s^{-1})

10^4 = Factor to convert cm^{-2} to m^{-2}

The radon diffusion coefficient is calculated using Equation 5.10 (from RG 3.64):

$$D_{area} = 0.07 * e^{\left[-4*\left(w_{area} - n_{area}{}^{2} * w_{area} + w_{area}{}^{5}\right)\right]} \qquad \text{(Equation 5.10)}$$

Where:

n = Porosity

Using the parameters listed in Table 5.7-5 and Equations 5.8-10, the release rates of Rn-222 from land application are calculated. The releases are 7.43 Ci y^{-1} for Dewey, 0.38 Ci y^{-1} for Burdock-1, 6.88 Ci y^{-1} for Burdock-2, and 1.91 Ci y^{-1} for Burdock-3.

5.7.15.2.7 Production Releases

Plans are to have up to two mine areas which potentially could be mined concurrently. The potential Rn-222 releases from the production well fields were estimated using methods described in RG 3.59 as follows:

The yearly radon released to the production fluid is calculated using Equation 5.11:

$$Y = 1.44 * G * M_{production} * D * (1 - e^{-\lambda * t}) \qquad \text{(Equation 5.11)}$$

Where:

Y= Yearly radon released to production fluid (Ci y^{-1})

G = Radon released at equilibrium (Ci m^{-3})

M = Lixiviant flow rate (L min^{-1})

D = Production days per year (d)

λ = Radon-222 decay constant (d^{-1})

t = Lixiviant residence time

1.44 = Factor to convert L min^{-1} to m^3 y^{-1}

Radon released (equilibrium condition) to production fluid from leaching is calculated using Equation 5.12:

$$G = R * \rho_{form} * E * \frac{(1 - n_{form})}{n_{form}} * 10^{-6} \quad \text{(Equation 5.12)}$$

Where:

G = Radon released (Ci m^{-3})

R = Radium content of ore (pCi g^{-1})

E= Radon emanation coefficient

ρ_{form} = Formation density (g cm^{-3})

n_{form} = Formation porosity

Using Equations 5.11-12 and the parameters listed in Table 5.7-5, the yearly radon released to production fluid is 2117 Ci y^{-1}. RG 3.59 assumes all the Rn-222 that is released to the production fluid is ultimately released to the atmosphere which in the case of ion exchange columns operating at atmospheric pressure in an open system is an appropriate conservative assumption. In cases where pressurized downflow ion exchange columns are used, and well fields are operated under pressure, the majority of radon released to the production fluid stays in solution and is not released. The radon which is released is from occasional well field venting for sampling events, small unavoidable leaks in well field and ion exchange equipment, and maintenance of well field and ion change equipment. For this reason, estimated annual releases of 10 percent of the Rn-222 in the production fluid would occur in the well fields and an additional 10 percent in the ion exchange circuit was assumed. Given these assumptions, the annual Rn-222 released from production in the well field and at the main plant facility is 212 and 191 Ci y^{-1}, respectively. Since the satellite facility is planned to operate at the same parameters as the main plant facility, the annual Rn-222 released from production in the well field and at the satellite facility is also 212 and 191 Ci y^{-1}, respectively. This 10 percent release rate also includes Rn-222 released from the 1-5 percent bleed from the production well field.

5.7.15.2.8 Restoration Releases

Radon-222 releases resulting from well field restoration activities were estimated in the same manner as the production activities above (i.e. using Equations 5.11-12) but modified for the lower restoration flow rate listed in Table 5.7-5. The assumption of a 10 percent release in the well field and the main plant facility results in releases of 26.5 and 23.8 Ci y^{-1}, respectively. Since the satellite facility is planned to operate at the same parameters as the main plant facility, the annual Rn-222 released from production in the well field and at the satellite facility is also 26.5 and 23.8 Ci y^{-1}, respectively.

5.7.15.2.9 New Well Field Releases

Radon-222 releases resulting from new well field development activities were estimated using methods described in NUREG-1569*, Standard Review Plan for In Situ Leach Uranium Extraction License Applications* (NUREG-1569) by the US Nuclear Regulatory Commission as follows:

The yearly radon released new well field development is calculated using Equation 5.13:

$$Rn_{nw} = E * L * [Ra]_{ore} * T * m * N * 10^{-12} \qquad \text{(Equation 5.13)}$$

Where:

Rn_{nw} = Radon-222 release rate from new well field (Ci y^{-1})

$[Ra]_{ore}$ = Concentration of radium-226 in ore (pCi g^{-1})

L = Decay constant of radon-222 (0.181 d^{-1})

T = Storage time in mud pit (d)

m = Average mass of ore material in the pit (g)

N = Number of mud pits generated per year (y^{-1})

10^{-12} = Factor to convert pCi to Ci

Using Equation 5.13 and the parameters listed in Table 5.7-5, the yearly radon released from new well field development is 3.6E-05 Ci yr^{-1}.

5.7.15.2.10 Resin Transfer Releases

Radon-222 releases resulting from resin transfers at the SF are estimated using methods described in NUREG-1569 as follows:

The yearly radon released new well field development is calculated using Equation 5.14:

$$Rn_x = 3.65 * 10^{-10} * F_i * C_{Rn} \qquad \text{(Equation 5.14)}$$

Where:

Rn_x = Radon release rate from resin transfers (Ci y^{-1})

F_i = Water discharge rate from resin unloading (L d^{-1})

C_{Rn} = Steady state radon-222 concentration in process water (pCi L^{-1})

$3.65 * 10^{-10}$ = Factor to convert pCi d^{-1} to Ci yr^{-1}

The steady state radon-222 concentration in process water can be estimated using Equation 5.15:

$$C_{Rn} = \frac{Y * 1.9 * 10^6}{M} \qquad \text{(Equation 5.15)}$$

Where:

C_{Rn} = Steady state radon-222 concentration in process water (pCi L^{-1})

Y = Yearly radon released to production fluid (Ci y^{-1})

M = Lixiviant flow rate (L min^{-1})

$1.9 * 10^6$ = Factor to convert Ci y^{-1} to pCi min^{-1}

The water discharge rate from resin unloading (F_i) can be estimated using Equation 5.16:

$$F_i = N_{resin} * V_i * P_i \quad \text{(Equation 5.16)}$$

Where:

F_i = Water discharge rate from resin unloading (L d^{-1})

N_i = Number of resin transfers per day (d^{-1})

V_i = Volume of resin in transfer (L)

n_{resin} = Porosity of resin

Using Equations 5.13-16 and the parameters listed in Table 5.7-5, the yearly radon released from resin transfers at the SF is 0.523 Ci y^{-1}. This assumes the ore grade mined at the SF would yield the same radon concentration in production fluid as at the CPP.

5.7.15.2.11 Radon-222 Release Summary

A summary of estimated radon-222 releases from the site is presented in Table 5.7-7. The source coordinates in Table 5.7-7 are relative to the CPP. In the unlikely occurrence of an unmitigated event, doses to the workers could have a MODERATE impact depending on the type of accident, but doses to the general public would have only a SMALL impact (NUREG-1910, 2008).

Table 5.7-7 Estimated Releases (Ci y^{-1}) of Radon-222 from the Project Site

Location	X (km)	Y (km)	Production	Restoration	Drilling	Resin Transfer	Land Application	Total
Production Mine Unit (5)	-3.86	3.48	212	26.5	3.6E-05	0	0	238.5
Production Mine Unit (2)	1.83	-0.56	212	26.5	3.6E-05	0	0	238.5
SF	-5.00	3.54	191	23.8	0	0.523	0	215.3
CPP	0	0	191	23.8	0	0	0	214.8
Land Application - Dewey	-5.67	4.09	0	0	0	0	7.43	7.43
Land Application - Burdock-1	-1.48	2.31	0	0	0	0	0.38	0.38
Land Application - Burdock-2	-0.90	1.10	0	0	0	0	6.88	6.88
Land Application - Burdock-3	-1.57	-1.50	0	0	0	0	1.91	1.91
Total			806	100.6	3.6E-05	0.523	16.60	924

5.7.15.2.12 Receptors

The receptors used in the MILDOS-AREA simulations are presented in Table 5.7-8 and include the property boundary in 16 compass directions of the CPP and SF, 7 residences, and the town of Edgemont.

Table 5.7-8 Project Receptor Names and Locations

Location	X (km)	Y (km)	Distance (km)
Boundary - CPP - N	0.00	2.82	2.82
Boundary - CPP - NNE	1.07	2.78	2.96
Boundary - CPP - NE	1.16	1.17	1.65
Boundary - CPP - ENE	2.64	1.01	2.83
Boundary - CPP - E	2.60	0.00	2.60
Boundary - CPP - ESE	2.53	-0.97	2.71
Boundary - CPP - SE	2.13	-2.14	3.02
Boundary - CPP - SSE	0.85	-2.25	2.41
Boundary - CPP - S	0.00	-2.87	2.87
Boundary - CPP - SSW	-1.09	-2.84	3.04
Boundary - CPP - SW	-2.44	-2.43	3.44
Boundary - CPP - WSW	-2.37	-0.90	2.54
Boundary - CPP - W	-2.32	0.00	2.32
Boundary - CPP - WNW	-2.29	0.87	2.45
Boundary - CPP - NW	-2.55	2.52	2.45
Boundary - CPP - NNW	-1.42	3.70	3.96
Boundary - SF - N	-4.92	5.28	7.22
Boundary - SF - NNE	-4.23	5.25	6.74
Boundary - SF - NE	-2.70	5.64	6.25
Boundary - SF - ENE	-3.35	4.01	5.23
Boundary - SF - E	-2.97	3.43	4.54
Boundary - SF - ESE	-3.00	2.69	4.03
Boundary - SF - SE	-2.81	1.30	3.10
Boundary - SF - SSE	-3.55	-0.15	3.55
Boundary - SF - S	-4.91	-0.25	4.92
Boundary - SF - SSW	-5.70	1.38	5.86
Boundary - SF - SW	-6.28	2.06	6.61
Boundary - SF - WSW	-6.24	2.92	6.89
Boundary - SF - W	-7.02	3.43	7.81
Boundary - SF - WNW	-6.98	4.21	8.15
Boundary - SF - NW	-6.24	4.69	7.81
Boundary - SF - NNW	-5.40	4.67	7.14
Resident - Daniels Ranch	2.13	0.02	2.13
Resident - Spencer Ranch	-2.00	1.21	2.34
Resident - BC Ranch	-6.64	3.81	7.66
Resident - Puttman Ranch	-5.16	7.23	8.88
Resident - Burdock School	-2.25	-1.96	2.98
Resident - Heck Ranch	1.73	-6.38	6.61
Resident - Englebert Ranch	0.30	-4.83	4.84
Town - Edgemont	11.03	-18.59	21.62

5.7.15.2.13 Miscellaneous Parameters

The meteorological data used in the MILDOS-AREA model is from the joint frequency distribution data presented in Section 5.5 of this application.

The population distribution used in the MILDOS-AREA model to estimate population doses is from the demographic information presented in Section 5.7.14 of this application.

5.7.15.2.14 Total Effective Dose Equivalent to Individual Receptors

In order to show compliance with the annual dose limit found in 10 CFR part 20.1301, Powertech (USA) has demonstrated by calculation that the total TEDE to the individual most likely to receive the highest dose from the project uranium in situ leach operation is less than 100 mrem y^{-1}. Additionally, the annual effective dose equivalent (EDE) limit found in 40 CFR part 190 of 25 mrem y^{-1} was not exceeded at any receptors. The results of the MILDOS-AREA simulation for each receptor in Table 5.7-5 are presented in Table 5.7-9. The output from the MILDOS-AREA simulation for the land application option is in Appendix 5.7-D. The output for the MILDOS-AREA simulation for the deep well disposal option is in Appendix 5.7-E.

An evaluation of the TEDE calculations follows:

- The maximum 40 CFR part 190 EDE of 10.8 mrem y^{-1}, located at the property boundary north-northwest of the SF, is 43.2 percent of the public dose limit of 25 mrem y^{-1}. The 40 CFR 109 TEDE public dose limit is not exceeded at any boundary receptor. If the land application sources were excluded from the MILDOS-AREA model, no doses would exceed the 40 CFR part 190 dose limit since this limit specifically excludes sources of radon-222.
- The maximum total TEDE of 12.5 mrem per year, located at the property boundary north-northwest of the SF, is 12.5 percent of the 10 CFR 20 public dose limit of 100 mrem y^{-1}. The 10 CFR 20 public dose limit is not exceeded at any property boundary. If the land application sources were excluded form the MILDOS_AREA model, the TEDE at this location would be 2.5 mrem y^{-1}.
- The maximum 40 CFR part 190 EDE at a resident is 2.32 mrem y^{-1}, located at Spencer Ranch. This is 9.28 percent of the public dose limit of 25 mrem y^{-1}. None of the resident receptors have 40 CFR part 190 EDEs exceeding the 25 mrem y^{-1} public dose limit. None of these estimated EDEs exceed the 10 CFR 20 constraint rule for airborne effluents of 10 mrem y^{-1}. If the land application sources were excluded from the MILDOS-AREA model, no doses would exceed the 40 CFR part 190 dose limit for reasons discussed above.
- The maximum TEDE at a resident is 4.48 mrem y^{-1}, located at Spencer Ranch. It is 4.48 percent of the 10 CFR 20 public dose limit of 100 mrem y^{-1}. None of the residents have TEDEs exceeding the 100 mrem y^{-1}public dose limit. If the land application sources were excluded from the MILDOS-AREA model, the TEDE at this location would be 1.72 mrem y^{-1}.

Table 5.7-9 Estimated Total Effective Dose Equivalents (TEDE) to Receptors near the Project Site

Receptor	Distance from Main Plant (km)	40 CFR part 190 TEDE (mrem y^{-1})	Total TEDE (mrem y^{-1})
Boundary - CPP - N	2.82	1.20	2.32
Boundary - CPP - NNE	2.96	0.864	1.79
Boundary - CPP - NE	1.65	1.89	3.43
Boundary - CPP - ENE	2.83	1.06	2.17
Boundary - CPP - E	2.60	1.42	3.23
Boundary - CPP - ESE	2.71	1.49	5.11
Boundary - CPP - SE	3.02	1.59	5.39
Boundary - CPP - SSE	2.41	2.09	5.36
Boundary - CPP - S	2.87	2.13	4.59
Boundary - CPP - SSW	3.04	2.33	4.17
Boundary - CPP - SW	3.44	1.29	2.86
Boundary - CPP - WSW	2.54	1.76	3.65
Boundary - CPP - W	2.32	1.98	4.16
Boundary - CPP - WNW	2.45	2.30	4.59
Boundary - CPP - NW	2.45	2.15	4.72
Boundary - CPP - NNW	3.96	1.21	2.31
Boundary - SF - N	7.22	1.37	2.62
Boundary - SF - NNE	6.74	1.06	2.24
Boundary - SF - NE	6.25	0.727	1.52
Boundary - SF - ENE	5.23	1.79	3.54
Boundary - SF - E	4.54	1.90	4.30
Boundary - SF - ESE	4.03	2.23	6.08
Boundary - SF - SE	3.10	2.25	5.22
Boundary - SF - SSE	3.55	1.51	3.96
Boundary - SF - S	4.92	1.01	2.82
Boundary - SF - SSW	5.86	1.52	3.16
Boundary - SF - SW	6.61	1.41	2.59
Boundary - SF - WSW	6.89	2.23	3.38
Boundary - SF - W	7.81	1.08	1.85
Boundary - SF - WNW	8.15	1.23	1.90
Boundary - SF - NW	7.81	3.63	4.55
Boundary - SF - NNW	7.14	10.8	12.5
Resident - Daniels Ranch	2.13	1.64	3.43
Resident - Spencer Ranch	2.34	2.32	4.48
Resident - BC Ranch	7.66	1.23	2.06
Resident - Puttman Ranch	8.88	0.596	1.25
Resident - Burdock School	2.98	1.86	3.56
Resident - Heck Ranch	6.61	0.771	2.27
Resident - Englebert Ranch	4.84	0.978	2.74
Town - Edgemont	21.61	0.200	0.572

5.7.15.2.15 Population Dose

The annual population dose commitment to the population in the region within 80 km of the project site is also predicted by the MILDOS-AREA code. The results are contained in Table 5.7-10 where TEDE is expressed in terms of person-rems. For comparison, the dose to the population within 80 km of the facility due to background radiation has been included in the table. Background radiation doses are based on a North American population of 346 million and an average TEDE of 360 mrem.

The atmospheric release of radon also results in a dose to the population on the North American continent. This continental dose is calculated by comparison with a previous calculation based on a 1 kilocurie release near Casper, Wyoming, during the year 1978. The results of these calculations are included in Table 5.7-10. These calculations are also combined with the dose to the region within 80 km (50 miles) of the facility to arrive at the total radiological effects of one year of operation at the project site. The maximum radiological effect of the project operation would be to increase the TEDE of continental population by 7.5E-6 percent.

Table 5.7-10 Total Effective Dose Equivalent to the Population from One Year's Operation at the Project Site

Criteria	TEDE (person rem/yr)
Dose received by population within 80 km of the facility	0.879
Dose received by population beyond 80 km of the facility	8.13
Total continental dose	9.01
Background North American dose	1.2E8
Fractional increase to background dose	7.5E-8

5.7.15.2.16 Exposure to Flora and Fauna

MILDOS-AREA estimates surface deposition rates of Ra-226 and its decay products as a function of distance from the source and calculates surface concentrations. Table 5.7-11 presents the highest surface concentrations of Ra-226 and its decay products predicted by MILDOS-AREA over a 100-year period. Soil concentrations were calculated based on a conservative assumption of 1.5 g cm^{-3} bulk soil density.

Table 5.7-11 Highest Surface Concentrations of Radium-226 and its Decay Products

Radionuclide	Distance from site (km)	Direction	Surface concentration (pCi m^{-2})	Soil concentration in upper 15cm (pCi g^{-1})
Radium-226	1.5	WNW	9.94E+03	0.0442
Polonium-218	1.5	WNW	9.94E+03	0.0442
Lead-214	1.5	WNW	9.94E+03	0.0442
Bismuth-214	1.5	WNW	9.94E+03	0.0442
Lead-210	15.0	S	254	1.13E-3

The largest increase in soil concentration is 0.0442 pCi g^{-1} of radium-226, polonium-218, lead-214, and bismuth-214. Recent site specific surface soil (0-15 cm) data show that the background concentration of radium-226 ranges from 0.76 (25 percentile) to 2.2 (75 percentile) pCi g^{-1} with a geometric mean of 1.3 pCi g^{-1} and geometric standard deviation of 1.3 pCi g^{-1}. The increase in soil radioactivity is less than the geometric mean soil radioactivity prior to operations and if added to the geometric mean (1.3 pCi g^{-1}) is still within normal background variability observed at the site. Assuming the most important pathways to flora and fauna exposure start with radionuclide concentrations in soil, the impacts from normal site operations would be minimal and probably not distinguishable from background.

5.7.15.2.17 Determination of Radium Benchmark Dose

RESRAD was used to model the ISL site and calculate the maximum annual dose rate from the current radium cleanup standard.

The following supporting documentation for determination of the radium benchmark dose and the natural uranium soil standard is attached in the Appendix 5.7-F (Radium Benchmark Dose Assessment, ERG, Inc., Oct., 2008):

- The RESRAD Data Input Basis (Attachment 1 of Appendix 5.7-F) provides a summary of the modeling performed with RESRAD and the values that were used for the input parameters. A sensitivity analysis was performed for parameters which are important to the major component dose pathways and for which no site specific data was available.
- Selected graphs produced with RESRAD that present the results of the sensitivity analysis performed on the input parameters are attached (Attachment 2 of Appendix 5.7-F).
- A full printout of the final RESRAD modeling results for the resident farmer scenario with the chosen input values is attached (Attachment 3.0 and 3.1 of Appendix 5.7-F). The printout provides the modeled maximum annual dose for calculated times for the 1,000-year time span and provides a breakdown of the fraction of dose due to each pathway.
- Graphs produced with RESRAD that present the modeling results for the maximum dose during the 1,000 year time span for radium-226 and natural uranium. A series of graphs depicting the summed dose for all pathways and the component pathways that contributes to the total dose are attached (Attachment 4.0 and 4.1 of Appendix 5.7-F).

The maximum dose from Ra-226 contaminated soil at the 5 pCi/g above background cleanup standard, as determined by RESRAD, for the residential farmer scenario was 38.1 mrem/year. This dose was based upon the 5 pCi/g surface (0-6-inch) Ra-226 standard and was noted at time, t = 0 years. The two major dose pathways were external exposure and plant ingestion (water independent). For these two pathways, a sensitivity analysis was performed for important parameters for which no site specific information was available. The 38.1 mrem/year dose from radium is the level at which the natural uranium radiological end point soil standard will be based as described in the following section.

5.7.15.2.18 Determination of Natural Uranium Soil Standard

RESRAD was used to determine the concentration of U-nat in soil distinguishable from background that would result in a maximum dose of 38.1 mrem/year. The method involved modeling the dose from a set concentration of U-nat in soil. This dose was then compared to the radium benchmark dose and scaled to arrive at the maximum allowable U-nat concentration in soil.

For ease of calculations, a preset concentration of 100 pCi/g U-nat was used for modeling the dose. The fractions used were 49.2 percent (or pCi/g) U-234, 48.6 percent (or pCi/g) U-238 and 2.2 percent (or pCi/g) U-235. The distribution coefficients that were selected for each radionuclide were RESRAD default values. All other input parameters were the same as those used in the Ra-226 benchmark modeling.

Using a U-nat concentration in soil of 100 pCi/g, RESRAD determined a maximum dose of 7.1 mrem/year, at time, t = 0 years. The printout of the RESRAD data summary is provided in Attachment 3.1 of Appendix 5.7-G and the dose figures generated with RESRAD are provided in Attachment 4.1 of Appendix 5.7-F.

To determine the uranium soil standard, the following formula was used:

$$\text{Uranium Limit} = \left(\frac{100 \text{ pCi/g U - nat}}{7.1 \text{ mrem/yr U - nat dose}} \right) \text{x } 38.1 \text{ mrem/yr radium benchmark dose}$$

$$\text{Uranium Limit} = 537 \text{ pCi/g U - nat}$$

The U-nat limit is applied to soil cleanup with the Ra-226 limit using the unity rule. To determine whether an area exceeds the cleanup standards, the standards are applied according to the following formula:

$$\left(\frac{\text{Soil Uranium Concentration}}{\text{Soil Uranium Limit}}\right)+\left(\frac{\text{Soil Radium Concentration}}{\text{Soil Radium Limit}}\right) < 1$$

This approach will be used at the ISL site to determine the radiological impact on the environment from releases of source and byproduct materials.

5.7.15.3 Uranium Chemical Toxicity Assessment

The chemical toxicity effects from uranium exposure are evaluated by assuming the same exposure scenario as that used for the radiation dose assessment. In the benchmark dose assessment for the resident farmer scenario, it was assumed that the diet consisted of 25 percent of the meat, fruits, and vegetables grown at the site. No intake of contaminated food through the aquatic or milk pathways was considered probable. Also, the model showed that the contamination would not affect the groundwater quality. Therefore, the same model will be used in assessing the chemical toxicity. The intake from eating meat was shown to be negligible compared to the plant pathway and therefore is not shown here. This is confirmed by the results of the RESRAD calculations shown in Attachment 3.1 of Appendix 4.14-B and the figures generated with RESRAD shown in Attachment 4.1 of Appendix 5.7-F.

The method and parameters for estimating the human intake of uranium from ingestion are taken from NUREG/CR-5512 Vol. 1 (NRC, 1992). The uptake of uranium in food is a product of the uranium concentration in soil and the soil-to-plant conversion factor. The annual intake in humans is then calculated by multiplying the annual consumption by the uranium concentration in the food. Since the soil-plant conversion factor is based on a dry weight, the annual consumption must be adjusted to a dry-weight basis by multiplying by the dry-weight to wet-weight ratio. Parameters for these calculations are given in Section 6.5.9 of the NUREG/CR-5512 Vol. 1 (NRC, 1992). Table 5.7-12 provides the parameters used in these calculation and results for leafy vegetables, other vegetables, and fruit. Annual intakes of 14 kg/year and 97 kg/year were assumed for leafy vegetables and other vegetables and fruit, respectively. Consistent with Attachment 3.1 of Appendix 4.14-B dose calculations, it was assumed that 25 percent of the food was grown on the site. It was also assumed that the uranium concentration in the garden or orchard was 537 pCi/g. This corresponds to the uranium Benchmark Concentration for surface soils. Using a conversion factor for U-nat of 1 mg = 677 pCi, then 537 pCi/g is equivalent to 793 mg/kg. The human intake shown in the second column of Table 5.7-12 is equal to the product of the parameters given in the subsequent columns. Table 5.7-12 shows that the total annual uranium intake from all food sources from the site is 52.4 mg/year.

The two-compartment model of uranium toxicity in the kidney from oral ingestion was used (ICRP, 1995) to predict the burden of uranium in the kidney following chronic uranium ingestion. This model allows for the distribution of the two forms of uranium in the blood, and consists of a kidney with two compartments, as well as several other compartments for uranium distribution, storage and elimination including the skeleton, liver, red blood cells (macrophages) and other soft tissues.

Table 5.7-12 Annual Intake of Uranium from Ingestion

Food Source	Human Intake (mg/yr)	Soil Concentration (mg/kg)	Soil to Plant Ratio (mg/kg plant to mg/kg soil)	Annual Consumption (kg)	Dry Weight Wet Weight Ratio
Leafy Vegetables	9.4	793	1.7E-2	3.5	0.2
Other Vegetables	36.1	793	1.4E-2	13	0.25
Fruit	6.9	793	4.0E-3	12	0.18
Total	52.4				

The total burden to the kidney is the sum of the two compartments. The mathematical representation for the kidney burden of uranium at steady state can be derived as follows (ICRP, 1995):

$$Q_P = \frac{IR \times f_1}{\lambda_P \left(1 - f_{ps} - f_{pr} - f_{pl} - f_{pk} - f_{pk1}\right)}$$

Where:

Q_P = uranium burden in the plasma, μg

IR = dietary consumption rate, mg U/d

f_1 = fractional transfer of uranium from GI tract to blood, unitless

f_{ps} = fractional transfer of uranium from plasma to skeleton, unitless

f_{pr} = fractional transfer of uranium from plasma to red blood cells, unitless

f_{pl} = fractional transfer of uranium from plasma to liver, unitless

f_{pt} = fractional transfer of uranium from plasma to soft tissue, unitless

f_{pk1} = fractional transfer of uranium from plasma to kidney, compartment 1, unitless

λ_p = biological retention constant in the plasma, d^{-1}

The burden in kidney compartment 1 is:

$$Q_{k1} = \lambda_P \times Q_P \times \frac{f_{pk1}}{\lambda_{k1}}$$

Where:

Q_{k1} = uranium burden in kidney compartment 1, mg

λ_{k1} = biological retention constant of uranium in kidney compartment 1, d^{-1}

Similarly, for compartment 2 in the kidney, the burden is:

$$Q_{k2} = \lambda_P \times Q_P \times \frac{f_{pk2}}{\lambda_{k2}}$$

Where:

Q_{k2} = uranium burden in kidney compartment 2, µg

λ_{k2} = biological retention constant of uranium in kidney compartment 2, d^{-1}

f_{pk2} = fractional transfer of uranium from plasma to kidney compartment 2, unitless

The total burden to the kidney is then the sum of the two compartments is:

$$Q_{k1} + Q_{k2} = \frac{IR \times f_1}{\left(1 - f_{ps} - f_{pr} - f_{pl} - f_{pt} - f_{pk1}\right)} \times \left(\frac{f_{pk1}}{\lambda_{k1}} + \frac{f_{pk2}}{\lambda_{k2}}\right)$$

The parameter input values for the two-compartment kidney model include the daily intake of uranium estimated for residents at this site, and the ICRP69 values recommended by the ICRP as listed below (ICRP, 1995). The daily uranium intake rate was estimated to be 0.14 mg/day (52.4 mg/year) from ingestion while residing at this site.

IR = 0.14 mg/day

f_1 = 0.02

f_{ps} = 0.105

f_{pr} = 0.007

f_{pl} = 0.0105

f_{pt} = 0.347

f_{pk1} = 0.00035

f_{pk2} = 0.084

$_{k1}$ = ln(2)/(5 years*365 days/year)

$_{k2}$ = ln(2)/7 days

where ln(2) = 0.693…

Given a daily uranium intake of 0.14 mg/day at this site and the above equation, the calculated uranium in the kidneys is 0.0093 mg U, or a concentration of 0.032 µg U/g kidney. This is 3.2 percent of the 1.0 µg U/g value that has generally been understood to protect the kidney from the toxic effects of uranium.

Some researchers have suggested that mild effects may be observable at levels as low as 0.1 μg U/g of kidney tissue. Using 0.1 μg U/g as a criterion, then the intake is 32 percent of the level where mild effects may be observable.

The EPA evaluated the chemical toxicity data and found that mild proteinuria has been observed at drinking water levels between 20 and 100 μg/L. Assuming water intake of 2 L/day, this corresponds to an intake of 0.04 to 0.2 mg/day. Using animal data and a conservative factor of 100, the EPA arrived at a 30 μg/L limit for use as a National Primary Drinking Water Standard (Federal Register/Vol.65, No.236/ December 7, 2000). This is equivalent to an intake of 0.06 mg/day for the average individual. Naturally, since large diverse populations are potentially exposed to drinking water sources regulated using these standards, the EPA is very conservative in developing limits.

This analysis indicates that a soil limit of 537 pCi/g of U-nat would result in an intake of approximately 0.14 mg/day. Using the most conservative daily limit corresponding to the National Primary Drinking Water standard, a soil limit of 230 pCi/g corresponds to the EPA intake limit from drinking water with a uranium concentration of 0.06 mg/day. Therefore exposure to soils containing 230 pCi/g of natural uranium should not result in chemical toxicity effects. Since the roots of a fruit tree would penetrate to a considerable depth, limiting subsurface uranium concentrations to 230 pCi/g will be considered.

The ALARA principle requires an evaluation of, considering a cost benefit analysis and socio-economic impacts, the practicality of lowering established or derived soil cleanup levels. For gamma-emitting radionuclides, the cost and impacts becomes excessively high as soil concentrations, thus the gamma emission rates, become indistinguishable from background.

Cleanup of uranium mill sites has demonstrated that conservatively derived gamma action levels coupled with appropriate field survey and sampling procedures result in radium-226 soil concentrations near background levels. The presents of radium-226 and natural uranium in a mixture will tend to drive the cleanup to lower radium-226 concentrations. The ALARA principle is met by choosing conservatively derived gamma actions levels, thus no ALARA goals for radium-226 need to be established.

Powertech (USA) Uranium USA proposes an ALARA goal of limiting the natural uranium concentration in the top 15 cm soil layer to 150 pCi/g averaged over the impacted areas. Subsurface soil (greater than 15 cm) natural uranium concentrations should be limited to 230 pCi/g averaged over the impacted area based on chemical toxicity.

5.7.15.4 Potential Radiological Accidents

The following section discusses potential impacts from radiological accidents. Section 5.8.2 discusses the mitigation measures that will be taken to reduce or eliminate these potential impacts.

5.7.15.4.1 Potential Tank Failure

The tanks at the PAA will contain injection and production solutions, ion exchange resin, pregnant eluant, yellowcake, and liquid waste. All tanks will be constructed with the proper material (e.g., fiberglass, steel or aluminum) to adequately contain to the stored material. Instantaneous tank failure is unlikely, but a small leak in the tank would be more probable. In the event of a leak, the tank would be repaired or replaced as necessary.

An NRC sponsored study contained in NUREG/CR-6733 evaluated the potential impacts from the failure of a yellowcake thickener, which resulted in the release of 20% of the thickener volume escaped outside the processing building, based on an event at the Irigaray ISL facility in 1994. NUREG/CR-6733 calculated that the public dose would be below the limits in 10 CFR Part 20 and the dose to an unprotected worker would exceed the 5 rem exposure limits from 10 CFR Part 20. This calculation contains several conservative assumptions, such as the yellowcake would become dry and transportable because no effort would be made to clean up the spill, and that the dose calculation negates the use of protective equipment, and finally, the dose was based on lung clearance class Y uranium, which produces the highest dose estimates.

This study also calculated the potential dose from a catastrophic release of the entire contents from an ion exchange column and the subsequent release of radon gas. The calculated dose for a 30-minute period to a worker in the area would be 1.3 rem. NUREG/CR-6733 recommends that the use of ventilation or atmosphere-supplying respirators designed to protect against gases should be sufficient to mitigate such doses, that unprotected personnel should evacuate the spill areas near areas that have pregnant lixiviant feeds, such as the ion-exchange columns and report any spills immediately, and that ISL facilities maintain proper equipment, training, and procedures to respond to large lixiviant spills or IX column failure.

5.7.15.4.2 Potential Plant Pipe Failure

In the event of the rupture of a plant pipe, operating staff would easily detect rupture and would quickly contain and manage the spilled solution following the same procedures outlined for a tank failure.

5.7.15.4.3 Potential Well Field Spill

The failure of a process pipeline within the well field could result in the discharge of pregnant or barren lixiviant to the surface. In order to minimize the amount of process fluid that is lost should a failure occur, high and low pressure alarms and shutoffs as well as flowmeters will be installed on pipelines between the well field and the central processing plant. Should a failure occur and the amount and/or concentration of the process fluid lost constitute an environmental concern, then the affected area would have the contaminated soil surveyed and removed for disposal. Pipeline failure is minimized by burying the pipeline two to five feet below ground surface and inspecting and testing the piping prior to burial. Pressure test results for the piping will be documented. Corrosion free high density polyethylene (HDPE) or similar piping will be used to further reduce the chance of pipeline failure.

Small leaks at pipe joints and fittings in the header houses or at wellheads may occur occasionally. These leaks may drip process solutions onto the underlying soil until they are identified and repaired. Powertech (USA) will implement a program of continuous well field monitoring by roving well field operators including periodic inspections of each well, in order to identify and remedy small leaks. Small leaks rarely result in contamination of the underlying soil. Following repair, Powertech (USA) will survey the affected soil for contamination, and, if contamination is detected, the soil will be appropriately removed.

5.7.15.5 Waste Management

5.7.15.5.1 Gaseous and Airborne Particulates

The main radioactive airborne effluent of concern at an ISL facility is radon-222 gas. Radon-222 is found in the pregnant lixiviant which is transported into the facility from the well field for uranium separation. Ion exchange (IX) units will be used to separate the uranium from the groundwater by passing the solution through IX units operated in a pressurized downflow mode. Small amounts of radon-222 may potentially be released during solution spills, filter changes, IX resin transfer, reverse osmosis (RO) system operation during groundwater restoration, and various maintenance activities. These potential minimal radon gas releases generally occur on an infrequent basis. An exhaust system installed to ventilate radon-222 gas to the atmosphere from the CPP will reduce employee exposure. The air in the CPP and other facilities will be sampled for radon daughters to assure that radon and radon daughters are maintained at concentration levels as low as reasonably achievable (ALARA).

5.7.15.5.2 Liquid Waste

Sources of liquid waste are collected as a result of in situ leach production. The following sections represent potential liquid waste sources at the project.

5.7.15.5.3 Liquid Waste

Sources of liquid waste are collected as a result of in situ leach production. The following sections represent potential liquid waste sources at the project.

5.7.15.5.3.1 Liquid Process Waste

The primary source of liquid waste is the operation of the ion exchange process which generates production bleed. This bleed will be treated with ion exchange to remove uranium, arsenic and vanadium, with ferric hydroxide coagulants to remove arsenic if necessary and finally with barium chloride to remove radium before being either injected in a deep disposal well or used to irrigate alfalfa within the PAA using center-pivot sprinklers. Other sources of liquid waste from the central plant include plant wash down water and the waste streams from the elution and precipitation circuits; however, these liquid waste streams make up a much smaller portion of the total liquid waste stream at the project facility.

5.7.15.5.3.2 Water Collected from Well Field Releases

Injection lixiviant or leach fluids recovered from areas where a liquid release has occurred from a pipeline or well will be placed into the wastewater system for treatment and disposal.

5.7.15.5.3.3 Disturbed Area Runoff

Runoff from disturbed areas will be prevented from entering local waterways. The permitting process through DENR and Powertech (USA)'s Storm Water Management Plan (SWMP) provides confidence that potential environmental impacts will be limited. Facility drainage will be designed to contain disturbed area runoff. The design of the project facilities, combined with engineering and procedural controls contained in a Best Management Practices (BMP) Plan, will ensure that the disturbed area runoff is not a potential source of pollution.

5.7.15.5.3.4 Liquid Waste Disposal

5.7.15.5.3.4.1 Deep Well Disposal

The use of deep well injection alone or in combination with land application is being considered by Powertech (USA) to dispose of liquid waste. Exhibit 1.1-2 provides the facilities map depicting the deep well disposal option. The permitting of the wells will meet the criteria and standards promulgated by the Environmental Protection Agency under the regulatory provisions of 40 CFR Part 146, Underground Injection Control Program.

The physical and chemical properties of the wastes will be similar to the estimated quality of wastes provided in Table 5.7-13 for land application. The process waters for deep well injection will meet the regulatory provisions in 10 CFR 20.2002 and be within the dose limits in 10 CFR 20.1301.

5.7.15.5.3.4.2 Land Application

In the land application option of wastewater disposal, bleed water from the process circuit will be extracted and treated using ion-exchange columns to remove uranium and other metals. This water will be discharged to lined settling ponds, where radium will be precipitated with barium sulfate. Water from these ponds will then be pumped to center pivot sprinklers and used to irrigate alfalfa during the growing season (May 11 to September 24). Water from the ponds will be sampled before it is pumped to the sprinklers to ensure that it meets the applicable discharge standards for all constituents (Exhibit 1.1-1).

The design of the land application system was developed based on modeling using the SPAW model, which is described in detail in the Dewey-Burdock Pond Design Report located in Appendix 4.3-A.

The following Table 5.7-13 provides the estimated water quality to be applied to crops at both the Dewey and Burdock land application sites. It is anticipated that trace metal concentrations will be at or below EPA Primary Drinking Water Standards. In addition, the effluent concentration limits for the release of radionuclides to the environment as contained in 10 CFR Part 20, Appendix B will be met.

5.7.15.5.3.4.3 SPAW Model Description

The SPAW (Soil-Plant-Atmosphere-Water) Model was developed by the U.S. Department of Agriculture (Saxton and Willey, 2006) to simulate the daily hydrologic water budgets of agricultural landscapes by two connected routines, one for farm fields and one for impoundments such as irrigation ponds. The field hydrology simulation is represented by: 1) daily climatic descriptions of precipitation, temperature, and evaporation; 2) a soil profile of interacting layers each with unique water holding characteristics; and 3) annual crop growth with management options for rotations, irrigation, and fertilization. The model output for the field hydrology routine includes a daily vertical, one-dimensional water budget depth for all major hydrologic processes such as runoff, infiltration, evapotranspiration, soil water profiles, and percolation. Water volumes for each component of the water balance are estimated by multiplying the water budget depth times the associated field area.

Table 5.7-13 Estimated Land Application Water Quality

Analyte	Units	Dewey Land Application Estimate	Burdock Land Application Estimate
pH	s.u.	6.5-7.5	6.5-7.5
Eh	mV	350	350
cond.	mS/cm	3	4
Major Ions			
Bicarbonate	mg/L	<50	<50
Calcium	mg/L	270	330
Carbonate	mg/L	<1	<1
Chloride	mg/L	300-1300	300-1300
Sodium	mg/L	270	190
Sulfate	mg/L	1000	1800
Solids	mg/L	4000-5000	4000-5000
Minor Ions			
Arsenic	mg/L	0.01	0.01
Barium	mg/L	0.42	0.42
Cadmium	mg/L	0.34	0.34
Chromium	mg/L	0.38	0.38
Copper	mg/L	0.28	0.28
Iron	mg/L	1.1	0.2
Lead-210	mg/L	<10	<10
Magnesium	mg/L	120	220
Molybdenum	mg/L	<0.1	<0.1
Nickel	mg/L	340.34	340.34
Potassium	mg/L	20	10
Radium-226	pCi/L	<60	<60
Selenium	mg/L	<0.2	<0.2
Thorium 230	pCi/L	<100	<100
U-Nat	pCi/L	<300	<300
Uranium	mg/L	<0.2	<0.2
Vanadium	mg/L	<10	<10
Sodium Absorption Ratio		4.9	2.8
Cations	meq/L	36	43
Anions	meq/L	30	47
Zinc	mg/L	-	-
A/C balance	%	8	-4
TDS Calc.	mg/L	2043	2908

Notes:

1) Estimates of land application water quality were based on the results of laboratory scale leach tests conducted on ore samples from the Dewey (Fall River) and Burdock (Lakota) sites, as well as from historical end-of-mining water quality data from other ISL sites in Wyoming and Nebraska, with adjustments as necessary to account for planned post-mining water treatments.

2) For the anion computation, a chloride concentration of 300 mg/L was used.

3) For the calculated TDS computation, a chloride concentration of 800 mg/L was used.

Pond hydrology simulations provide water budgets by multiple input and depletion processes for impoundments whose water source is runoff from agricultural fields and/or water produced by wells or other sources. Model outputs for the pond hydrology routine include daily values of depth, volume, precipitation, evaporation, and change in storage for the period of simulation. The version of the SPAW model used was Version 6.02.75. The model has been extensively tested by the developers using research data and real-world applications.

5.7.15.5.3.4.4 Domestic Liquid Waste

Domestic liquid wastes from the restrooms and lunchrooms will be disposed of in an approved septic system that meets the requirements of the DENR. These systems are commonly used throughout the United States and the effect of the system on the environment is known to be minimal.

5.7.15.6 Solid Waste

5.7.15.6.1 Radioactive Solid Wastes

Solid radioactive waste generated at the site is expected to include impounded 11e.(2) byproduct material extracted directly from the ISL process (reverse osmosis units, spent resins, etc) as well as material contaminated with radionuclide byproducts (miscellaneous pipe, pumps, fittings and similar items contaminated with low levels of radioactive "scale" and precipitates). The radiological contaminant will be primarily residual natural uranium and radium 226 (NMA 2007, Brown 2007, 2008). As radium will follow the process calcium chemistry, process pH and related chemical parameters will play a role in determining where and how much residual byproduct material becomes deposited in process components. Mobilization of other radionuclides, in situ (Th 230, Pb 210), has been indicated to be minimal (Brown 1982).

5.7.15.6.2 Impounded Byproduct Material

Small volumes of solid radioactive wastes are typically generated at ISL facilities and need to be temporarily impounded at designated on-site locations pending further evaluation and/or shipment offsite. Temporary impoundment on-site typically involves designated ponds and/or tankage. Alternatively, the material may be drummed as produced.

These wastes result primarily from spent resins and process sludges, including pond sludges, reject streams/brine from reverse osmosis (RO) units, solid slurry precipitates from brine concentrators, spent sand and/or Cuno filters, filter back flush from similar process stream "polishing" activities and potentially small amounts of contaminated soil from leaks and/or spills, as well as contaminated equipment and supplies, such as personal protective equipment.

Byproduct material requiring offsite disposal in accordance with NRC requirements and/or license conditions will be transported off site to an NRC or Agreement State licensed 11e.(2) disposal facility. Powertech (USA) estimates that the proposed project will produce approximately 100 yd^3 of 11e.(2) byproduct material per year. These materials will be stored on-site, properly labeled and posted inside the restricted area until such time that a full shipment can be transferred to a licensed 11e.(2) waste disposal facility in accordance with the requirements of the NRC. Powertech (USA) will have a contract with an approved disposal facility for disposal of 11e.(2) material in place prior to beginning licensed production operations.

5.7.15.6.3 Contaminated Materials

This category of solid radioactive waste includes process and other ancillary equipment and materials that have become contaminated with low levels of byproduct materials as a result of use and/or contact with process streams. Equipment and materials generated by this proposed project that may become contaminated with byproduct materials include items such as rags, trash, worn or replaced parts from equipment, piping, fittings, pumps, filters, and protective clothing. In some cases, reusable items with economic value may be decontaminated prior to release from the restricted area. If decontamination of equipment is deemed desirable and practical, this will be performed using strict decontamination and according to radiation release criteria. Decontaminated materials must have activity levels lower than those specified in Table 2 of NRC Regulatory Guide 8.30 (NRC, 2002).

5.7.15.6.4 Hazardous Waste

The potential exists for any industrial facility to generate hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). On the basis of the processes and materials to be used on the project, it is likely that this project will be classified as a Conditionally Exempt Small Quantity Generator (CESQG), defined as a generator that generates less than 100 kilograms (kg) of hazardous waste in a calendar month and that complies with all applicable hazardous waste program requirements. Powertech (USA) expects that only used waste oil and universal hazardous wastes such as cleaning solvents and spent batteries will be generated at the project.

5.7.16 Potential Cumulative Impacts of Proposed Action

5.7.16.1 Potential Cumulative Impacts of Other Uranium Development Projects

The National Environmental Policy Act (NEPA) defines cumulative effects as "...impacts [that] can result from individually minor but collectively significant actions taking place over a period of time." The PAA is within the Nebraska – South Dakota – Wyoming Uranium Milling Region, which has a history of conventional uranium surface mining. According to the NUREG-1910, there were no identified coal mines within this uranium milling region that might affect the cumulative impacts of the project or other uranium developments.

Within the Edgemont Uranium District, uranium was first discovered in 1951 and subsequently mined for a number of years using conventional surface mining methods. There are no Source Material Licenses for ISL uranium projects within fifty miles of the PAA. The nearest operational ISL facility is the Crow Butte ISL facility, SUA-1534, in Darrow County, near Crawford, Nebraska (U.S. NRC, 2008). Considering the distance between the existing projects and the proposed project and the almost half acentury since the previous uranium development in the area, cumulative environmental impacts are considered to be small to negligible.

Powertech (USA) Inc. is currently investigating several prospective uranium ISL projects along with other companies within the Nebraska – South Dakota – Wyoming Uranium Milling Region. These projects are in various stages of development. At the time of this application Powertech (USA) is not aware of other licensing or permitting applications within the study area.

5.8 Mitigation Measures

Mitigation measures are those actions that can be taken to reduce potential adverse impacts and that will be incorporated into the Proposed Action and alternatives (40 CFR §§ Parts 1502.14(f) and 1508.20). The mitigation measures discussed in this Section are tangible and specific and cover the range of potential impacts of the Proposed Action. All relevant, reasonable mitigation measures that, to the extent practicable, can improve the Proposed Action are identified, even if they are outside NRC's jurisdiction. The anticipated effectiveness of the proposed mitigation measures in reducing potential adverse impacts, the technical feasibility, and the costs versus benefits of any recommended mitigation measures are discussed.

The following subsections provide greater detail on proposed mitigation measures that could be used to reduce potential adverse impacts presented in Section 4.0, including the following potential impacts of the Proposed Action: land use, transportation, geologic and soil, surface water, groundwater (hydrology), ecology, air quality, noise, historic and cultural resources, visual/scenic resources, socioeconomic resources, environmental justice, radioactive and non-radioactive risk and waste management.

As a general proposition and as will be shown below, active mitigation measures for ISL operations originate from two sources: (1) the nature of the ISL process and (2) NRC/Agreement State license conditions, which essentially are a series of protective or "mitigation" measures. Taken together, these measures will result in the licensed PAA exhibiting minimal, if any, evidence that site land and water (both surface and underground) resources will be impacted by licensed ISL operations.

5.8.1 Proposed Mitigation Measures for Potential Land Use Impacts from the Proposed Action

5.8.1.1 Surface Disturbance During Construction and Operation

As previously stated, the average estimated land disturbed per year for the life of the operation is a maximum of 108 acres. The following proposed procedures will be used to minimize the impacts of surface disturbance during construction and operation as previously discussed:

- Disturbance will be limited to only what is necessary for operations.
- Development of Quality Assurance Quality Control (QA/QC) plan to monitor the effectiveness of mitigation methods.
- Restrict normal vehicular traffic to designated roads and keep required traffic in other areas of the wellfield to a minimum.
- Use Class V deep disposal wells for disposal of liquid wastes to mitigate potential land use impacts.
- Conduct site ISL reclamation in interim steps to minimize potential land use environmental impacts. As noted above, sequential wellfield development results in minimizing land area impacted at any one time.
- Stockpile topsoil from the well sites, evaporation ponds, and facilities. Shape, seed the piles with a cover crop or mulch the stockpiles to control erosion.
- Evaporation or water treatment ponds, if used, will be reclaimed and re-vegetated and the land returned to its previous uses, or as otherwise agreed with the regulatory body and landowners.
- After groundwater restoration is completed, properly decommission each wellfield and remove or decontaminate in place all wellfield lines and pipelines. Upon decommissioning, all wells will be sealed and capped. As areas are restored, they will be backfilled, contoured, and smoothed to blend with the natural terrain in accordance with the surface reclamation plan.
- All process facilities will be decontaminated and removed unless they are to be used for other future activities; the Permit Area will regain its pre-operational features.

Upon completion of final site D&D, including surface reclamation, landowners will be contacted and given the option to retain the roads for their private use or have the roads reclaimed by Powertech (USA). If the roads are deemed beneficial to others (i.e., hunters, ranchers and residents) and the landowner agrees, the roads will not be reclaimed. Only roads related to the Proposed Action will be reclaimed.

5.8.2 Proposed Mitigation Measures for Potential Transportation Impacts from the Proposed Action

5.8.2.1 Mitigation of Access Road Construction Risk

The primary potential impacts associated with access road construction are relatively minor and consist mainly of air quality impacts from equipment exhaust and dust. The following proposed procedures will be used to minimize the impacts from transportation discussed in Section 5.7.3:

- Maintain access roads to minimize or eliminate truck accidents.
- Implement control of fugitive dust using water application and speed limits.
- Reduce maximum fugitive dust by coordinating construction and transportation activities.
- Maintain vehicles to meet applicable EPA emission standards.

5.8.2.1.1 Mitigation of Potential Impacts from Material Shipments of Supplies Sent and Received via the Process Facilities

The following proposed procedures will be used to minimize the impacts of the shipment activities discussed in Section 5.7.3.3:

- Compliance with all applicable NRC and DOT packaging and transport requirements.
- Use of SOPs for transportation and emergency response.
- Use dedicated tanker trucks for transporting loaded or barren/eluted (stripped) resins to and/or from CPP or SF facilities.
- Proper training will be required for relevant transport contractor personnel on how to respond to a transportation accident based on the specific material(s) shipped. Written procedures (SOPs) will accompany all drivers to ensure proper response to accidents and spill containment.
- Prior to each shipment of loaded or barren/eluted (stripped) resin or yellowcake the exterior and cab of the shipping truck will be surveyed for radiological contamination.
- Emergency response kits will be supplied to both the receiving and shipping facilities.
- Each resin or yellowcake transport vehicle will carry an emergency spill kit to help contain any spilled material.
- Shipping records (bill of landing) will be maintained to identify and quantity of material shipped.
- Both the transport vehicle and shipping facilities will be equipped with communication devices to enable direct communication with relevant Powertech (USA) personnel.
- For radiological accidents, notification will be provided to NRC in compliance with the requirements of 10 CFR €€ 20.2202 & 20.2203.
- Communication with local and State authorities on transportation and emergency response procedures.

When IX resins are fully loaded at the Dewey SF, such resins will be pumped (transferred) into dedicated tanker trucks and will be transported to the Burdock CPP where it will be pumped (transferred) into the CPP elution circuit. Trained Powertech (USA) personnel will comply with all Powertech (USA) SOPs for such activities to minimize potential impacts.

After proper cooling, yellowcake will be loaded into gasketed and sealed 55-gallon (208-L) steel drums at the Burdock CPP and will be transported to a conversion facility for further refining and conversion. A properly licensed and certified transportation contractor will transport resin and/or yellowcake from the PAA to a conversion facility in a manner consistent with all applicable NRC and DOT regulations and requirements.

In addition, all shipments of process chemicals, fuel and non-AEA radioactive materials will comply with applicable DOT hazardous materials shipping regulations and NRC requirements to further mitigate the potential impacts of a transportation accident.

5.8.3 Proposed Mitigation Measures for Geologic and Soil Impacts from the Proposed Action

Potential impacts to soils during all phases of the Proposed Action include soil compaction, loss of productivity, loss of soil, increased salinity, and soil contamination.

As noted in Section 5.7 of this ER, ISL production has not in the past and is not in the future expected to contribute to any potential, significant geological impacts. The following proposed measures will be used to minimize the potential impacts to soil resources discussed in Section 5.7.4.8:

- Salvage and stockpile soil from disturbed areas.
- Reestablish temporary or permanent native vegetation as soon as possible after disturbance utilizing the latest technologies in reseeding and sprigging, such as hydroseeding.
- Decrease runoff from disturbed areas by using structures to temporarily divert and/or dissipate surface runoff from undisturbed areas.
- Retain sediment within the disturbed areas by using silt fencing, retention ponds, and hay bales.
- Fill pipeline and cable trenches with appropriate material and re-grade surface soon after completion.
- Drainage design will minimize potential for erosion by creating slopes less than 4 to 1 and/or provide rip-rap or other soil stabilization controls.
- Construct roads using techniques that will minimize erosion, such as surfacing with a gravel road base, constructing stream crossings at right angles with adequate embankment protection and culvert installation.
- Use a spill prevention and cleanup plan to minimize soil contamination from vehicle accidents and/or wellfield spills or leaks. Collect and monitor soils and sediments for potential contamination including areas used for land application of treated wastewater, transport routes for yellowcake and ion exchange resins, and well field areas where spills or leaks are possible.

5.8.4 Proposed Mitigation Measures for Surface Water Impacts from the Proposed Action

Potential surface water impacts due to storm events during all phases of the Proposed Action include increased sedimentation and changes in water quality. The following procedures will be used to minimize the impacts to surface waters as discussed in Section 5.7.5.1:

- Minimize disturbance of surface areas and vegetation which, in turn, will minimize erosion and run-off rates.
- Minimize physical changes to drainage channels unless changes are made to upgrade drainage.
- Use erosion and run-off control features such as proper placement of pipe, grading to direct run-off away from water bodies, and use of riprap (broken rock and/or concrete) at these intersections to make bridges or culverts more effective, if necessary.
- Use sediment trapping devices such as hay or straw bales, fabric fences, and devices to control water flow and discharges to trap sediments moved by run-off.
- Train employees in the handling, storage, distribution, and use of hazardous materials.
- Maintain natural contours as much as possible, stabilizing slopes and avoiding unnecessary off-road travel with vehicles; maintaining natural contours as much as possible, stabilizing slopes and avoiding unnecessary off-road travel with vehicles.
- Provide rapid response cleanup and remediation capability, techniques, procedures, and training for potential spills.
- The land application of treated waste water will be applied in a manner consistent with local conditions to avoid excess irrigation run-off into surface water.
- Ponds will be designed with underdrains and leak detection systems to detect and mitigate any impact from a potential leak.
- Fueling operations and storage of hazardous materials and chemicals will be conducted in bermed/curbed areas and in a manner that minimizes potential impacts to surface water.
- Prepare and implement a Storm Water Pollution Prevention Plan that is consistent with state and federal standards for construction activities.

- Surface piping will avoid any identified 100-year or 500-year flood plain levels.
- Curbing relevant facilities and structures at CPP to minimize or eliminate escape of process fluids during spills.

Best management practices will be utilized in all phases of the Proposed Action.

5.8.5 Proposed Mitigation Measures for Potential Groundwater Impacts from the Proposed Action

Potential groundwater impacts during all phases of the Proposed Action include the following: groundwater consumption (Section 5.7.6), alteration of ore zone groundwater quality, potential groundwater quality impacts from accidents, potential groundwater impacts from land application , and potential aquifer restoration impacts will be used to minimize the impacts to groundwater as discussed in Section 5.7.5.4: The following is a list of potential mitigation measures for such potential impacts measures to mitigate impacts to groundwater.

- Minimize groundwater use during operations.
- Monitor well pressures to detect leaks.
- Install monitoring wells as an early warning system for potential lixiviant excursions or leaks from the relevant CPP or SF.
- Maintain pumping and injection rates (well field balance) to ensure radial hydraulic flow into and through the production zone.
- Monitor to detect and define unanticipated surface spills, releases, or similar events that may infiltrate into the groundwater system.
- Implement a spill prevention and cleanup plan to minimize impacts to groundwater, including rapid response cleanup and remediation capability, techniques, procedures, and training.
- Recycle groundwater collected for use in dust suppression and other activities.
- Monitor closest private domestic, livestock, and agricultural wells as appropriate during operations.
- Provide alternate sources of water to landowners in the event of significant drawdown impacts from the proposed action, to domestic wells adjacent to the PAA.
- Select restoration method to minimize water consumption during groundwater restoration.
- Monitor area downgradient from land application sites to determine potential vertical and lateral seepage.
- During restoration, monitor groundwater using standard industry practices to determine the progression and effectiveness of restoration.

5.8.6 Proposed Mitigation Measures for Potential Ecological Resources Impacts from the Proposed Action

Potential ecologic impacts during all phases of the Proposed Action ISL operations could include the following: impacts to vegetation (Section 5.7.8.1), such as alteration of vegetative density, reduction of wildlife habitat, reduction of livestock forage, and changes in visual aesthetics; impacts to wildlife and fisheries (Section 5.7.8.2), such as, loss of habitat, increased soil erosion and human contact; potential impacts to threatened and endangered, or candidate species and species tracked by SDNHP (Section 5.7.8.3), such as, increased human presence and disturbances, and lost of habitat: The following is a list of proposed mitigation measures for such potential impacts:

- Fencing designed to permit big game passage to the extent practicable.

- Use existing roads when possible, and limit construction of new primary and secondary roads to provide for to access to more than one drill site, if possible.
- Enforced speed limits to minimize collisions with wildlife, especially during the breeding season.
- Adherence to timing and spatial restrictions within specified distances of active raptor nests during the breeding season as determined by appropriate regulatory agencies, (February 1 – July 31).
- If direct impacts to raptors or other migratory bird species of concern occur a Monitoring and Mitigation Plan for those species will be prepared and approved by the USFWS, including one or more of the following provisions:
  - Relocation of active and inactive raptor nests that could be impacted by construction or operation activities in accordance with the approved raptor monitoring and mitigation plan
  - Creation of raptor nests and nesting habitat through enhancement efforts such as nest platforms to mitigate other nest sites impacted by ISL operations
  - Obtaining appropriate permits for all removal and mitigation activities
  - Establishing buffer zones protecting raptor nests where necessary and restricting ISL-related disturbances from encroaching within buffers around active raptor nests from egg-laying until fledging to prevent nest abandonment, or injury to eggs or young
  - Reestablishing the ground cover necessary to attract and sustain a suitable raptor prey base after drilling, construction, and future ISL operations and site D&D
  - Required use of raptor-safe construction for overhead power lines according to current guidelines and recommendations by the USFWS
- Restoration of pre-ISL native habitats for species that nest and forage in those vegetative communities.
- Restoration of diverse landforms, direct topsoil replacement, and the construction of brush piles, snags, and/or rock piles to enhance habitat for wildlife.
- Conduct weed control as needed to limit the spread of undesirable and invasive, non-native species on disturbed areas.

Adjusting the timing of various construction, operational, and D&D activities to avoid the breeding season can also be an effective way to minimize impacts related to such activities in the PAA. As a practical matter, worker crews conducting construction or D&D activities only work during daylight hours; so, potential impacts to year-round residents, particularly more nocturnal species such as bats, rodents, and others should not be increased significantly. Following completion of construction in a given area, access roads would be blocked with berms or fencing to prevent use by casual traffic. Site D&D, including surface reclamation will be completed in the same manner, with activities timed to minimize disturbance to nesting or migrating species. Relevant agency standards for reclamation will be followed and this phased, systematic approach will allow more mobile wildlife species to relocate into adjoining, undisturbed habitat and then return following completion of construction or D&D in a particular area. Thus, the sequential, phased nature of this approach will decrease potential direct and indirect impacts on all wildlife species and their habitat.

5.8.7 Proposed Mitigation Measures for Potential Air Quality Impacts from the Proposed Action

Potential impacts to air quality during all phases of the Proposed Action (Section 5.7.9) include the generation of non-radioactive particulate emissions and fugitive dust. Typical air quality protection measures that will be implemented at the project site may include the following:

- Reduce fugitive dust emissions via standard dust control measures (e.g., water application, speed limits).
- Reduce maximum fugitive dust by coordinating dust-producing activities during construction.

- Maintain vehicles to meet applicable EPA emission standards.
- Use of a Yellow Cake vauum dryer virtually eliminates to assure compliance with 40 CFR Part 190.

These proposed mitigation measures will reduce fugitive dust to levels equal to or less than current conditions and ensure that applicable emission standards will be met.

5.8.8 Proposed Mitigation Measures for Potential Noise Impacts from the Proposed Action

Potential noise impacts during all phases of the Proposed Action (Section 5.7.10) include the generation of noise resulting from operating heavy equipment and process machinery. Noise from process machinery will be contained within process structures and, as such, should have no discernible impacts on the public or the environment. With respect to potential noise impacts from heavy equipment, typical mitigation measures that will be implemented at the project to minimize noise impacts may include the following:

- Avoid construction activities during the night.
- Use sound abatement controls on operating equipment and facilities.
- Use personal hearing protection for workers in any high noise areas.

These proposed mitigation measures will ensure that noise levels will remain within relevant EPA guidelines for off-site receptors and OSHA standards for workers.

5.8.9 Proposed Mitigation Measures for Potential Historic and Cultural Resources Impacts

Potential impacts to historical and cultural resources could occur during construction and operations (Section 5.7.11 Mitigation measures that will be implemented at the project site to minimize impacts to historical and cultural resources may include the following:

- Consultation with appropriate SHPO and THPO.
- A Memorandum of Agreement (MOA) has been negotiated and executed with the State of South Dakota Archaeologist to ensure the preservation of any historical, cultural, and archaeological sites that may be present within the PAA. Additional MOA mitigation measures have been prepared to ensure that no significant historical, cultural, or archaeological resources will be damaged during all phases of the Proposed Action.
- Conduct pre-construction surveys to ensure that work will not affect important historical, cultural, and archaeological resources.
- NRC License Conditions mandating phased identification of previously unidentified historical, cultural or archaeological resources and immediate response procedures for protecting such resources during all phases of the Proposed Action.

5.8.10 Proposed Mitigation Measures for Potential Visual/Scenic Resources Impacts

Potential impacts to visual/scenic resources (Section 5.7.12) during all phases of the Proposed Action include the alteration of visual/scenic resources. Typical visual/scenic mitigation measures that could be implemented at the project site include the following:

- Use exterior lighting only where needed to accomplish facility tasks.
- Limit the height of exterior lighting units.
- Use shielded or directional lighting to limit lighting only to areas where it is needed.

- Construction and placement of structures taking into consideration the topography in order to conceal wellheads, plant facilities, and roads from public vantage points.
- Satisfy BLM guidelines by using building materials and paint that complement the natural environment.
- During construction of roads, consider the topography that a given road follows, as well as the potential area of disturbance.

5.8.11 Proposed Mitigation Measures for Potential Socioeconomic Impacts from the Proposed Action

As discussed in Section 5.7.13, the overall impacts of the proposed project indicate that the project will result in positive socioeconomic benefits to the local and regional economy, with the potential to create of hundreds of jobs and millions of dollars in tax revenue. The potential impacts of increased population associated with the project are expected to be dispersed, due to the remoteness of the PAA and the phased nature of construction, operation, and site D&D. The proposed mitigation measures to minimize adverse socioeconomic impacts include the following:

- Use local vendors, employees, and contractors to the extent possible.
- Develop and deliver educational presentations and tours to interested groups in nearby communities to maintain community awareness of the nature of the Proposed Action.

5.8.12 Proposed Mitigation Measures for Potential Environmental Justice Impacts from the Proposed Action

As discussed in Section 5.7.14, the Proposed Action will not have any significant adverse impacts and, therefore, will not have significant disproportionate impacts on minorities or low-income individuals as compared with the state-wide averages; therefore, no mitigation measures need to be identified.

5.8.13 Proposed Mitigation Measures for Potential Public and Occupational Health Impacts from the Proposed Action

Potential impacts to pubic and occupational health (Section 5.7.15) during all phases of the Proposed Action include potential exposure to hazardous chemicals and radiological emissions such as radon-222. The proposed mitigation measures for potential public and occupational health impacts from the PA include the following:

- Use downflow, pressurized IX columns, and ventilation during resin transfers to keep occupational exposure to radon levels in process facilities as low as is reasonable achievable (ALARA).
- Use vacuum dryers, bag filters, and vapor filtration to reduce particulate emissions during yellowcake drying.
- Use high-efficiency particulate air filters or similar controls for all particulates.
- Design SOPs to reduce potential accidents.
- Implement health and safety procedures and administrative controls to minimize workers risks during all phases of the PA.
- Develop and implement training programs for Powertech (USA) personnel to enable them to respond to all potential emergencies.
- Develop emergency management procedures/SOPs that are consistent with standard and best management practices to satisfy applicable non-radiological exposure limits and to implement risk control recommendations contained in NUREG/CR-6733 analyses.

- Installation of engineering and administrative controls consistent with standard and best management practices to prevent both surface and subsurface releases to the environment, and to mitigate the effects in the event of an accident.

5.8.14 Proposed Mitigation Measures for Potential Waste Management Impacts from the PA

Potential impacts from waste management activities (Section 5.7.15.5) during all phases of the PA include potential exposure to hazardous and radiological emissions from such wastes. The proposed mitigation measures for potential impacts associated with waste management activities from the Proposed Action include the following:

- Recycle wastewater to reduce the amount of water needed for facilities and the amount of wastewater that could require disposal
- Use decontamination techniques that reduce waste generation
- Institute preventative maintenance and inventory management programs to minimize waste from breakdowns and overstocking
- Recycle non-radioactive materials where appropriate
- Encourage the reuse of materials and use of recycled materials
- Avoid using hazardous materials when possible
- Develop a spill prevention plan for petroleum products and other hazardous materials
- Ensure that equipment is available to respond to spills and identify the location of such equipment
- Inspect and replace worn or damaged components
- Salvage extra materials and use them for other construction activities or for regrading activities
- Install curbs or berms on all waste storage areas
- Install leak detection and warning systems in all liquid waste facilities

5.8.15 Proposed Mitigation Measures for Potential Impacts from Uncontaminated Solid Waste Management

The PA will generate non-radioactive (i.e., uncontaminated) solid wastes, which could include, but are not limited to: fluorescent tubes, and light ballasts, batteries not directly associated with uranium recovery, and waste paper, cardboard and other materials generally associated with office and equipment maintenance activities. These materials will be collected on a regular basis and disposed of in an appropriately permitted off-site disposal facility.

5.8.16 Proposed Mitigation Measures for Potential Impacts from 11e.(2) Byproduct Material Management

Byproduct material requiring offsite disposal in accordance with NRC requirements and/or license conditions will be transported off-site to an NRC-approved disposal facility. Powertech (USA) estimates that the PA will produce approximately 100-yd^3 of 11e.(2) byproduct material per year. These materials will be stored on-site to prevent any potential release, will be properly labeled, and will be isolated inside the restricted area until such time as a full shipment can be transferred to an NRC-approved disposal site.

5.8.17 Proposed Mitigation Measures for Potential Impacts from Hazardous Waste Management

The potential exists for any industrial facility to generate hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). On the basis of the processes and materials proposed to be used for the PA, it is likely that this project will be classified as a CESQG (a generator that generates less than 100 kg of hazardous waste in a calendar month) and will comply with all applicable hazardous waste program requirements. Powertech (USA) expects that only used waste oil and universal hazardous wastes such as cleaning solvents and spent batteries will be generated at the project. Powertech will develop management programs to meet the regulatory requirements for a CESQG. However, in the event it is not classified as a CESQG, Powertech (USA) will dispose of such wastes in a manner consistent with applicable regulations and requirements.

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Section 6.0 - Interim Management Plan

6.1 Background

The Interim Management Plan was developed in compliance with Section 3809.401 of Title 43 CFR. The plan addresses management upon temporary closure and prevention of undue and/or unnecessary deterioration of facilities.

6.2 Reasons and Causes of Temporary Closure

Powertech's Dewey-Burdock Proposed Action has an expected mine life of 17 years based on the estimated time it would take to mine out and process the total inferred resources of 10.8 million lbs listed in the company's 43-101. As further exploration is performed, additional resources may be delineated for mining, thus extending the life of mining. Various reasons may exist for temporary closures throughout the life of the mine:

- Uneconomical mining environment i.e. uranium price drop and/or mining costs increase.
- Lack of adequate manpower to operate the mine safely and efficiently.
- Road closures due to weather or other causes.
- Inadequate ore reserves or grade resulting in additional exploration activities prior to advanced development.
- Loss of ore purchase agreement.

If for any reason a temporary closure results, the following will be implemented.

6.3 Measures to Stabilize Excavations and Workings

There are no underground workings associated with an ISL mine. The surface area will be maintained according to the project's Storm Water Management Plan (SWMP). Areas experiencing erosion and/or runoff will be monitored periodically in accordance with the approved SWMP and POO. All drainage features will be inspected periodically and cleaned and maintained as necessary. Reclamation will proceed as weather permits.

6.4 Measures to Isolate or Control Toxic or Deleterious Materials

Potentially toxic materials on site are limited to, fuel and oil, water treatment chemicals, and possibly a solvent cleaning station in one or two maintenance shops. Measures for isolating or controlling each of these materials during temporary closure are described below.

As discussed above, reclamation and restoration would continue during a short-term closure.

During short-term closure, fuel tanks, oils and other petroleum products will be secured in a locked area and solvents will be gathered and disposed of by a licensed vendor. Inspections will be performed for all secured areas and secondary containment features onsite. These areas will be maintained in such a manner so operations could resume at any time.

However, if a closure were to extend into a six month time frame, Powertech would evaluate other control methods, such as implementation of an alternative treatment system and/or adjusting surface reclamation efforts. Based on previous experience, there are several options available to operators with regard to conducting reclamation and restoration safely and efficiently in a manner that is protective of health and environment. All fuels and oils will be removed from the site upon a long-term closure.

Adequate pond and tank capacity will be maintained in order to treat and/or store water and manage the site in the case of precipitation that may contribute to runoff in a magnitude such as the 100 year, 24 hour storm event.

ISL operations do not create ore stockpiles, however if Powertech is in possession of an amount of loaded resin that meets the capacity of licensed conditions, Powertech will attempt to transport the resin for processing within six months of a temporary closure. If for some reason this cannot be accomplished within six months, Powertech will work with appropriate agencies to develop a long-term material storage plan. The plan may include utilizing a building on site as a secured storage area with appropriate safety controls, alarms and locks. Additional monitoring may be required.

6.5 Provisions for the Storage or Removal of Equipment, Supplies and Structures

Equipment and supplies will be maintained on site in secure areas during a short-term closure period. Vehicles associated with onsite work will be locked and parked within a secure gated area. Most supplies and equipment will remain stockpiled in the yard area or under lock and key in the maintenance shops, and the warehouse. A security guard will be present on site as needed to deter theft and vandalism.

If period of closure extends to six months, Powertech may gradually remove some or all equipment, supplies, and both mobile and modular structures from the site to minimize potential for vandalism and theft; this measure would also reduce the need for fulltime security personnel. The equipment and supplies would be moved to other property under Powertech's control.

6.6 Measures to Maintain the Project Area in a Safe and Clean Condition

The Safety and Environmental Review Panel (SERP) will conduct a review every quarter during a temporary closure to ensure safety and environmental procedures are conducted appropriately and demonstrate compliance with applicable license and permit requirements.

Good housekeeping standards and practices will be practiced in all areas of the site this requires areas to be kept clean and free of litter and debris. Trash, used tires, old equipment parts, empty barrels, and other miscellaneous materials will be removed from the site and either recycled or disposed of properly as general housekeeping and surface reclamation continue throughout the temporary closure. Site safety will be maintained by discouraging unauthorized access through the use of locked gates, fences, warning signs, and security personnel. All buildings and trailers will be kept locked when not in use. The gates to the main facilities area, CPP and SF areas, and will also be locked.

6.7 Plans for Monitoring Site Conditions During Periods of Non-Operation

During temporary closure, environmental monitoring will continue as required by the various licenses and permits. This will include monitoring of:

- Discharges of treated water
- Monitoring wells
- Personnel
- Storm water

All surface areas will be inspected at least weekly during a closure of six months or less. If the site remains relatively stable and the closure period extends beyond six months, the frequency of surface inspections may be reduced.

6.8 Closure Schedule and Reporting

No seasonal or maintenance shutdowns of the project are anticipated at this time. In the event that market conditions or other circumstances require a temporary shutdown of mine operations, Powertech will provide notice to the BLM within 30 days after such suspension in compliance with Part 3802.4-7 of Title 43 of the CFR. This notice will include:

- Verification of intent to maintain structures, equipment, and other facilities
- The expected reopening date
- Current mine contact information
- Any revisions to this Interim Management Plan

Section 7.0 - Geology and Hydrology

7.1 Regional Structure and Stratigraphy

The project is located in the Great Plains Physiographic province on the southwestern flank of the Black Hills uplift in southwestern South Dakota. To the west of the PAA is the Powder River Basin of Wyoming. The regional geologic map of this region is shown in Figure 7.1-1.

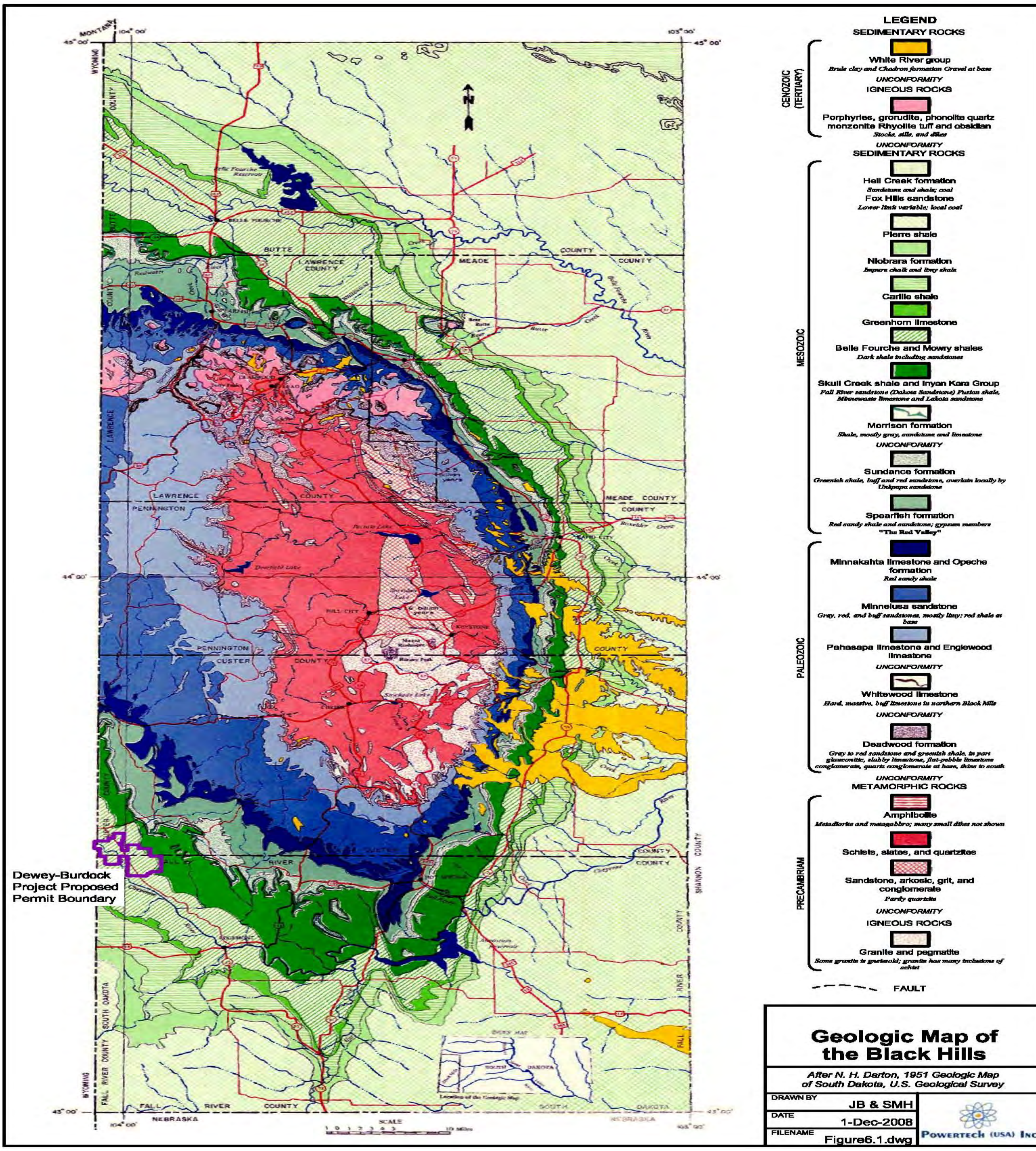

Figure 7.1-1 Geologic Map of the Black Hills

7.1.1 Regional Structure

The dominant structural feature in this region is the Black Hills Uplift. This uplift is of Laramide age (65 million years ago) and is an elongate northwest trending dome about 125 miles long and 60 miles wide. Igneous and metamorphic Precambrian-age rock are exposed in the core of the uplift and are surrounded by outward-dipping Paleozoic and Mesozoic rocks that form cuestas and hogbacks around the core of the uplift. Folds constitute the major structural features in the Black Hills. In early Cretaceous time minor deformation along concealed northeast trending structures of Precambrian age affected the courses of the northwest flowing streams and their tributaries, thereby influencing the location of the fluvial sandstone deposits of the Inyan Kara Group.

7.1.2 Regional Stratigraphy

The oldest rocks in the region are Precambrian metamorphic rocks and granites. These form the core of the Black Hills Uplift and are exposed at the surfaced of this structural feature. Overlying these crystalline rocks are 2000-3000 feet of Paleozoic sediments. This sedimentary sequence contains several regional aquifers, to include the Deadwood Formation of Cambrian age, the Mississippian Madison Limestone and the Pennsylvanian/Permian-age Minnelusa Formation.

Mesozoic sediments include the Triassic age Spearfish Formation and the Sundance, Unkpapa and Morrison Formations of Jurassic age. The Sundance Formation is a minor aquifer in the southern Black Hills region. A thick sequence of Cretaceous age sediments completes the Mesozoic section.

The Early Cretaceous sediments of the Inyan Kara Group consist of the Lakota Formation and the Fall River Formation and is a transitional unit, exhibiting a change from terrestrial to marine deposition. The basal Lakota Formation (Chilson Member) is a fluvial sequence, which grades upward into marginal marine sediments as the Cretaceous Seaway inundated a stable land surface. Basal units of the Lakota Formation scour into clays of the underlying Morrison Formation and display the depositional nature of a large braided stream system, crossing a broad, flat coastal plain and flowing toward the northwest. Younger fluvial sand units of the Lakota become progressively thinner and less continuous and are separated by thin deposits of overbank and flood plain silts and clays. At the top of the Lakota is the Fuson Member. The Fuson consists of shale with minor beds of fine grained sandstone and siltstone. The Fuson separates the underlying Lakota Formation from the overlying Fall River Formation. The Fall River consists of thick, widespread fluvial sands in the lower portion, grading to thinner, less continuous, marginal sands in the upper part. The Cretaceous Lakota and Fall River Formations are the hosts of the roll front uranium mineralization in the Black Hills region.

Following deposition of the Fall River, this region was covered by the North American Cretaceous Seaway, which resulted in the accumulation of vast thicknesses of marine sediments. From 3000-5000 feet of these marine sediments are represented by the Skull Creek Shale, Newcastle Sandstone, Mowry Shale, Belle Fourche Shale, Greenhorn Formation, Carlisle Shale, Niobrara Formation and Pierre Shale. In Late Cretaceous time, the modern Rocky Mountain Uplift began, forcing the retreat of the Cretaceous seaway.

Unconformably overlying the Cretaceous sediments in the Black Hills region is the Tertiary-age (Oligocene) tuffaceous White River Formation. This thick, tuffaceous sequence was the result of volcanic eruptions to the west and was rich in volcanic fragments. The White River sediments have primarily been removed by erosion and can be found only as erosional remnants. This unit is thought to be the source of the uranium deposits found in the Black Hills region and the Powder River Basin of Wyoming.

The most recent sediments in the region are Quaternary-age deposits consisting of local material derived as a result of post-Laramide-uplift erosion. Recent deposits include alluvium and floodplain terrace deposits. Refer to Figure 7.1-2 for a stratigraphic column of the Black Hills.

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ERATHEM	SYSTEM	ABBREVIATION FOR STRATIGRAPHIC INTERVAL	STRATIGRAPHIC UNIT	THICKNESS IN FEET	DESCRIPTION
CENOZOIC	QUATERNARY & TERTIARY (?)	QTac	UNDIFFERENTIATED ALLUVIUM AND COLLUVIUM	0-50	Sand, gravel, boulder, and clay
		Tw	WHITE RIVER GROUP	0-300	Light colored clays with sandstone channel fillings and local limestone lenses.
	TERTIARY	Tui	INTRUSIVE IGNEOUS ROCKS	—	Includes rhyolite, latite, trachyte, and phonolite
MESOZOIC	CRETACEOUS	Kus	PIERRE SHALE	1,200-2,700	Principal horizon of limestone lenses giving teepee buttes. Dark-gray shale containing scattered concretions. Widely scattered limestone masses, giving small teepee buttes. Black fissile shale with concretions.
			NIOBRARA FORMATION	[1]80-300	Impure chalk and calcareous shale
			CARLILE SHALE — Turner Sandy Member, Wall Creek Member	[1]350-750	Light-gray shale with numerous large concretions and sandy layers. Dark-gray shale
			GREENHORN FORMATION	225-380	Impure slabby limestone. Weathers buff. Dark-gray calcareous shale, with thin Orman Lake limestone at base
			GRANEROS GROUP — BELLE FOURCHE SHALE	150-850	Gray shale with scattered limestone concretions. Clay spur bentonite at base.
			GRANEROS GROUP — MOWRY SHALE	125-230	Light-gray siliceous shale. Fish scales and thin layers of bentonite.
			GRANEROS GROUP — MUDDY SANDSTONE / NEWCASTLE SANDSTONE	0-150	Brown to light-yellow and white sandstone
			GRANEROS GROUP — SKULL CREEK SHALE	150-270	Dark-gray to black siliceous shale.
		Kil	INYAN KARA GROUP — FALL RIVER FORMATION	10-200	Massive to thin-bedded, brown to reddish-brown sandstone.
			INYAN KARA GROUP — LAKOTA FM — Fuson Shale / Minnewaste Limestone / Chilson Member	10-190 / 0-25 / 25-485	Yellow, brown, and reddish brown massive to thinly bedded sandstone, pebble conglomerate, siltstone, and claystone. Local fine grained limestone and coal.
	JURASSIC	Ju	MORRISON FORMATION	0-220	Green to maroon shale. Thin sandstone.
			UNKPAPA SS	0-225	Massive fine-grained sandstone.
			SUNDANCE FORMATION — Redwater Member, Lak Member, Hulett Member, Stockade Beaver Mem, Canyon Spr Member	250-450	Greenish-gray shale, thin limestone lenses. Glauconitic sandstone, red sandstone near middle
			GYPSUM SPRING FORMATION	0-45	Red siltstone, gypsum, and limestone.
	TRIASSIC	TRPs	SPEARFISH FORMATION — Goose Egg Equivalent	375-800	Red silty shale, soft red sandstone and siltstone with gypsum and thin limestone layers. Gypsum locally near the base.
PALEOZOIC	PERMIAN	Pmk	MINNEKAHTA LIMESTONE	[1]25-65	Thin to medium-bedded, fine-grained, purplish-gray laminated limestone.
		Po	OPECHE SHALE	[1]25-150	Red shale and sandstone.
	PERMIAN / PENNSYLVANIAN	PPm	MINNELUSA FORMATION	[1]375-1,175	Yellow to red cross-bedded sandstone, limestone, and anhydrite locally at top. Interbedded sandstone, limestone, dolomite, shale, and anhydrite. Red shale with interbedded limestone and sandstone at base.
	MISSISSIPPIAN	MDme	MADISON (PAHASAPA) LIMESTONE	[1]≈200-1,000	Massive light-colored limestone. Dolomite in part. Cavernous in upper part.
	DEVONIAN		ENGLEWOOD FORMATION	30-60	Pink to buff limestone. Shale locally at base.
	ORDOVICIAN	Ou	WHITEWOOD (RED RIVER) FORMATION	[1]0-235	Buff dolomite and limestone.
			WINNIPEG FORMATION	[1]0-150	Green shale with siltstone.
	CAMBRIAN	Ꞓd	DEADWOOD FORMATION	[1]0-500	Massive to thin-bedded buff to purple sandstone. Greenish glauconitic shale flaggy dolomite and flat-pebble limestone conglomerate. Sandstone, with conglomerate locally at the base.
PRECAMBRIAN		pꞒu	UNDIFFERENTIATED IGNEOUS AND METAMORPHIC ROCKS		Schist, slate, quartzite, and arkosic grit. Intruded by diorite, metamorphosed to amphibolite, and by granite and pegmatite.

[1]Modified based on drill-hole data

STRATIGRAPHIC COLUMN OF THE BLACK HILLS AREA (from Driscoll et al.)

DEWEY-BURDOCK PROJECT

DRAWN	L. Tafoya
DATE	12-Nov-2008
SCALE	NONE
FILENAME	Figure 6.2.dwg

Powertech (USA) Inc.

Figure 7.1-2 Stratigraphic Column of the Black Hills Area

7.2 Site Structure and Stratigraphy

The site geology is shown in Figure 7.2-1. The Fall River Formation outcrops across the eastern part of the project and the Skull Creek Shale and Mowry Shale outcrops across the western part of the project. The formations dip west and southwest at 2 to 6 degrees.

The geology of the project was developed through the interpretation of data gathered from thousands of exploration drill holes. For each drill hole there was a suite of down-hole electric logs run to characterize natural radioactivity and the lithology (rock type) of the sediments in the subsurface. Resistivity and Self Potential provide the rock types encountered in the subsurface (sandstone, siltstone, shale, etc.). This is further enhanced by a geologist's description of the drill cuttings. Exhibit 7.2-1 is an example of a "type log" from the project.

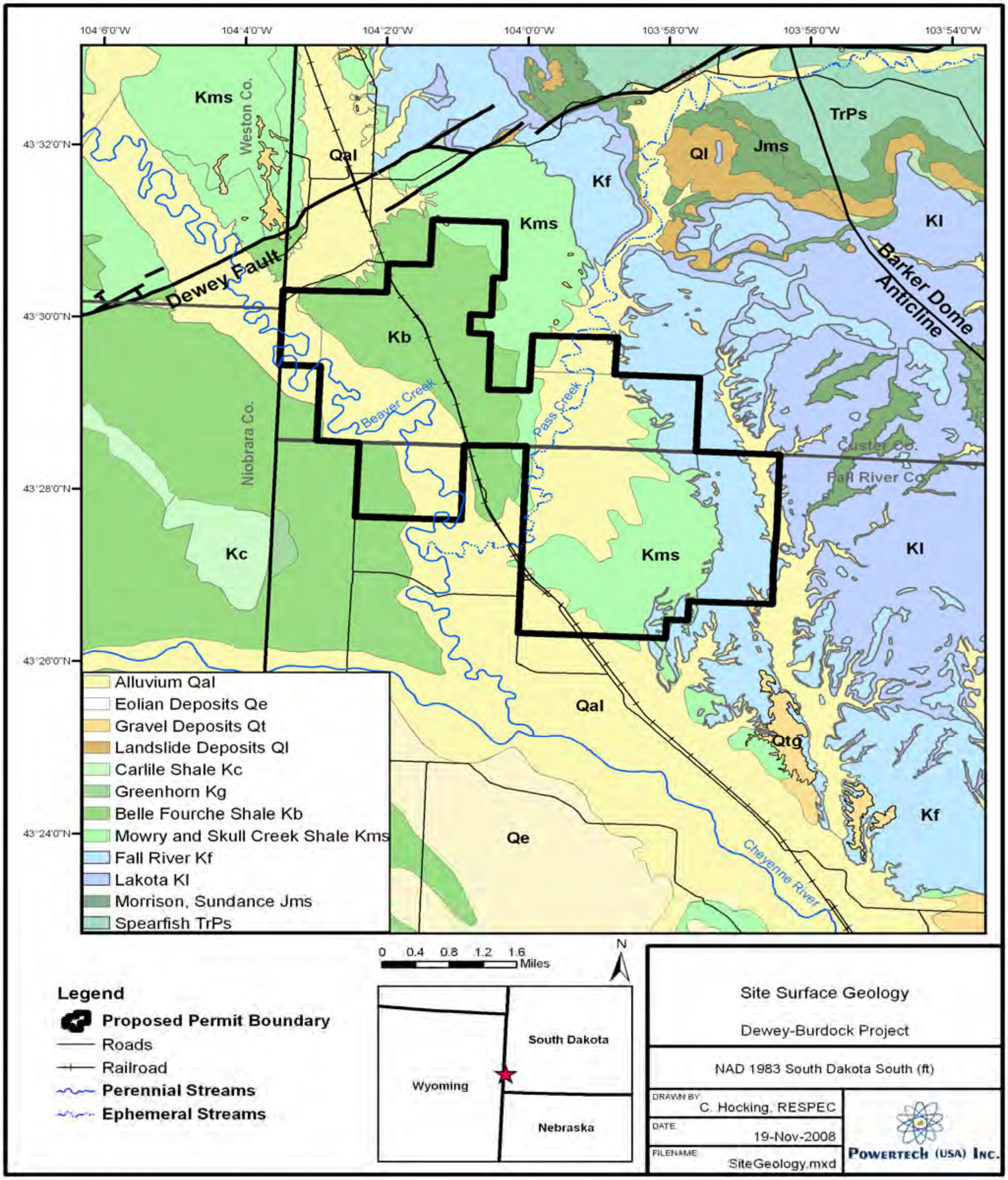


Figure 7.2-1 Site Surface Geology

7.2.1 Site Structure

The structure across the project is simple and shows sediments dipping gently 2 to 6 degrees to the southwest. This is illustrated by a structure contour map on the tops of the Fall River Formation (Exhibit 7.2-2) the Chilson Member of the Lakota Formation (Exhibit 7.2-3) and the Unkpapa Formation (Exhibit 7.2-4).

The Dewey Fault, a northeast to southwest trending fault zone, is present approximately one mile north of the north and northwest parts of the PAA. The Dewey Fault is a steeply dipping to vertical normal fault with the north side uplifted approximately 500 feet by a combination of displacement and drag. The USGS considers an area 7 miles southeast of the project as the Long Mountain Structural Zone. This northeast – southwest trend contains several small shallow surface faults in the Inyan Kara. No faults show up along this trend on subsurface structure maps of the underlying Madison Formation, Minnelusa Formation or the Deadwood Formation. Despite the presence of faulting north and south of the site, there are no identified faults within the Dewy-Burdock PAA.

There is some folding in the areas surrounding the project. East of the project is a northwest – southeast trending anticline that ends in a closed structure called the Barker Dome. To the west is the Fanny Peak Monocline. This monocline is the structural boundary between the Black Hills and the Powder River Basin.

7.2.2 Site Stratigraphy

The sedimentary rocks of primary interest that underlie the project range in age from Upper Jurassic to Early Cretaceous. The Upper Jurassic Morrison Formation is considered to be the Lower Confining Unit for the project. The uranium mineralization is contained within the Inyan Kara Group (Lakota and Fall River Formations). The Skull Creek Shale is the Upper Confining Unit. Exhibit 7.2-5 is a generalized cross section of the PAA, illustrating the relationship between these sedimentary units, as well as their position to underlying rocks, ranging in age from Jurassic to Precambrian.

The following is a brief description of the formations of interest at the project site:

Morrison Formation - The Upper Jurassic Morrison Formation was deposited as flood plain deposits. It is composed of waxy, unctuous, calcareous, noncarbonaceous massive shale with numerous limestone lenses and a few thin fine grained sandstones. Below the site, this formation has an average thickness of approximately 100 feet and is the Lower Confining Unit for the project. Analyses of core samples demonstrate that the Morrison clays have extremely low vertical permeabilities, ranging from 3.9×10^{-9} cm/sec to 4.2×10^{-8} cm/sec (0.004 millidarcies to 0.043 millidarcies).

Inyan Kara Group – This Group consists of the Lakota Formation and the Fall River Formation. Sandstones within these two formations are hosts to all the uranium mineralization for the project.

Lakota Formation - The Lakota Formation consists of three members; from lower to upper are the Chilson Member, the Minnewasta Limestone Member and the Fuson Member.

The Minnewasta Limestone Member is not present in the PAA.

The Chilson Member (commonly referred to as the Lakota Sandstone) is composed largely of fluvial deposits. These deposits consist of sandstone, shale, siltstone, and shale. The member consists of a complex of channel sandstone deposits and their laterally fine-grained equivalents. The Chilson Member consists of two units; a basal carbonaceous black mudstone and an overlying unit of channel sandstones with laterally fine-grained equivalents and interbedded shales. The sandstones are very fine to medium-grained and well sorted and were deposited by a northwest flowing river system. Analyses of core samples of these sandstones indicate these units exhibit high horizontal permeabilities, ranging from

2.6×10^{-3} cm/sec to 4.1×10^{-3} cm/sec (2697 millidarcies to 4161 millidarcies). The massive sandstone is made up of numerous individual sand filled channels, which contain the uranium deposits.

The isopach map of the Chilson Member of the Lakota Formation shows the thickness of the channel sandstones and interbedded shales within the Chilson Member. Thicknesses vary from 100 to 240 feet. This isopach map may not adequately show the total thickness of the Chilson Member because drilling usually did not penetrate its entire extent. Drilling was usually stopped in the lower carbonaceous shale unit of the Chilson Member and did not reach the Morrison Formation. (Exhibit 7.2-6)**.**

The Fuson Member is the upper most member of the Lakota Formation and the shale-siltstone portion of the Fuson has been used to divide the Lakota Formation from the Fall River Formation. Analyses of core samples of these lithologies demonstrate low vertical permeabilities, ranging from 7.8×10^{-9} cm/sec to 2.2×10^{-7} cm/sec (0.008 millidarcies to 0.228 millidarcies).

The Fuson Member is described as having a lower discontinuous sandstone unit at its base and an upper discontinuous sandstone at the top of the member. If present the lower sandstone unit was mapped as Lakota sandstone. Similarly if the upper sandstone was present it was mapped as Fall River sandstone. The isopach map of the Fuson Member shows the thickness of the shale – siltstone unit ranging from 30 to 80 feet (Exhibit 7.2-7). It shows thinning of the shale under the overlying channel sandstones of the Fall River Formation.

Fall River Formation - The Fall River formation is composed of carbonaceous interbedded siltstone and sandstone, channel sandstones, and a sequence of interbedded sandstone and shale. The lower part of the Fall River consists of dark carbonaceous siltstone interbedded with thin laminations of fine-grained sandstone. Channels were cut into this interbedded sequence by northwest flowing rivers and fluvial sandstones were deposited. These channel sandstones occur across various parts of the project and generally contain the uranium deposits. Overlying the channel sandstones is another sequence of alternating sandstone and shales. The sandstones are cross-bedded to massive, fine to medium-grained, and well-sorted.

The isopach map of the Fall River Formation shows a range of thickness of 120 to 160 feet. The thickening of the formation indicates the presence channel sandstones. Along the northeastern portion of the PAA, this formation is exposed on the surface and erosion has taken place (Exhibit 7.2-8)**.**

Skull Creek Shale - The Skull Creek Shale directly overlies the Fall River Formation and consists of dark-grey to black shale, organic material, and some silt sized quartz grains. The Skull Creek Shale has a thickness of approximately 200 feet and is the Upper Confining Unit for the project. Analyses of core samples demonstrate that the Skull Creek clays have extremely low vertical permeabilities, in the range of 6.8×10^{-9} cm/sec (0.007 millidarcies). The Skull Creek Shale is eroded from the eastern parts of the project.

Mowry Shale – At the project the Skull Creek Shale is directly overlain by the Mowry shale and is also considered to be part of the Upper Confining Unit. Normally, the Newcastle Sandstone is present between the Skull Creek Shale and the Mowry Shale, but is absent across the PAA. The Mowry Shale consists of light gray marine shale with minor amounts of siltstone, fine grained sandstone, and a few thin beds of bentonite. Dark-gray to purple and black iron and manganese concretionary zones are common within the shale. The combined Skull Creek Shale – Mowry Shale reaches a thickness of 400 feet in the western part of the project. Exhibit 7.2-9 is an isopach map showing the combined thickness of these two shale units. In the northeastern portion of the PAA, these units outcrop and have been eroded.

Terrace Deposits - Along the sides of drainages are relatively flat terrace deposits representing floodplains and former levels of streams. The terraces are primarily overbank deposits of clay and silt with gravel beds. Gravel deposits consist of boulders and pebbles of chert, sandstone, and limestone.

Alluvium - The most recent sedimentary units deposited within the PAA are the Quaternary age alluvium deposits. Alluvium is present in the major drainages and their tributaries. The alluvium consists of silt, clay sand and gravel.

Four site cross sections, based on exploration logs, were developed along each orebody to illustrate the relationship between mineralized Inyan Kara sands and their confining units. Exhibit 7.2-10 shows the locations of the four cross sections. The cross sections were generated in the MVS model and were hung on the elevation of each drill hole. Traces of electric logs of exploration holes were overlain on these cross sections to illustrate the data sources used in the preparation of these sections. Cross sections A-A'', F-F', H-H''', and J-J' show the project stratigraphy and mineralization across the PAA and are presented in Plates 7.2--11, 7.2-12, 7.2-13, and 7.2-14. The Skull Creek Shale thickens from the east to the west. The Fall River Formation is continuous across the area and dips to the west. The Fuson Member of the Lakota thickens and thins across the area. The Chilson Member of the Lakota is continuous across the area and thickens and thins due to channeling. The uranium mineralization in the Fall River occurs in the lower sandstone unit. The mineralized sands in the Chilson Member of the Lakota occur within individual sandstone lenses or channels.

7.3 Ore Mineralogy and Geochemistry

Uranium deposits within the project are classic, sandstone, roll-front type deposits, similar to those in Wyoming and Texas. These type deposits are usually "C" shaped in cross section, with the concave side of the deposit extending up-dip, toward the outcrop. Roll-front deposits are a few tens of feet-to-100 or more-feet wide and often thousands of feet long. Uranium minerals were emplaced in these deposits after migrating down gradient from the surface in oxygenated groundwater and precipitating in the subsurface upon encountering a reducing environment at depth. These roll-front deposits are centered at and follow the interface of naturally-occurring chemical boundaries between oxidized and reduced sands. Reducing conditions are the result of a reductant in the sands these can be from organic material or from Hydrogen Sulfide (H_2S) or methane in the host sands.

There is a geochemical "footprint" associated with these roll-front deposits, resulting from the passage of oxygenated groundwater through subsurface sands. The typical alteration pattern associated with these oxidizing solutions consists of limonitic and hematitic staining of the sandstones. This is due to the alteration of naturally-occurring iron rich minerals (valence state of Fe^{+2}) to iron oxides (valence state of Fe^{+3}). On outcrop, most of the sandstones of the Inyan Kara Group exhibit trace to pervasive limonite staining of various shades of yellow and orange. Red hematite staining is less common and occurs as scattered streaks in most outcrops. Generally, the more porous and thicker the sandstone, the more pronounced the alteration. Reduced or unaltered sands have a medium to dark grey color. Alteration within the host sands has been mapped for distances of over 12 miles within the sandstones of the Inyan Kara Group in the PAA.

The primary uranium minerals in the project deposits are very fine-grained, opaque pitchblende and coffinite. This mineralization occurs as sand grain coatings in the host sand, and marginal to or as replacement of pyrite grains.

Mineralized sands within the project occur at depths of less than 100 feet in the outcrop area of Fall River Formation and at depths of up to 800 feet in the Lakota in the northwest part of the project. This mineralization occurs in three sandstones in the Fall River Formation and within six sandstones of the Lakota Formation. The uranium mineralization occurs along a large "U" shaped trend that is five miles long and three to four miles wide. The average thickness of this mineralization has been calculated to be 6.1feet and the average grade is 0.21 percent U_3O_8.

In 1988 in a Thesis for a Master of Science in Geology degree, Bonnie Janine Blake used scanning x-ray fluorescence supplemented by standard x-ray fluorescence, x-ray diffraction, electron microprobe, scanning electron microscopy, and atomic absorption to study core samples from the Burdock orebody.

She did not identify any uranium or vanadium minerals but concluded that the uranium was in an amorphous or poorly-crystalline form or was associated with the clays or carbonaceous material. Bonnie Blake noted “quartz grains illustrated layered clay coatings in the paragenetic sequence of a smectite partially covered by kaolinite with remnants of possible illite on the kaolinite. The smectite coatings showed isolated concentrations of uranium and vanadium.” This is to be expected where uranium cation exchanges with the clays. The uranium mineralization is probably uranphane and coffinite.

7.4 Historic Uranium Exploration

Uranium was first discovered in the Edgemont District in 1952 by professors from the SDSMT. They mined about 500 pounds of ore and hauled it to Grand Junction, Colorado. The Atomic Energy Commission (AEC) announcement of a new district at Edgemont led to a boom of stacking, mining, and dealing in the summer of 1952. By 1953 the AEC had built a buying station in Edgemont. In July 1956 a 250-ton per-day mill went on stream and soon expanded to a 500-ton-per-day. In 1960 a vanadium circuit was added. Production from the Edgemont District (open pits in the Fall River), some mines in the Powder River basin and several mines in the Northern Black Hills continued until 1972. Susquehanna Western Inc. (SWI) bought the Edgemont mill and took control of the mines in the Edgemont District. Until the late 1960’s early 1970’s they were the only company active in the Edgemont District.

In 1967, Homestake Mining Company began exploration in the Dewey area. In 1974, Wyoming Mineral Corporation (Westinghouse) acquired the Dewey properties from Homestake. In 1974, TVA bought out the mill and mines from SWI. The mill was shut down, but exploration continued. Besides WMC and TVA, other companies exploring in the district were Union Carbide, Federal Resources, and Kerr McGee. TVA acquired the Dewey Project from WMC in 1978 and continued exploration until 1986. In total, over 4000 exploration drill holes were completed on this project.

In 1981 TVA completed a mine feasibility study on the project deposits. A DES was prepared by TVA to address the potential impacts of a proposed underground mine in the PAA, but the NEPA process was never completed by TVA. Due to falling uranium prices the project leases were allowed to expire. In 1994 EFN acquired the mineral interests within the PAA. Their intention was to mine the uranium deposits by ISL. EFN did no additional exploration drilling on the project. In 2000 the leases were dropped.

In 2005, Powertech (USA) acquired the property, consisting of approximately 10,580 acres. Since the spring of 2007, Powertech (USA) has drilled approximately 115 exploration holes, including 20 monitoring wells on the project. Both the historic and recent drill holes have helped to generate the geologic mode and delineate the extent of the mineralized sands. Figure 7.4-1 is a map showing the location of all known drill holes. Appendix 7.4-A includes a table summarizing all historical exploration drilling.

POWERTECH (USA) INC.

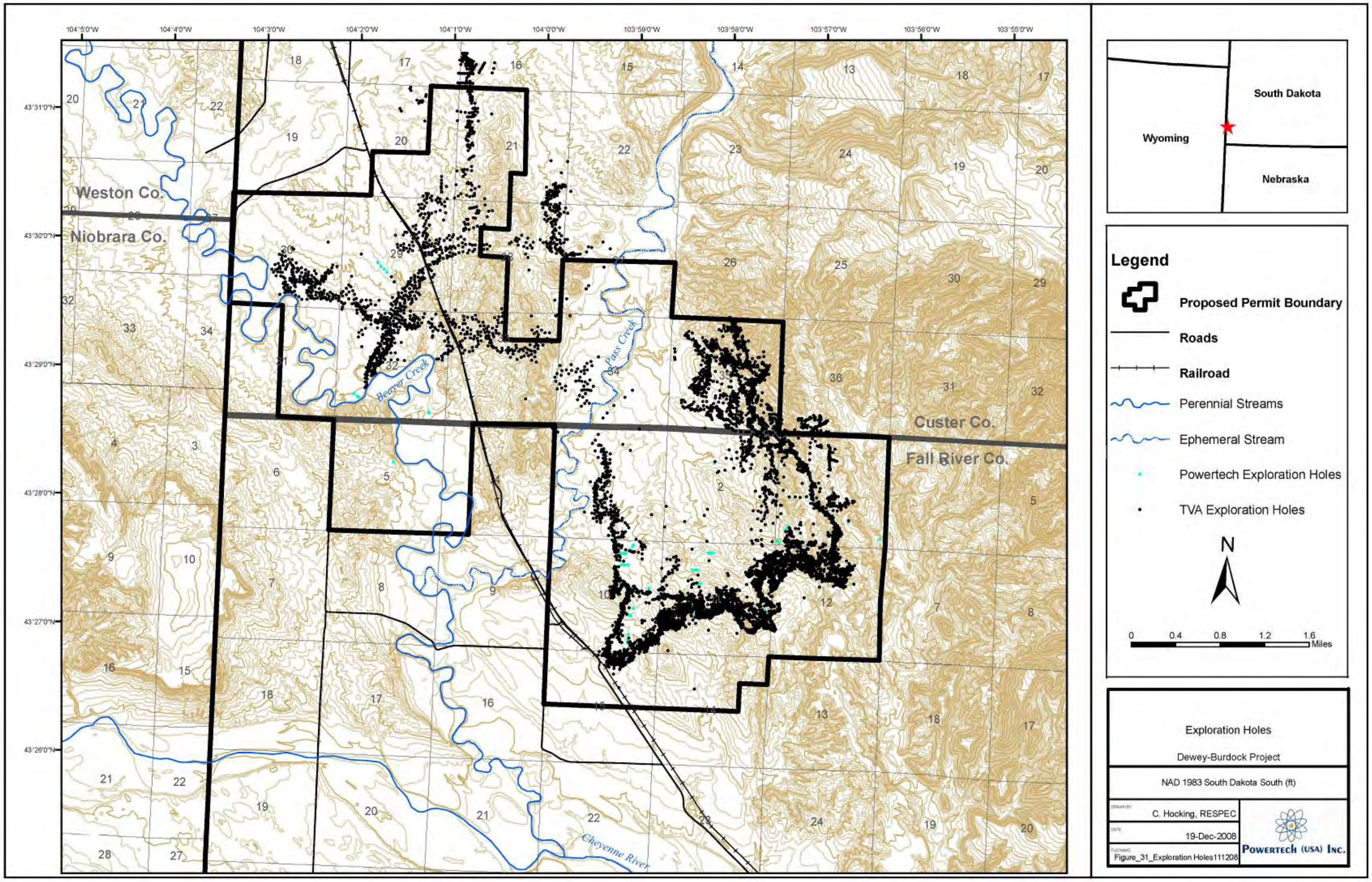


Figure 7.4-1 Location of all Known Exploration Drill Holes within the Proposed Project Site

7.5 Soils

Powertech (USA) conducted baseline soil sampling and mapping covering an estimated 7,964.26 acres as shown on Exhibit 7.5-1 in accordance with NUREG-1569 and RG-4.14.

Stripping depths for the PAA were evaluated during mapping and sampling. Soil depths within a given mapping unit will vary based on any combination of the five primary soil forming factors, i.e., climate including effective precipitation, organisms, relief or topography, parent material, and time. Subtle differences in any one of the previously mentioned factors will impact development between series and within series designation but may not be as noticeable as when topography is a major factor. The proposed topsoil salvage depths are based on laboratory data of the samples found within the borders of the area, as well as field observations and knowledge of the soils in Custer and Fall River Counties, South Dakota.

Soils in the PAA are typical for semi-arid grasslands and shrublands in the Western United States. Parent material included colluvium, residuum, and alluvium. Most soils are classified taxonomically as Aridic Argiustolls, Aridic Ustorthents, and Aridic Haplusterts.

Almost all soils have some suitable topsoil. The primary limiting factors within the PAA are electrical conductivity (EC), sodium adsorption ratio (SAR), calcium carbonates, and texture (clay percentage).

Refer to Appendix 7.5-A for the Soil Mapping Unit Descriptions. Refer to Appendix 7.5-B for the Soil Series Descriptions. Refer to Appendix 7.5-C for the Original Laboratory Data Sheets. Refer to Appendix 7.5-D for the Prime Farmland Designation. Refer to Appendix 7.5-E for the Site Photographs.

7.5.1 Methodology

7.5.1.1 Review of Existing Literature

The soils in this portion of Custer and Fall River Counties were studied and mapped to an Order 2 scale by the USDA, NRCS in 1982 and 1990. Information for Custer and Fall River Counties is available electronically as well as hard copy. The NRCS has also centralized dissemination of typical soil series descriptions; general information is available on the internet at www.nrcs.usda.gov.

7.5.1.2 Project Participants

BKS performed the 2007 soil survey field work and compiled the resulting report. All soil analysis was handled by Energy Labs in Gillette, Wyoming.

7.5.1.3 Soil Survey

Construction of the PAA soil map was completed according to techniques and procedures of the National Cooperative Soil Survey. Guideline No. 1 (August, 1994 Revision) of the WDEQ-LQD was followed during all phases of the work.

A total of 7,960.77 acres were included in the final soil mapping of the PAA, in which 3,065.74 of those acres were located in disturbance areas. Refer to Table 7.5-1 for soil mapping unit designations and associated acreage within the PAA. Table 7.5-1 also describes the soil map units in terms of actual map designations and slope percentages.

7.5.1.4 Field Sampling

Soil series were sampled to reflect recommended sample numbers in WDEQ Guideline 1 (August 1994 Revision) based on mapping acreage. Most samples were taken either in or near disturbed areas.

Table 7.5-1 Proposed Action Area Soil Mapping Unit Acreages

Map Symbol	Map Unit Description	Permit Acreage	Disturbance Areas	% Total PAA
Aa	Alice, 0 to 6 percent slopes	36.99	0	0
Ar	Arvada, 0 to 6 percent slopes	258.3	121.78	3.97
As	Ascalon, 0 to 6 percent slopes	27.42	41.22	1.35
Bc	Barnum, 0 to 6 percent slopes	484.09	13.01	0.42
Bo	Boneek, 0 to 6 percent slopes	51.53	0	0
Br	Broadhurst, 6 to 15 percent slopes	60.22	190.74	6.22
Bw	Butche, 6 to 40 percent slopes	234.53	25.42	0.83
Cn	Colby, 6 to 15 percent slopes	72.2	0	0
Cy	Cushman, 6 to 15 percent slopes	110.06	12.26	0.40
Dg	Demar, 0 to 6 percent slopes	509.39	134.26	4.38
DA	Disturbed-Ag	196.05	41.36	1.35
GrA	Grummit, 0 to 6 percent slopes	250.81	37.85	1.24
GrB	Grummit, 6 to 15 percent slopes	632.43	369.1	12.04
GrC	Grummit, 15 to 60 percent slopes	550.67	48.43	1.58
Ha	Haverson, 0 to 6 percent slopes	233.1	0	0
He	Hisle, 0 to 6 percent slopes	307.65	54.52	1.78
Ky	Kyle, 0 to 6 percent slopes	471.39	333.96	10.89
Lo	Lohmiller, 0 to 6 percent slopes	38.06	5.66	0.19
Mm	Mathias, 15 to 40 percent slopes	331.62	34.08	1.11
MP	Mine Pit	340.48	18.31	0.60
Nf	Nihill, 15 to 50 percent slopes	11.36	25.61	0.84
No	Norka, 0 to 6 percent slopes	85.07	0	0
NuA	Nunn, 0 to 6 percent slopes	28.54	41.22	1.35
NuB	Nunn, 6 to 15 percent slopes	17.45	0	0
Pa	Paunsaugunt, 6 to 15 percent slopes	0.86	0	0
Pg	Penrose, 15 to 40 percent slopes	210.76	231.08	7.54
PeA	Pierre, 0 to 6 percent slopes	479.11	216.03	7.05
PeB	Pierre, 6 to 15 percent slopes	470.36	157.99	5.15
RO	Rock Outcrop	126.91	17.42	0.57
Sa	Samsil, 15 to 40 percent slopes	249.01	515.29	16.81
Sc	Satanta, 0 to 6 percent slopes	32.28	0	0
Sn	Shingle, 15 to 40 percent slopes	86.75	11.66	0.38
SS	Slickspots	536.39	148.77	4.85
Gs	Snomo, 6 to 15 percent slopes	179.92	106.06	3.46
Ta	Tillford, 0 to 6 percent slopes	171.69	7.84	0.26
W	Water	32.77	72.5	2.37
Wt	Winetti, 0 to 6 percent slopes	7.73	6.92	0.23
202	Worfka, 15 to 40 percent slopes	3.04	0	0
ZnB	Zigweid, 6 to 15 percent slopes	11.35	25.39	0.83
ZnC	Zigweid, 6 to 40 percent slopes	22.43	0	0
Total		**7,960.77**	3,065.74	**100**

Additional sampling of soils in the permit area will occur as the operation is expanded outside the current disturbed areas.

Series were sampled and described by coring with a mechanical auger, i.e., truck-mounted Giddings. The physical and chemical nature of each horizon within the sampled profile was described and recorded in the field. Each hole augered for series and map unit verification was plotted on the soils map included with this report. Sampled soil material was placed in clean, labeled, polyethylene plastic bags and kept cool to limit chemical changes. Samples were kept out of direct sunlight and transported to Energy Labs for analysis. A total of 33 sites on the PAA were sampled for analysis; all had corresponding soil profile descriptions written. Refer to Table 7.5-2 Soils Series Sample Summary and Table 7.5-3 Soil Sample Locations.

Table 7.5-2 Soil Series Sample Summary for the Proposed Action Area [1]

Soil Series	Number of Profiles Sampled for Chemical Analysis
Broadhurst	1
Kyle	3
Hisle	2
Nevee	1
Barnum	1
Ascalon	1
Cushman	1
Zigweid	1
Butche	1
Samsil	3
Paunsaugunt	1
Boneek	4
Arvada	1
Lohmiller	2
Pierre	2
Haverson	1
Demar	2
Penrose	1
Satanta	1
Snomo	1
Grummit	1
Shingle	1
Total	**33**

[1]Samples were taken within proposed disturbed area as defined by initial estimates of the orebody.

Table 7.5-3 Proposed Action Area[1] Soil Sample Locations

Soil Sample Number	Map Unit Designation	Soil Series
17	Broadhurst silty clay, 6 to 15 percent slopes	Broadhurst
27	Kyle noncalcareous variant, 0 to 6 percent slopes	Kyle
36	Kyle noncalcareous variant, 0 to 6 percent slopes	Kyle
39	Hisle silt loam, 0 to 6 percent slopes	Hisle
40	Hisle noncalcareous variant, 0 to 6 percent slopes	Hisle
41	Nevee silt loam, 6 to 15 percent slopes	Nevee
42	Barnum silt loam, 0 to 6 percent slopes	Barnum
43	Ascalon clay loam, 0 to 6 percent slopes	Ascalon
50	Cushman loam, 6 to 15 percent slopes	Cushman
56	Zigweid loam, 0 to 6 percent slopes	Zigweid
57	Butche clay loam, 3 to 15 percent slopes	Butche
60	Samsil clay loam, 15 to 40 percent slopes	Samsil
63	Paunsaugunt loam, 6 to 15 percent slopes	Paunsaugunt
64	Boneek silty clay loam, 0 to 6 percent slopes	Boneek
72	Arvada silty clay loam, 0 to 6 percent slopes	Arvada
73	Lohmiller loam, 0 to 6 percent slopes	Lohmiller
74	Pierre sandy clay loam, 0 to 15 percent slopes	Pierre
75	Haverson clay loam, 0 to 6 percent slopes	Haverson
76	Demar loam, 0 to 6 percent slopes	Demar
77	Penrose clay loam, 0 to 6 percent slopes	Penrose
79	Demar silty clay loam, 0 to 6 percent slopes	Demar
82	Satanta loam, 0 to 6 percent slopes	Satanta
83	Snomo silty clay loam, 0 to 6 percent slopes	Snomo
84	Lohmiller silty clay loam, 0 to 6 percent slopes	Lohmiller
85	Kyle loam, 0 to 6 percent slopes	Kyle
88	Samsil noncalcareous variant, 15 to 40 percent slopes	Samsil
89	Pierre silty clay loam, 0 to 15 percent slopes	Pierre
90	Grummit silty clay, 0 to 6 percent slopes	Grummit
91	Boneek clay loam, 0 to 6 percent slopes	Boneek
92	Samsil silty clay loam, 15 to 40 percent slopes	Samsil
93	Shingle loam, 15 to 40 percent slopes	Shingle
94	Boneek noncalcareous variant, 0 to 6 percent slopes	Boneek
95	Boneek loam, 0 to 6 percent slopes	Boneek

[1]Samples were taken within proposed disturbed area as defined by initial estimates of the orebody.

7.5.1.5 Laboratory Analysis

Samples were individually placed into lined aluminum pans to air dry. Coarse fragments were measured with a 10 mesh screen prior to grinding; the entire sample was then hand ground to pass 10 mesh. An approximate 20 ounce subsample was obtained through splitting with a series of riffle splitters and subsequently analyzed. A second subsample was maintained in storage at Energy Labs. Approximately 10 percent of the samples are run for duplicate analysis. Actual laboratory analysis follows the methodology outlined in WDEQ-LQD Guideline 1 (August 1994 Revision). In general, samples were analyzed within 45 days of receipt of the samples at the laboratory. All analytical data is presented in Appendix 7.5-C, Original Laboratory Data Sheets.

7.5.2 Results and Discussion

7.5.2.1 Soil Survey - General

General topography of the area ranged from nearly level uplands to very steep hills, ridges and breaks of dissected shale plains. The soils occurring on the PAA were generally a clayey or very fine texture throughout with patches of sandy loam on upland areas and fine, clay textured soils occurring in or near drainages. The PAA contained deep soils on level upland areas with shallow and very shallow soils located on hills, ridges and breaks.

7.5.2.2 Soil Mapping Unit Interpretation

The primary purpose of the 2007 fieldwork was to characterize the soils within the PAA in terms of topsoil salvage depths and related physical and chemical properties. The total number of samples per series was established in line with WDEQ Guideline 1 (August 1994 Revision) recommendations based on estimated acreage of soil series known within the PAA. Refer to Appendix 7.5-A and Appendix 7.5-C for soil mapping unit descriptions and soil series descriptions, respectively.

7.5.2.3 Analytical Results

Analyzed parameters, as defined in WDEQ Guideline 1 (August 1994 Revision), are in Appendix 7.5-C Original Laboratory Data Sheets. Laboratory soil texture analysis did not include percent fine sands. Field observations of fine sands within individual pedestals as well as sample site topographic position were used in conjunction with laboratory analytical results to determine series designation. Where applicable, field observation of fine sands is also included in the textures found in the soil series descriptions in Appendix 7.5-D. In several of the pedestal sampling locations, laboratory analysis yielded finer than expected textures (based upon field observations). Where textures are finer than typical for the series, it is noted in the Range of Characteristics (according to field observations, lab analysis) in the soil series descriptions.

7.5.2.4 Evaluation of Soil Suitability as a Plant Growth Medium

Approximate salvage depths of each map unit series are presented in Table 7.5-4 and ranged from 0.0 to 5.0 feet. Within the PAA, suitability of soil as a plant growth medium is generally affected by physical factors such as texture (clay percentage) and saturation percentage. Chemical limiting factors included selenium (Se), calcium carbonate content (based upon field observations of strong or violent effervescence), SAR, EC, pH, and boron (B). Marginal material, according to WDEQ Guideline 1, was found in 26 of the 33 profiles. Unsuitable material, according to WDEQ Guideline 1, was found in 14 of the 33 profiles. Marginal or unsuitable parameter information for sampled profiles is identified in Table 7.5-5. A summary of trends in marginal or unsuitable parameters as it relates to soil series is found in Table 7.5-6. Based on laboratory analysis and field observations, marginal material parameters primarily consisted of texture (clay percentage), calcium carbonates, EC, and SAR.

Table 7.5-4 Proposed Action Area Summary of Approximate Soil Salvage Depths

Map Symbol	Mapping Unit Description	Disturbance Areas[1]	Salvage Depth (feet)	Total Volume (Acre feet)
Ar	Arvada	121.78	1.5	182.67
As	Ascalon	41.22	1.17	48.23
Bc	Barnum	13.01	0.5	6.51
Br	Broadhurst	190.74	0.67	127.80
Bw	Butche	25.42	0.67	17.03
Cy	Cushman	12.26	2.08	25.50
Dg	Demar	134.26	0.21	28.20
DA	Disturbed-Ag	41.36	-	-
GrA	Grummit, 0 to 6 percent slopes	37.85	1.67	63.21
GrB	Grummit, 6 to 15 percent slopes	369.1	1.67	616.40
GrC	Grummit, 15 to 60 percent slopes	48.43	1.67	80.88
He	Hisle Noncalc. Variant Average	54.52	5 5 5	272.60
Ky	Kyle Noncalc. Variant Average	333.96	2.5 0.80 1.65	551.03
Lo	Lohmiller	5.66	0.34	1.92
Mm	Mathias	34.08	0	0
MP	Mine Pit	18.31	-	-
Nf	Nihill	25.61	0.42	10.76
Nu	Nunn	41.22	2	82.44
Pg	Penrose	231.08	3	693.24
PeA	Pierre, 0 to 6 percent slopes	216.03	0.71	153.38
PeB	Pierre, 6 to 15 percent slopes	157.99	0.71	112.17
RO	Rock Outcrop	17.42	-	-
Sa	Samsil Noncalc. Variant Average	515.29	0.42 1.5 0.96	494.68
Sn	Shingle	11.66	0.67	7.81
SS	Slickspots	148.77	-	-
Gs	Snomo	106.06	0	0
Ta	Tilford	7.84	3.33	26.11
W	Water	72.5	-	-
Wt	Winetti	6.92	0.33	2.28
Zn	Zigweid	25.39	5	126.95
Average Salvage Depth of Study Area			**1.44**	
Total		**3,065.74**		**3,731.80**

[1]Samples were taken within proposed disturbed area as defined by initial estimates of the orebody.

Table 7.5-5 Proposed Action Area Summary of Marginal and Unsuitable Parameters within Sampled Profiles

Series	Sample Point	Depth (in)	Parameter
Broadhurst	17	0-3 3-8 8-24 24-40 40-54 54-60	Marginal clay %
Broadhurst	17	8-24	Marginal saturation %
Broadhurst	17	40-54	Marginal pH (Low)
Broadhurst	17	54-60	Unsuitable pH (Low)
Kyle	27	2-17 17-24 24-39 39-60	Marginal clay %
Kyle	27	24-39	Marginal saturation %
Kyle	27	17-24 24-39 39-60	Marginal SAR
Kyle	36	2-15 15-26 26-36 36-60	Marginal clay %
Kyle	36	2-15 26-36	Marginal saturation %
Kyle	36	15-26 26-36	Marginal SAR
Hisle	40	27-38 38-60	Marginal clay %
Nevee	41	21-36 36-45 45-60	Unsuitable EC (Conductivity) Unsuitable SAR Marginal Selenium
Nevee	41	21-36	Unsuitable Boron
Barnum	42	6-17 17-39	Unsuitable EC (Conductivity) Unsuitable SAR
Barnum	42	39-60	Marginal EC (Conductivity) Marginal SAR
Barnum	42	6-17	Marginal Selenium
Ascalon	43	2-14	Marginal clay %
Ascalon	43	38-60	Unsuitable SAR
Samsil	60	3-10	Marginal clay %
Samsil	60	10-18	Marginal EC (Conductivity) Marginal Selenium
Samsil	60	3-10 10-18	Marginal SAR
Boneek	64	17-33	Marginal pH (High)
Boneek	64	33-42	Marginal EC (Conductivity) Marginal Selenium
Arvada	72	18-28	Marginal clay %
Arvada	72	28-43 43-60	Marginal EC (Conductivity)

Table 7.5-5 Proposed Action Area Summary of Marginal and Unsuitable Parameters within Sampled Profiles (cont'd)

Series	Sample Point	Depth (in)	Parameter
Arvada	72	28-43	Marginal SAR
Arvada	72	43-60	Unsuitable SAR
Arvada	72	18-28 28-43 43-60	Marginal Selenium
Lohmiller	73	3-15 15-23 23-34 34-38 38-60	Marginal clay % Unsuitable SAR
Lohmiller	73	15-23 23-34 38-60	Marginal saturation %
Lohmiller	73	15-23	Marginal EC (Conductivity)
Lohmiller	73	23-34 34-38 38-60	Unsuitable EC (Conductivity)
Lohmiller	73	15-23 23-34 34-38 38-60	Marginal Selenium
Pierre	74	15-27 27-38	Marginal pH (High)
Pierre	74	27-38 38-51 51-60	Unsuitable EC (Conductivity) Marginal Selenium
Pierre	74	15-27 27-38 38-51 51-60	Unsuitable SAR
Haverson	75	15-35	Marginal SAR
Haverson	75	35-46 46-60	Unsuitable SAR
Demar	76	2-21 21-29	Marginal clay % Marginal SAR
Demar	76	29-46 46-60	Unsuitable SAR
Demar	76	46-60	Marginal Selenium
Penrose	77	36-48	Unsuitable Boron
Demar	79	3-17 17-30 30-42 42-60	Marginal clay % Unsuitable pH (Low)
Satanta	82	0-4	Marginal pH (Low)
Snomo	83	3-17 17-33	Marginal clay % Marginal texture
Snomo	83	42-52	Marginal saturation %

Table 7.5-5 Proposed Action Area Summary of Marginal and Unsuitable Parameters within Sampled Profiles (concl'd)

Series	Sample Point	Depth (in)	Parameter
Snomo	83	0-3 3-17	Unsuitable pH (Low)
Snomo	83	33-42 42-52 52-60	Unsuitable Boron
Lohmiller	84	18-37	Marginal clay % Marginal texture Unsuitable EC (Conductivity) Unsuitable SAR
Lohmiller	84	0-5 5-18	Marginal saturation %
Lohmiller	84	5-18 37-47 47-60	Marginal EC (Conductivity)
Lohmiller	84	5-18 37-47	Marginal SAR
Kyle	85	2-7	Marginal saturation %
Samsil	88	2-9	Marginal clay % Marginal texture
Pierre	89	0-2	Marginal pH (Low)
Pierre	89	2-18 18-31 31-37	Marginal clay % Marginal texture Marginal saturation %
Grummit	90	0-2 2-8 8-20	Marginal clay % Marginal texture Marginal saturation %
Boneek	91	4-19 40-48 48-60	Marginal saturation %
Boneek	91	19-40 40-48 48-60	Unsuitable EC (Conductivity) Unsuitable SAR
Boneek	91	48-60	Marginal Selenium
Samsil	92	7-19	Marginal clay % Marginal texture Marginal saturation %
Boneek	94	0-2 2-8 8-20 32-44 44-60	Marginal clay % Marginal texture Marginal saturation %
Boneek	94	20-32	Marginal saturation %
Boneek	95	24-38	Marginal Selenium

Table 7.5-6 Proposed Action Area Summary of Trends in Marginal and Unsuitable Parameters for Soil Series

Series	Unsuitable/Marginal Parameter
Arvada	Sodium/Salts, Selenium/Boron
Ascalon	Sodium/Salts
Barnum	Sodium/Salts, Selenium/Boron
Boneek	Texture, Sodium/Salts, Selenium/Boron
Broadhurst	Texture, pH
Demar	Sodium/Salts
Grummit	Texture
Haverson	Sodium/Salts
Hisle	Texture
Kyle	Texture
Lohmiller	Texture, Sodium/Salts
Nevee	Sodium/Salts, Selenium/Boron
Penrose	Selenium/Boron
Pierre	pH
Samsil	Texture
Satanta	pH
Snomo	Texture, pH, Selenium/Boron

7.5.2.5 Topsoil Volume Calculations

Based on the 2007 fieldwork with associated field observations and subsequent chemical analysis, the recommended topsoil average salvage depth over the PAA was determined to be 1.43 feet. Refer to Table 7.5-4, Approximate Soil Salvage Depths.

7.5.2.6 Soil Erosion Properties and Impacts

Based on the soil mapping unit descriptions, the hazard for wind and water erosion within the PAA varies from negligible to severe. The potential for wind and water erosion is mainly a factor of surface characteristics of the soil, including texture and organic matter content. Given the very fine and clayey texture of the surface horizons throughout the majority of the PAA, the soils are more susceptible to erosion from water than wind. See Table 7.5-7 for a summary of wind and water erosion hazards within the PAA.

Table 7.5-7 Proposed Action Area Summary of Wind and Water Erosion Hazards[1]

Soil Sample Number	Map Unit Description	Water Erosion Hazard	Wind Erosion Hazard
17	Broadhurst silty clay, 6 to 15 percent slopes	slight	very slight
27	Kyle noncalcareous variant, 0 to 6 percent slopes	moderate	very slight
36	Kyle noncalcareous variant, 0 to 6 percent slopes	moderate	very slight
39	Hisle silt loam, 0 to 6 percent slopes	moderate	slight
40	Hisle noncalcareous variant, 0 to 6 percent slopes	slight	very slight
41	Nevee silt loam, 6 to 15 percent slopes	moderate	slight
42	Barnum silt loam, 0 to 6 percent slopes	moderate	slight
43	Ascalon clay loam, 0 to 6 percent slopes	slight	slight
50	Cushman loam, 6 to 15 percent slopes	slight	moderate
56	Zigweid silty clay loam, 0 to 6 percent slopes	moderate	very slight
57	Butche clay loam, 3 to 15 percent slopes	slight	slight
60	Samsil clay loam, 15 to 40 percent slopes	slight	slight
63	Paunsaugunt loam, 6 to 15 percent slopes	slight	moderate
64	Boneek silty clay loam, 0 to 6 percent slopes	moderate	very slight
72	Arvada silty clay loam, 0 to 6 percent slopes	moderate	slight
73	Lohmiller loam, 0 to 6 percent slopes	very slight	slight
74	Pierre sandy clay loam, 0 to 15 percent slopes	negligible	severe
75	Haverson clay loam, 0 to 6 percent slopes	slight	slight
76	Demar loam, 0 to 6 percent slopes	slight	moderate
77	Penrose clay loam, 0 to 6 percent slopes	slight	slight
79	Demar silty clay loam, 0 to 6 percent slopes	slight	slight
82	Satanta loam, 0 to 6 percent slopes	very slight	severe
83	Snomo silty clay loam, 0 to 6 percent slopes	moderate	very slight
84	Lohmiller silty clay loam, 0 to 6 percent slopes	moderate	very slight
85	Kyle loam, 0 to 6 percent slopes	slight	slight
88	Samsil noncalcareous variant, 15 to 40 percent slopes	slight	slight
89	Pierre silty clay loam, 0 to 15 percent slopes	moderate	very slight
90	Grummit silty clay, 0 to 6 percent slopes	slight	negligible
91	Boneek clay loam, 0 to 6 percent slopes	slight	slight
92	Samsil silty clay loam, 15 to 40 percent slopes	slight	slight
93	Shingle loam, 15 to 40 percent slopes	slight	severe
94	Boneek noncalcareous variant, 0 to 6 percent slopes	slight	very slight
95	Boneek loam, 0 to 6 percent slopes	slight	moderate

[1]Based on lab analysis.

7.5.2.7 Prime Farmland Assessment

Prime farmland was assessed by Dan Shurtliff, the Acting State Soil Scientist out of Huron, South Dakota. The following sections in T6S R1E contain Prime farmland if irrigated: Sections 27, 30, 31, 32, 34, and 35. The following sections in T7S R1E contain Prime farmland if irrigated: Sections 1, 3, 4, 5, 10, 12, 14, and 15. The following sections in T7S R1E contain Farmland of statewide importance: Sections 2, 3, 4, 5, 10, 11, 12, 14, and 15. See Appendix 7.5-D for prime farmland designation. The following soil series have been listed as Prime farmland if irrigated: Alice, Ascalon, Barnum, Boneek, Haverson, Norka, Nunn, Satanta, and Tilford. The following soil series have been listed as Farmland of statewide importance: Kyle, Lohmiller, Nunn, Pierre, Satanta, and Stetter.

7.6 Seismology

7.6.1 Seismic Hazard Review

The seismic hazard review was based on analysis of available literature and historical seismicity for the PAA. 10 CFR Part 40, Appendix A Criterion 4(e) states:

"The impoundment may not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand. As used in this criterion, the term "capable fault" has the same meaning as defined in section III (g) of Appendix A of 10 CFR Part 100. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material."

There are no capable faults (i.e. active faults) with surface expression mapped within a radius of 100 kilometers (62 miles) from the center of the PAA, according to the 2002 U.S. Geological Survey's Quaternary Fault and Fold Database. In addition, there are no capable faults mapped in the entire state of South Dakota. The closest capable faults to the site are located in central Wyoming, nearly 345 km (200 miles) to the west-southwest.

7.6.2 Seismicity

South Dakota has a comparatively higher rate of seismicity than other areas in the northern plains states, although earthquakes in the area tend to be relatively rare and of low to moderate magnitude, and no active faults have been mapped in the vicinity. It is unclear which earthquakes, if any, in the PAA are associated with known faults. Since the Midwestern states are relatively stable in terms of earthquake activity, only a small number of seismograph stations are located in the region. South Dakota has one station located in Rapid City, which began operation in 1991. Two nearby stations are located in Golden, Colorado and French Village, Missouri.

Since 1872, a minimum of 65 earthquake epicenters have been identified in South Dakota (Hammond, 1992). These hfave mainly been concentrated in the southern and eastern regions of the state and are generally of low to moderate modified Mercalli intensity, with a maximum recorded intensity reaching VI. In general, the majority of the epicenters in the proximity of the project (see Figure 7.6-1) exhibit modified Mercalli intensities from III to V (corresponding to Richter magnitudes ranging from 2.2 to 4.1). However, a 1966 earthquake with intensity VI (approximate Richter magnitude 4.4) was recorded approximately 63 miles northeast of the project (17 miles northwest of Rapid City).

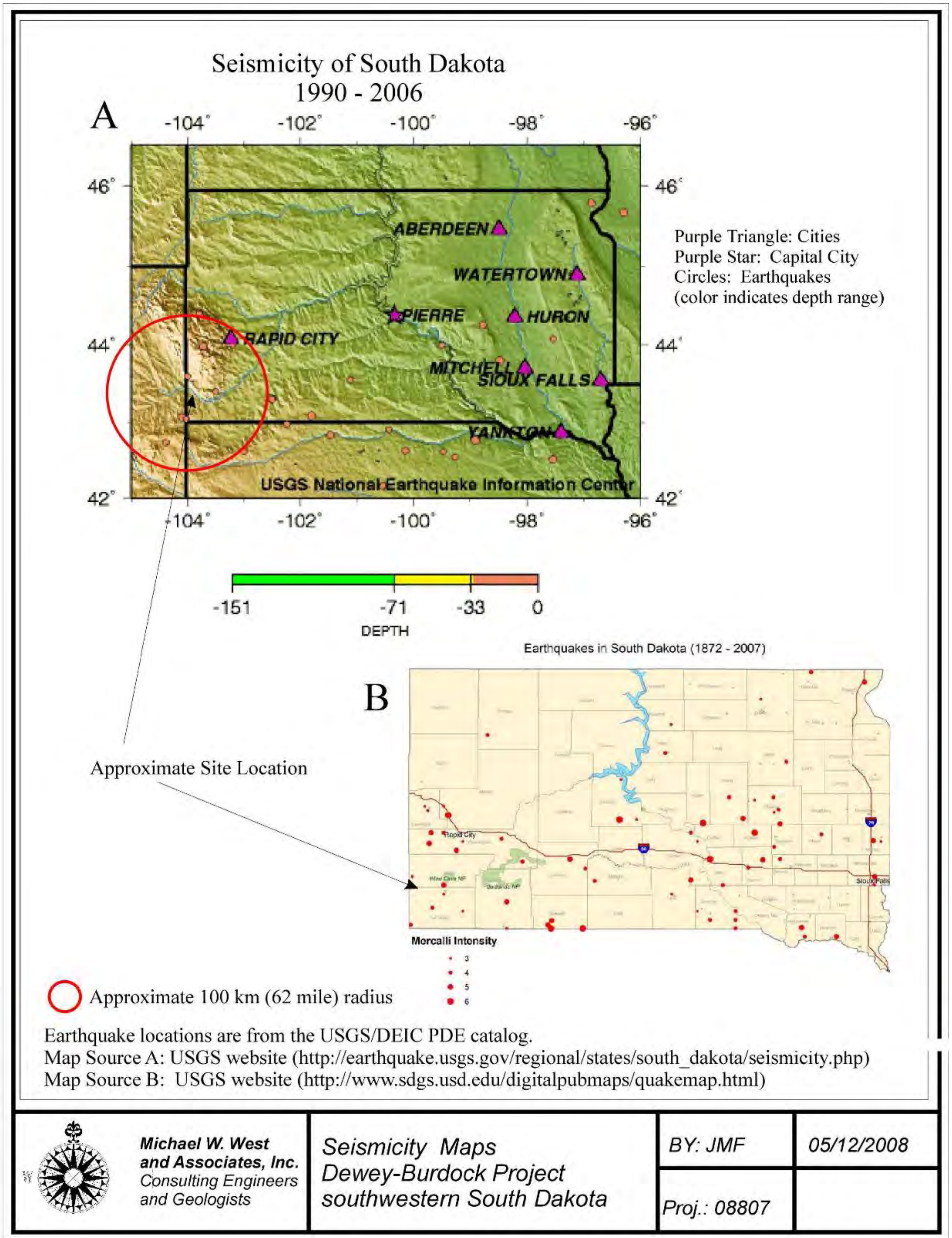


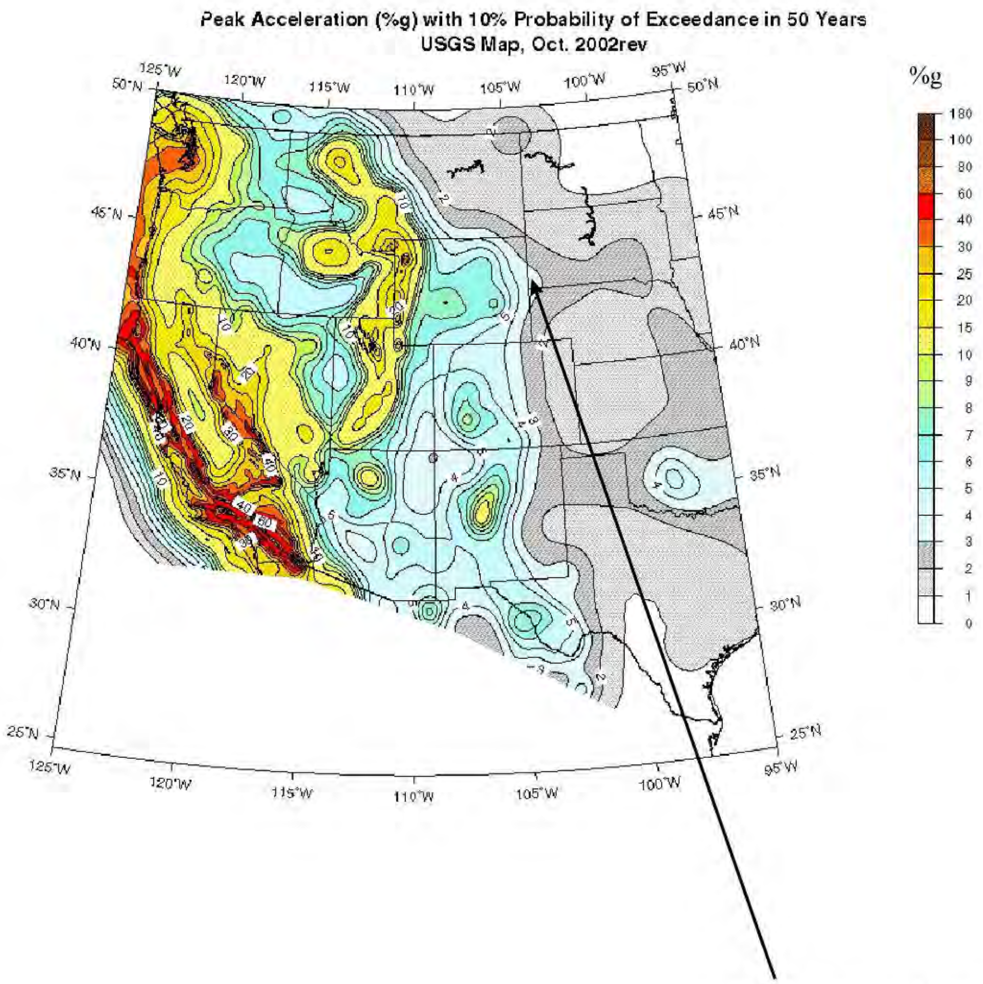
Figure 7.6-1 Seismicity of South Dakota, 1990 – 2006; and Earthquakes in South Dakota, 1872-2007

The U.S. Geological Survey Earthquake Database reports locations, times, and magnitudes for epicenters recorded since 1973. The database reports a total of 10 earthquakes with Richter magnitudes ranging from 2.3 to 3.7 within 100 km radius of the site (Appendix 7.6-A). This list includes epicenters in Wyoming and Nebraska. The closest historical earthquake to the project site (unknown magnitude) was recorded on May 16, 1975 approximately 19 km (12 miles) southeast of the site. The most recent earthquake recorded in the entire state of South Dakota took place on February 7, 2007, 35 miles east of Rapid City (approximately 80 miles northeast of the project site) and displayed a magnitude of 3.1.

According to the U.S. Geological Survey Earthquake Database (Appendix 7.6-A), two historical earthquakes, each exhibiting a magnitude of 3.7, represent the largest historical events recorded within 100 km (62 miles) of the project. These events occurred on February 6, 1996, and April 9, 1996, and were located 76 km (47 miles) to the north and 30 km (19 miles) to the southwest of the site, respectively. If the search radius was expanded to 200 km (124 miles), an earthquake with magnitude 5.50 occurring on October 18, 1984 approximately 180 km (112 miles) to the southwest of the site is the largest magnitude event near the site.

A zone of higher earthquake frequency is recorded along the eastern flank of the Black Hills (structural deformation also seems to be concentrated on the eastern flank; Geological Survey of South Dakota, 2004) and in the southwest corner of South Dakota (Figure 7.6-2). In addition, the PGA maps (USGS, 2002) of the area display an increase in ground motion to the west and southwest part of the state (Figures 7.6-3). Earthquakes may be concentrating along or near the boundaries of structural provinces (e.g. Black Hills and Missouri Plateau, or Missouri Plateau and High Plains) in the Precambrian, crystalline basement. Two possible faulting mechanisms may be at work: 1) initiation of movement along preexisting fractures due to crustal plate movements; or 2) fault movement and fracturing due to glacial rebound (South Dakota Department of Emergency Management website).

According to the U.S. Geological Survey's 2002 Seismic Hazard Mapping Program, the peak ground acceleration (PGA) derived from the probabilistic maximum bedrock acceleration with a 10 percent exceedance in 50 years (475-year return period) is 0.03 g (Figure 7.6-3) for the southwestern part of South Dakota. The probabilistic maximum bedrock acceleration with a 2 percent chance of exceedance in 50 years (2,475-year return period) is 0.09 g for the region.

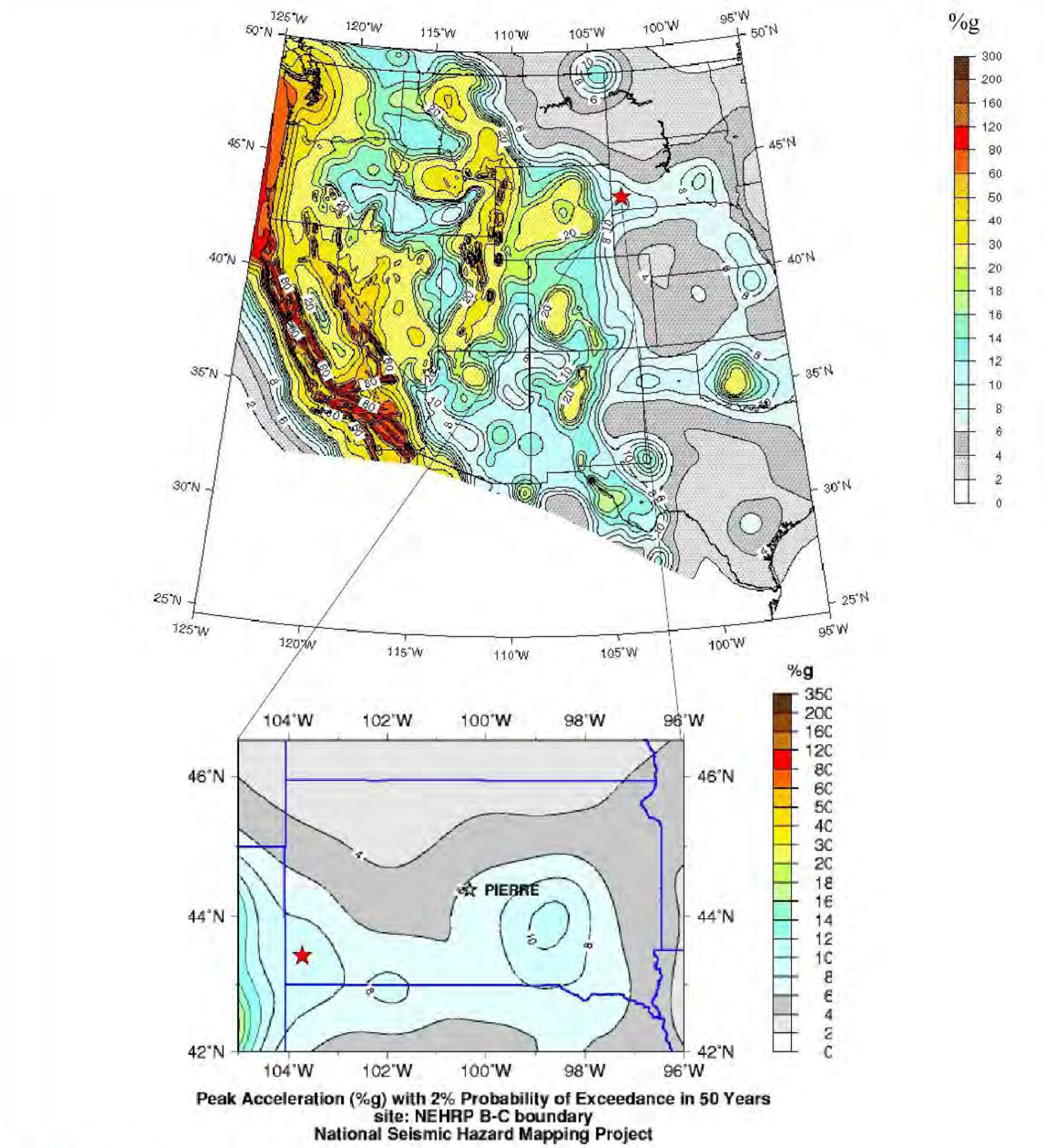


Approximate Site Location

Map Source: USGS website (http://earthquake.usgs.gov/research/hazmaps/products_data/2002/wus2002.php)

Michael W. West and Associates, Inc. Consulting Engineers and Geologists	PGA Map (10% Probability Exceedance 50 years)	BY: JMF	05/12/2008
	Dewey-Burdock Project southwestern South Dakota	Proj.: 08807	

Figure 7.6-2 Peak Ground Acceleration (PGA), Illustrating 10 Percent Probability of Exceedance in the Next 50 Years



★ Approximate Site Location

Map Source: USGS website (http://earthquake.usgs.gov/research/hazmaps/products_data/2002/wus2002.php)

Michael W. West and Associates, Inc. *Consulting Engineers and Geologists*	*PGA Map* *(2% Probability Exceedance in 50 Years)* *Dewey-Burdock Project* *southwestern South Dakota*	*BY: JMF*	*05/12/2008*
		Proj.: 08807	

Figure 7.6-3 Peak Ground Acceleration (PGA), Illustrating 2 Percent Probability of Exceedance in the Next 50 Years

7.6.3 Seismic Sources

Assessment of seismic hazards requires consideration of potential earthquake source zones, either identifiable faults or larger areas with common seismic characteristics. Once potential source zones have been identified, design earthquakes can be assigned based on a synthesis of geological and seismological data.

7.6.4 Capable Faults

The proposed project is located in an area of historically low seismic potential. There are no known capable faults within 100 kilometers of the site and a relatively low number of historical earthquakes (Appendix 7.6-A). The closest capable fault zone to the project is located nearly 345 km (200 miles) west of the site in central Wyoming. Therefore, the randomly occurring ‘floating’ earthquake is considered to be the most significant seismic hazard for the PAA (discussed below), the same as the maximum credible earthquake as defined in 10 CFR Part 40, Appendix A Criterion 4(e), quoted above.

7.6.5 The Randomly Occurring ‘Floating’ Earthquake

Industry standards and federal regulations require an analysis of the earthquake potential in regions where the surface expression of active faults is not mapped or exposed, and where earthquake epicenters are associated with buried faults with no associated surface rupture. Earthquakes associated with buried faults are assumed to occur randomly and can occur anywhere within that area of uniform earthquake potential. In reality, random earthquake distribution may not be the case, since all earthquakes are associated with specific faults. However, since all buried faults in the PAA have not been identified, it is reasonable to consider the distribution to be random. A ‘floating’ earthquake is an earthquake that is considered to occur randomly within a tectonic province.

The U.S. Geological Survey identified tectonic provinces for the contiguous United States (Algermissen et al., 1982). The project site is located in a source zone with a uniformly distributed seismicity which generally encompasses the Black Hills and surrounding environs. The zone is characterized by an earthquake with maximum magnitude M_{max}=6.1. This magnitude is used as the best estimate for the floating earthquake.

7.6.6 Conclusion

Seismic hazards at the project site include low to moderate ground shaking associated with regional and local earthquake sources. Figures 7.6-1 through 7.6-3 illustrate seismicity and PGA maps for the PAA, and Appendix 7.6-A is a summary of the USGS database results for historical earthquakes recorded within 100 and 200 km from the site since 1973.

There are no capable faults (as defined in section III (g) of Appendix A of 10 CFR Part 100) known to be present within 100 km of the project site. The closest capable fault zone to the project is located nearly 345 kilometers (200 miles) west of the site in central Wyoming. Therefore, the most significant seismic hazard is considered to be the randomly occurring, or ‘floating’, earthquake for the PAA. This is the maximum credible earthquake estimated for the project based on available literature, geologic information of the surrounding area, and historical data. A magnitude M_{max}=6.1 is estimated for this event.

According to the U.S. Geological Survey’s 2002 Seismic Hazard Mapping Program, PGA derived from the probabilistic maximum bedrock acceleration with a 10 percent exceedance in 50 years (475-year return period) is 0.03g (Figure 7.6-2) for the southwestern part of South Dakota. The probabilistic maximum bedrock acceleration with a 2 percent chance of exceedance in 50 years (2,475-year return period) is 0.09g for the region (Figure 7.6-3). Both of these estimates are considered to reflect a relatively low ground motion hazard.

7.7 Regional Surface Water Hydrology

Powertech (USA) conducted baseline surface water and groundwater quality monitoring in accordance with NRC Regulatory Guide 4.14 and NUREG-1569. The following sections describe the hydrology baseline assessment program and results.

7.7.1 Surface Water

7.7.1.1 Regional Hydrology

The PAA is approximately 12 mi^2 and lies in southwestern Custer County and northwestern Fall River County in South Dakota (Figure 7.7-1). Precipitation incorporates both rainfall and snow which can differ greatly based on elevation of the area and time of year. According to historical precipitation data, the upper elevations of the Black Hills can receive up to 24 inches annually, while most of the lower plains receive significantly less (Driscoll and others, 2002).

The PAA is in the Southern Black Hills, which includes two physiographic divisions that are characterized as the Black Hills and the Great Plains Divisions. The Black Hills Division generally consists of steep formations of metamorphosed and intensely compacted sedimentary rocks, which form a perimeter around an intrusion of Precambrian igneous and crystalline rocks. The sedimentary layers consist of aquifer formations that typically have high permeability, which allows for the transportation and storage of water. Aquifers are usually separated by an aquitard layer that restricts the vertical transport of water from one aquifer to the next. The aquifers generally receive a large amount of recharge from stream losses and infiltration. The infiltration rates can vary greatly due to variations in slope and soil and can have a significant impact on the base flow of natural streams (Driscoll and others, 2002).

The Great Plains physiographic division is characterized by relatively flat, rolling hills which are divided by low-sloping streams. The streams generally have well-developed natural drainage areas that primarily flow from west to east (Driscoll and others, 2002).

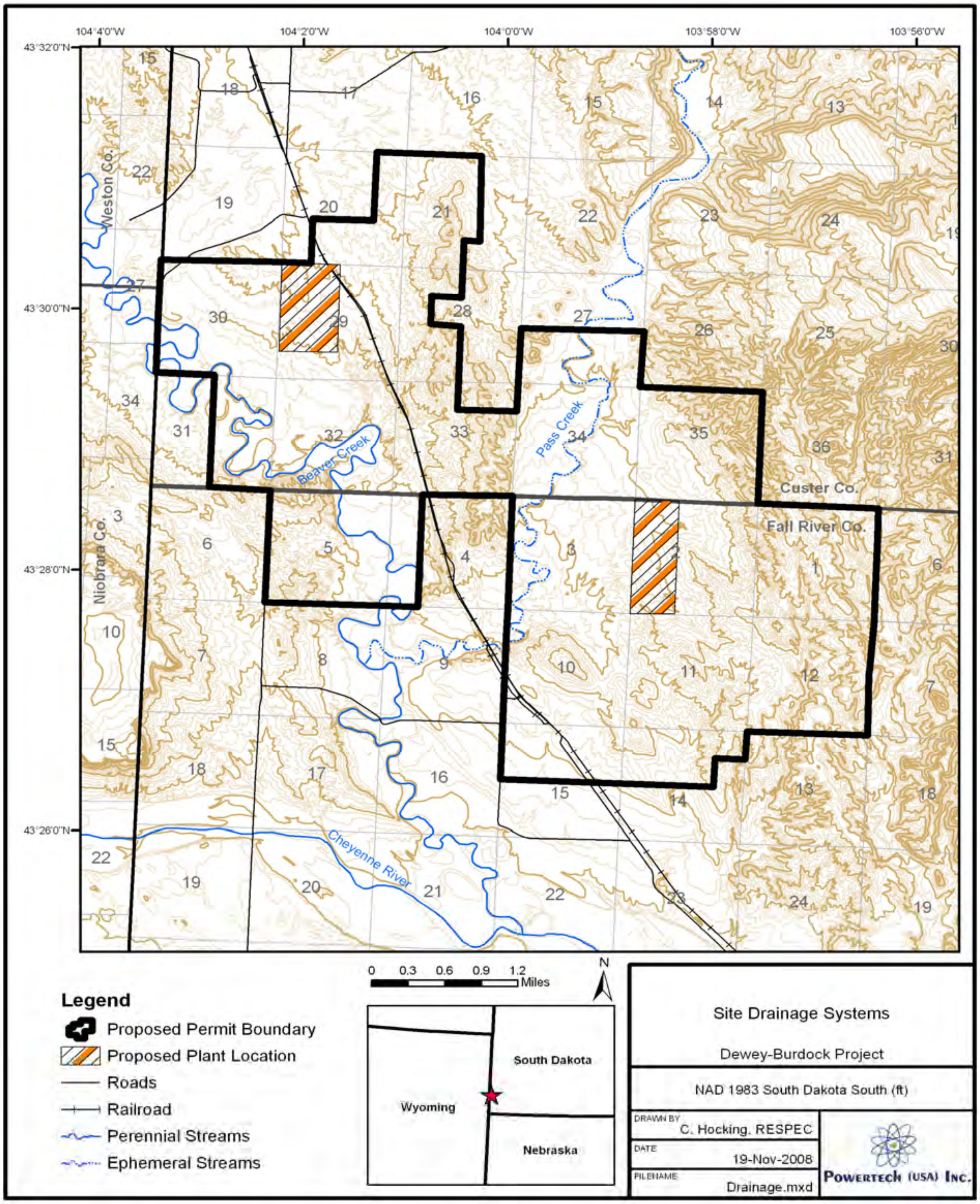


Figure 7.7-1 Site Drainage Systems

7.7.1.2 <u>Site Hydrology</u>

The local hydrology and surface water resources are described for the PAA and for the two main drainage systems that pass through the site (Beaver Creek and Pass Creek) (Figure 5.3-1).

7.7.1.3 Topography

The PAA is characterized by low to moderately sloping brush land with areas of moderately steep ridges. The elevation ranges from approximately 5190 feet to about 3310 feet within the site. The slopes within the site range from 0 percent to 92 percent, with an average slope of nearly 6 percent. Two primary facility zones exist within the PAA. Both the eastern and western facility zones have an average slope of nearly 3 percent.

7.7.1.4 Drainage Basins

The PAA lies primarily within the Beaver Creek Basin and is drained by both Beaver Creek and Pass Creek. The Pass Creek watershed is a sub-basin within the Beaver Creek basin, but the two watersheds were characterized as separate basins. The Beaver Creek system flows through the northwestern section of the PAA from the northwest to the southeast. The Pass Creek system flows south through the central portion of the PAA and joins Beaver Creek southwest of the PAA. Three miles south of this confluence, Beaver Creek converges with the Cheyenne River (Figure 5.3-1) which eventually flows into the Missouri River.

The nearest discharge gage on the Cheyenne River upstream of its confluence with Beaver Creek is USGS gage 06386500 near Spencer, WY. The nearest discharge gage downstream of the confluence of Beaver Creek and the Cheyenne River is USGS gage 06395000 at Edgemont, SD. This gage captures the contribution of flow to the Cheyenne River from Beaver Creek and Pass Creek between Spencer, WY and Edgemont, SD. Figure 7.7-2 shows an annual hydrograph for gage 06386500 from 1948 to 2008, and Figure 7.7-3 shows an annual hydrograph for gage 06395000 from 1903 to 2008. The lines in Figures 7.7-2 and 7.7-3 indicate the upper bound flow values for the 25th, 50th, and 95th flow percentiles for each of the 365 days per year. For example (in Figure 7.7-3), based on all of the January 1st flow values during 1903 to 2008 (106 data points), the flow was less than 1 cfs on 25 percent of those days (26 days), less than 4 cfs on 50 percent of those days (53 days) and less than 30 cfs on 95 percent of those days (101 days). Therefore, the graph indicates how variable the stream flow tends to be at various times during the year (e.g., more variable during a typical July than a typical November).

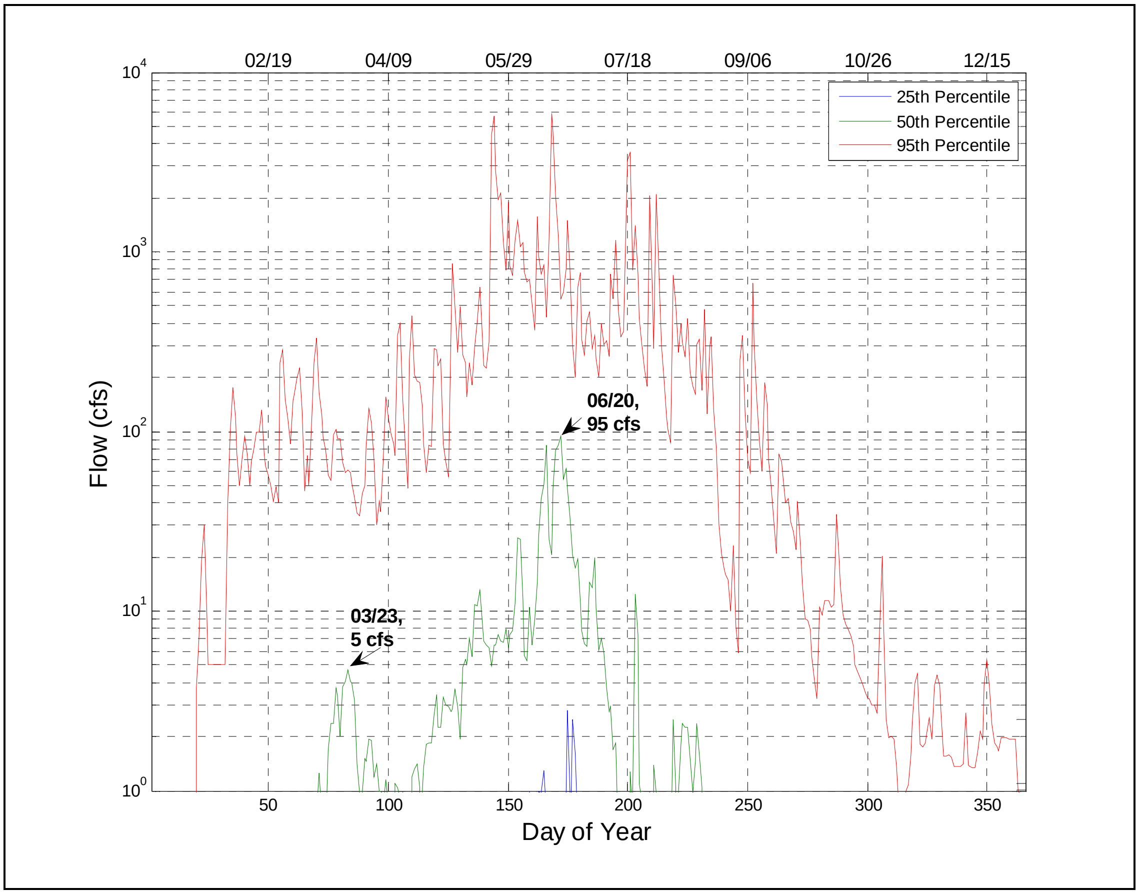


Figure 7.7-2 Annual Hydrograph for USGS Gage 06386500 on the Cheyenne River near Spencer, WY from 1948 to 2008

POWERTECH (USA) INC.

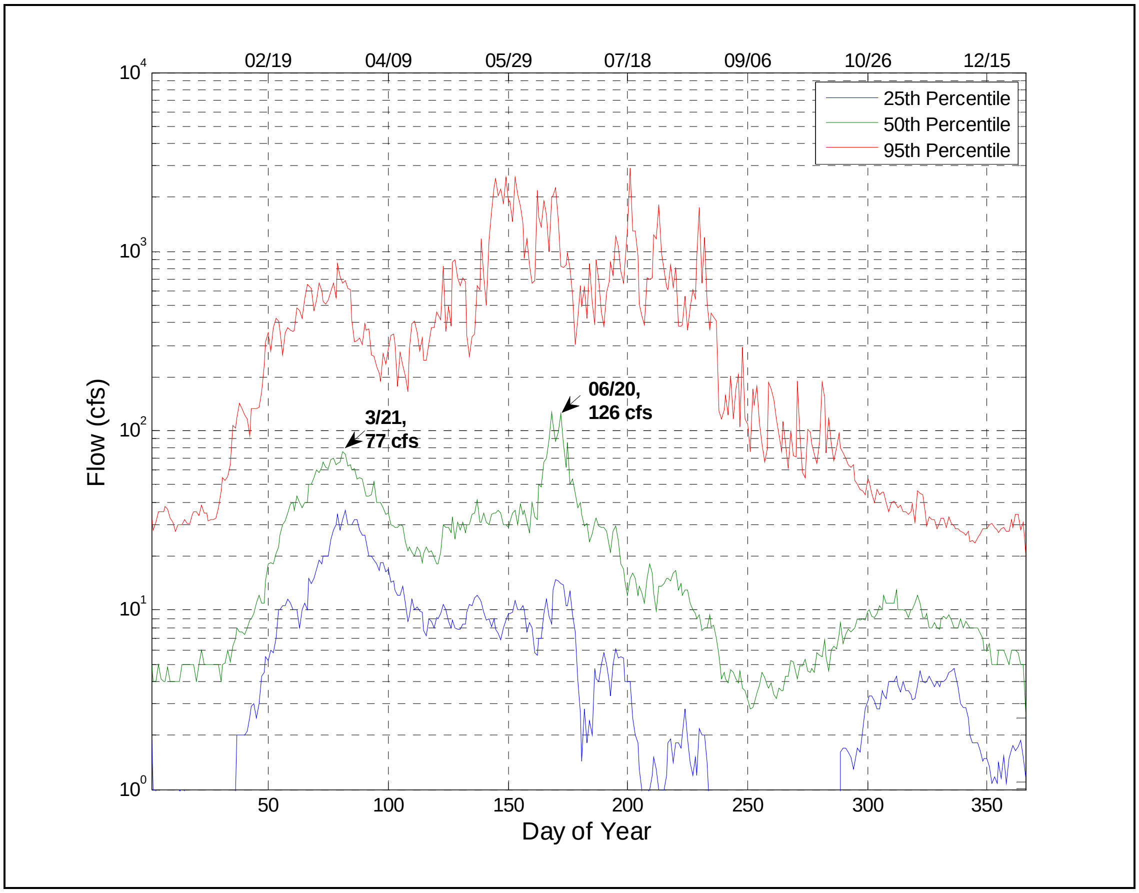


Figure 7.7-3 Annual Hydrograph for USGS Gage 06395000 on the Cheyenne River at Edgemont, SD from 1903 to 2008

7.7.1.4.1 Beaver Creek Basin

The Beaver Creek Basin is 1360 mi^2, excluding the Pass Creek sub-basin. It extends from a few miles northwest of Upton, WY to about eight miles southeast of Dewey, SD and lies within Weston, Niobrara and Crook Counties in Wyoming, and within Pennington, Custer and Fall River Counties in South Dakota. Beaver Creek is a perennial stream with ephemeral tributaries. Discharge data for Beaver Creek is collected at USGS gage 06394000 near Newcastle, WY (Figure 5.3-4). Figure 7.7-4 shows an annual hydrograph with the 25th, 50th and 95th flow percentiles for this gage from 1944 to 1998. Figure 7.7-5 shows monthly average flow data for this gage from 1944 to 1998.

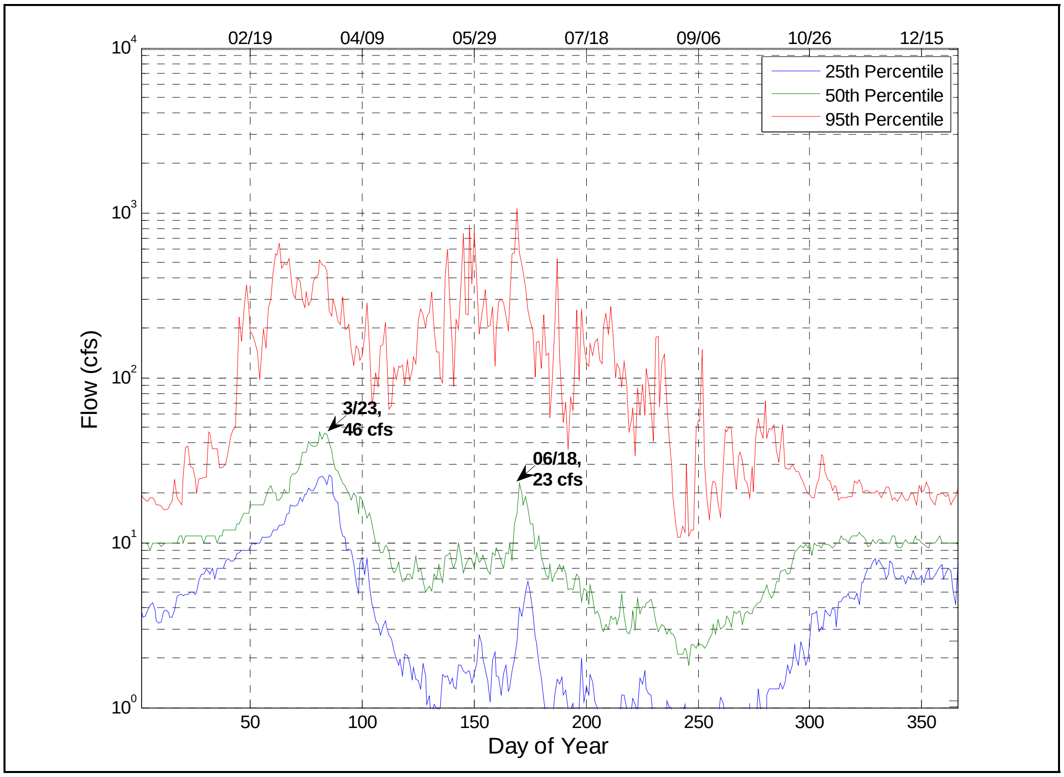


Figure 7.7-4 Annual Hydrograph for USGS Gage 06394000 on Beaver Creek near Newcastle, WY from 1944 to 1998

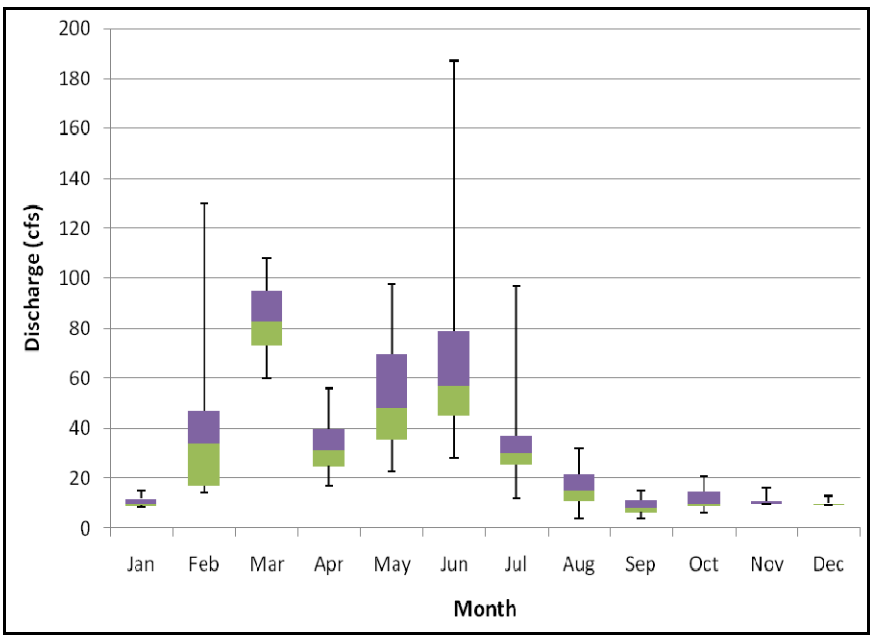


Figure 7.7-5 Monthly Average Flows at USGS Gage 06394000 on Beaver Creek near Newcastle, WY from 1944 to 1998

7.7.1.4.2 Pass Creek Watershed

The Pass Creek watershed, characterized as a subbasin of the larger Beaver Creek Basin, comprises most of the east-southeast portion of the Beaver Creek Basin and is almost fully contained in South Dakota. The Pass Creek watershed is 230 mi^2 and is located in Custer, Fall River, and Pennington Counties in South Dakota and a very small portion of Weston County in Wyoming. Pass Creek is dry except for brief periods of runoff following major storms. There is no permanent stream flow gage stationed along Pass Creek.

7.7.1.4.3 Project Boundary

The northwestern section of the PAA drains to Beaver Creek via an intermittent tributary. The north-central and east-central section of the PAA is drained via Pass Creek and smaller, ephemeral tributaries. The southeast portion of the PAA is also part of the Cheyenne River Basin that drains into the Cheyenne River through East Bennett Canyon. The PAA contains many intermittent streams and drainage channels, particularly in the eastern extent, that are consistently dry throughout the year. Stream flow only occurs in these channels after significant precipitation or snowmelt events and even then may not be of considerable amounts. Three small ephemeral stream channels cut through the primary facility zone in the eastern section of the PAA. Most of the small impoundments that exist within the PAA are dry during most of the year (Exhibit 7.9-1). Many of these existing impoundments are found along ephemeral streams and tributaries, particularly in the eastern section of the PAA.

7.7.1.4.4 Proximity of Surface Water Features to Proposed ISL Facilities

Beaver Creek is the primary surface water resource in the PAA. There will be no ISL operations within 0.4 miles of the Beaver Creek channel, with the exception of two very small areas of known ore bodies that may involve in situ leach well installations and associated piping (Refer to Exhibits 3.1-2).

Pass Creek is a secondary surface water resource in the PAA, although the channel is almost always dry. There will be no in situ leach operations within 0.5 miles of the Pass Creek channel, with the exception of one small orebody that may involve in situ leach well installations and associated piping.

The remaining surface water resources in the PAA are small intermittent stream channels and small ponds which are used by livestock when water exists. With the exception of two ponds in the eastern section of the PAA, just south of the Custer-Fall River County line, no ponds are located in the PAA primary facility zones. Several small, local drainage channels pass through the primary facility zone of the eastern site. The buildings, surface impoundments, and other major facilities constructed in these areas will be located far enough away from these intermittent drainage channels so that no flooding of the facilities will occur, and so that the occasional overland flow hydrographs will not be changed by the presence of these facilities.

7.7.1.5 Surface Water Run Off

7.7.1.5.1 General Approach

The potential for flood or erosion damage in the PAA was evaluated by developing a design flood using statistical methods and a computer model for watershed hydrology in accordance with NUREG-1569. Peak discharge of the design flood was then transformed to a water level using a computer model for stream hydraulics. This approach provides a floodplain map that shows the maximum area inundated by the design flood, as well as detailed information on the depth and velocity of flood water at points of interest in the study area. The 100-year event was used for the design flood, along with a much less likely flood referred to as an upper-bound flow or an extreme flow.

The 100-year event represents an appropriate level of risk for the evaluation of flood potential near the PAA facilities. The extreme flow event was used to demonstrate the additional extent of land that would be inundated between the 100 year event and floods that have an extremely low probability of occurring.

The uncertainty in the analysis and the flood potential at various locations in the PAA are evident when the two scenarios are compared. If a floodplain map shows a small increase in the area of land inundated by the 100-year and the extreme flows, compared to the distance and elevation difference between the edge of the 100-year floodplain and the nearest structure of concern, then the risk analysis is robust and the potential for flood damage to the nearest structure is extremely low. However, if a floodplain map shows a large increase in the area of land inundated between the 100 year and the extreme flows, compared to the distance and elevation difference between the edge of the 100 year floodplain and the nearest structure of concern, then the risk analysis may be too sensitive to the design event selected (i.e., the 100-year flood) and the potential for a flood to damage the nearest structure could be too high. This approach avoids attempts to quantify the 500-year or 1,000-year flood event for example, which involves significant uncertainty because the time period of the observed hydrologic data is too short for such a long return period.

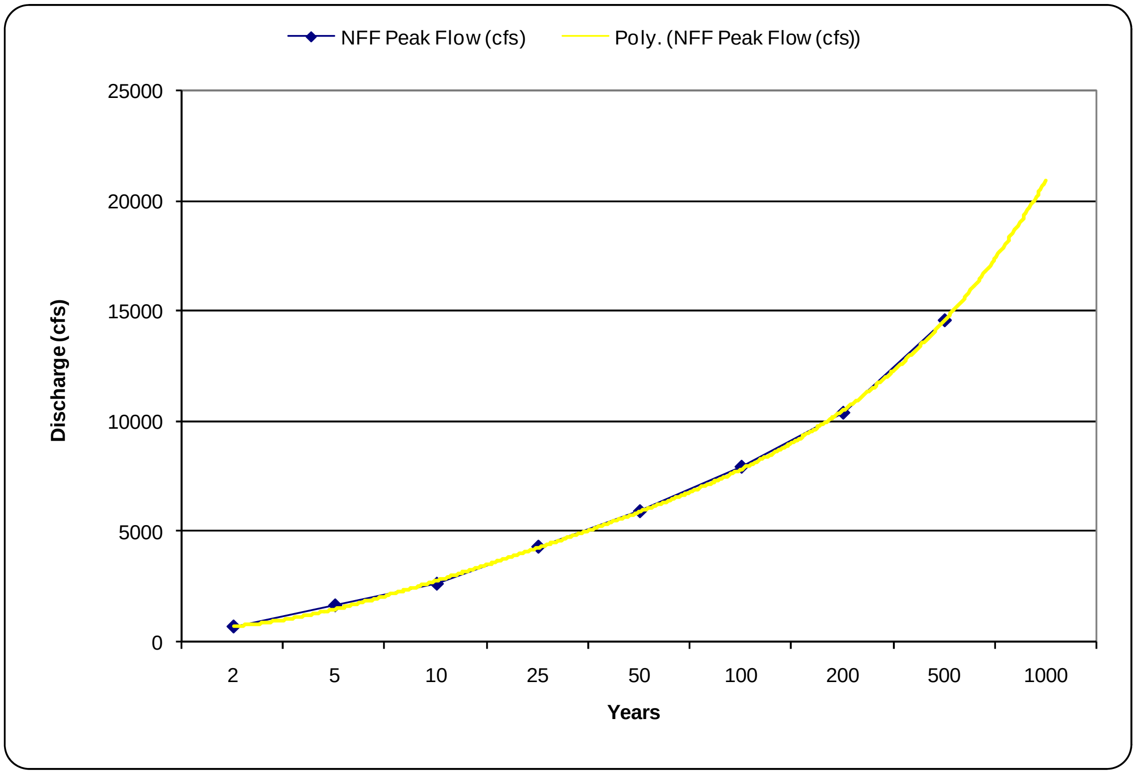
The 100-year flows were developed using hydrologic analyses for Beaver Creek and Pass Creek. These flows are then transformed to maximum water levels using a stream channel hydraulic model. Upper-bound flows, or extreme flows, were developed for each creek and used for comparison with the 100-year event. Floodplain maps showing the proximity of primary facility zones to the maximum level of floodwater were generated for each scenario.

7.7.1.5.2 Hydrologic Analysis – Beaver Creek

USGS gage number 06394000 is located along Beaver Creek near Newcastle, WY (Figure 5.3-1). Statistical methods were used to estimate the design flows. Three software programs were used: National Flood Frequency (NFF) Program 3.2 (Ries and Crouse, 2002), PKFQWin 5.0 (Flynn and others, 2006), and a Matlab Flood Frequency Analysis program (Rao and Hamed, 2000).

The NFF program uses sub-watershed areas, geographical information, and precipitation averages to estimate flood events based on regional regression analyses. The PKFQWin and Matlab programs use the 55 years of historical peak flow at gage 06394000 to estimate flood events. The NFF and PKFQW in methods compute estimated floods ranging from 2- to 500-year frequencies. Beyond that range, a fourth-order polynomial trend-line was used to estimate an extreme condition flood with a relative return period of approximately 500 years to 1500 years.

The sub-watershed areas required by the NFF program were established using ArcHydro 9.2, a GIS watershed delineation tool. The watershed boundaries were in Regions Two (Central Basin and Northern Plains) and Four (Eastern Mountains). Watershed areas for these regions are 971 mi^2 and 387 mi^2, respectively. The analysis for Region Four also required values for mean March precipitation (1.05 inches) – obtained from the National Oceanic and Atmospheric Administration (NOAA) – and latitude of the basin outlet (43.6 degrees north). The discharge results from the NFF program with return periods ranging from 2 to 500 years are given in Figure 7.7-6. The figure also shows the fourth-order polynomial trend-line used to extrapolate the NFF results to an extreme condition flood. The flood estimates from the NFF approach are listed in Table 7.7-1.



Note: Obtained from the NFF program and extrapolated with a 4th order polynomial trend-line to estimate and extreme condition flood.

Figure 7.7-6 Beaver Creek Flood Estimates

Table 7.7-1 Flood Estimate Results for Beaver Creek

Recurrence Interval (years)	Peak Flow (cfs)
2	700
5	1,660
10	2,640
25	4,320
50	5,930
100	7,950
200	10,400
500	14,600
Extreme Condition	22,000

The Matlab program used seven distributions to analyze the historical peak flows. The program ran a test hypothesis on the estimated flood events using the Klomo-Smirnov and Chi-squared procedures. Of the seven distributions, the Klomo-Smirnov method was accepted for the Log Pearson Type III distribution. The flood estimates from the Matlab programs are shown in Table 7.7-2.

Table 7.7-2 Flood estimate results for Beaver Creek

Recurrence Interval (years)	Peak Flow (cfs)
100	6,570
200	7,910
Extreme Condition	11,500

PKFQWin used a Pearson Type III distribution with a weighted and generalized skew, and computed slightly higher results than the NFF program. The PKFQWin results are shown in Table 7.7-3.

Table 7.7-3 PKFQWin Flood Estimate Results for Beaver Creek

Recurrence Interval (years)	Weighted Peak Flow (cfs)	Generalized Peak Flow (cfs)
5	1,840	1,870
10	2,750	2,700
25	4,340	4,070
50	5,940	5,350
100	7,980	6,870
200	10,560	8,680
500	15,030	11,600
Extreme Condition	23,000	17,000

The flood estimates for Beaver Creek are summarized in Table 7.7-4. The final flow values selected for the floodplain analysis of Beaver Creek were 7,990 cfs and 23,000 cfs representing the 100 year and extreme condition floods, respectively. These values were chosen because they represent the most conservative design flow estimates.

Table 7.7-4 Summary Flood Estimate for Beaver Creek

Recurrence Interval (years)	PKFQWin Estimate (cfs)	NFF Estimate (cfs)	MATLAB Estimate (cfs)
100	7,990	7,950	6,570
Extreme Condition	23,000	22,000	11,500

7.7.1.5.3 Hydrologic Analysis – Pass Creek

There are no gage sites along Pass Creek or its tributaries (Hell Canyon, West Hell Canyon, Sourdough Draw, and Tepee Canyon) to provide accurate flow data. To obtain design flow values for the stream channel of Pass Creek within the PAA, a rainfall runoff model was used along with design rainfall to generate stream flows with a range of exceedance probabilities. The 100-year event was used as the primary condition for evaluating the risk of flooding and erosion in the Pass Creek area. An upper bound or extreme condition was represented by 50 percent of an estimated probable maximum flood, for comparison with the 100-year event.

The Hydrologic Modeling System (HEC-HMS) is designed to simulate the precipitation-runoff processes of dendritic watershed systems. The Geospatial Hydrologic Modeling Extension (HEC-GeoHMS) is a software package for use with the ArcView Geographic Information System (GIS). HEC-GeoHMS analyzes digital terrain information and transforms the drainage paths and watershed boundaries into a hydrologic data structure that represents the watershed response to precipitation.

In order to use the HEC-HMS model a high resolution DEM was developed. Contour data from the U.S. Geological Survey 1:24,000 topographic maps were used with ArcGIS to create a grid of elevation data. Plotting stream elevation values against distance downstream indicated that adjacent stream vertices were within two feet of each other, providing good accuracy for this type of analysis.

The HEC-GeoHMS basin model of the Pass Creek watershed was imported into HEC-HMS and the meteorological models and control specifications were created. The 100-year/24-hour storm and the probable maximum precipitation (PMP) were used as the driving precipitation events. Estimates for the 100-year/24-hour storm were obtained from the national depth-duration-frequency maps (US Department of Commerce) (Table 7.7-5). The PMP estimate was obtained from HMR-51 depth-area-duration maps (Schreiner and Riedel, 1978) (Table 7.7-6). The comprehensive approach of HMR-52 (Hansen, et al, 1982) for developing a probable maximum flood (PMF) was not used. Instead, a simplified approach was developed using the PMP estimate as with conventional rainfall runoff modeling techniques. The resulting flood is therefore referred to as an estimated probable maximum flood (estimated PMF) and represents an appropriate extreme event for comparison with the 100-year event. Figure 7.7-7 shows a graphical representation of the PMP estimates for the Pass Creek watershed's geographical location. The depths and durations for the PMP on the Pass Creek watershed are shown in Table 7.7-7.

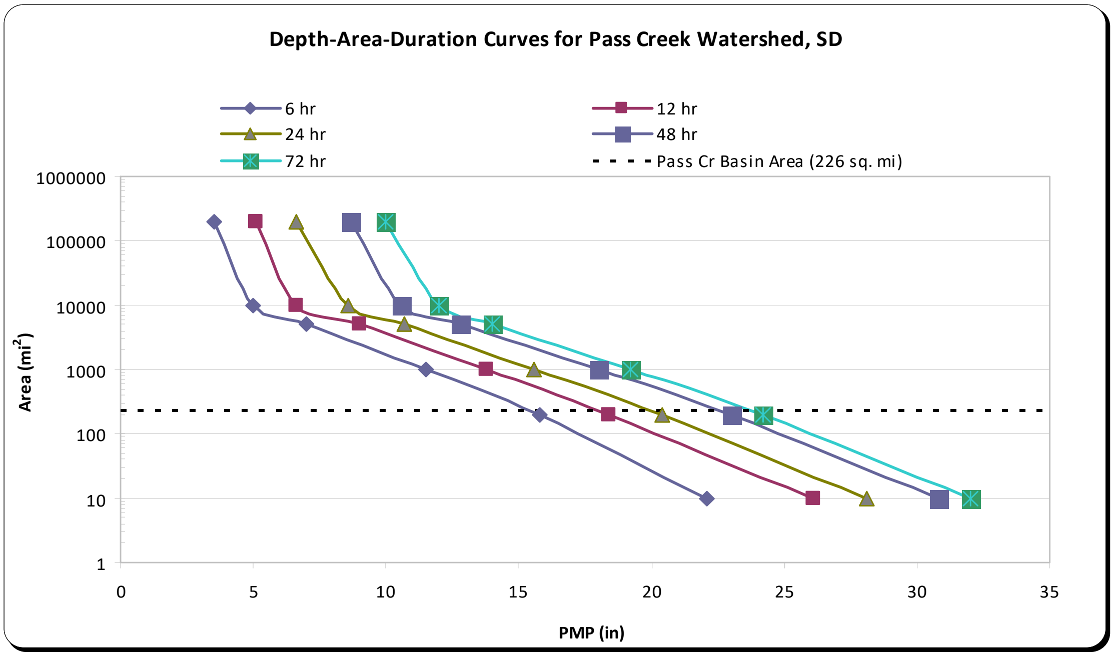
Table 7.7-5 Depth-Duration Data for the 100-Year Storm Event

100-year Storm	
Duration	Depth (in)
5 min	0.79
15 min	1.58
60 min	2.50
2 hour	3.00
3 hour	3.20
6 hour	3.60
12 hour	4.10
24 hour	4.80

Table 7.7-6 Probable Maximum Precipitation (PMP)

	Duration (hr)				
Area (mi^2)	6	12	24	48	72
10	22.1	26.1	28.1	30.8	32
200	15.8	18.4	20.4	23	24.2
1000	11.5	13.8	15.6	18	19.2
5000	7	9	10.7	12.8	14
10000	5	6.6	8.6	10.6	12
200000	3.5	5.1	6.6	8.7	10

Source: from HMR-51 (Schreiner and Riedel, 1978)
Note: Data in inches



Source: developed from probable maximum precipitation (PMP) estimates obtained from HMR-51 (Schreiner and Riedel, 1978)

Figure 7.7-7 Depth-Area-Duration Curves for the Pass Creek Watershed in SD

Table 7.7-7 Interpolated Estimates for the Probable Maximum Precipitation (PMP) for the Pass Creek Watershed in SD

	Duration (hr)				
Area (mi^2)	6	12	24	48	72
226	15.7	18.3	20.2	22.8	24.0

Two control specifications (time periods used to capture the response of a watershed from a precipitation event) were created for the HEC-HMS model of the Pass Creek watershed. The first used a 4-day duration with 15-minute time intervals for the 100-year/24-hour storm, and the second used a seven day duration with six hour time intervals for the PMP.

The loss and transform methods used in the HEC-HMS model of the Pass Creek watershed were the SCS Curve Number and SCS Unit Hydrograph, respectively. Both of these methods rely heavily on a curve number (CN) which is a characterization of soil type, land use and cover, and antecedent soil moisture. These parameters were estimated based on a field inspection of the Pass Creek watershed on May 21, 2008, on the Soil Survey Geographic (SSURGO) Database and on county land use data. Parameters for the loss and transform methods include CN, storage (S), initial abstraction (I_a) and lag time (t_l).

Curve numbers were assigned to different sub-watershed sectors, and area-weighted CNs were developed for the entire Pass Creek watershed for standard conditions (CN = 57) and for conservative conditions (CN = 63). An impervious area of five percent was also estimated based on field investigations. The CN of 63 was used in the model, providing a conservative approach because the higher CN would result in a larger percentage of rainfall becoming runoff.

The parameter values used in the loss and transform methods of the model were a CN of 63, S equal to 5.87 inches, I_a of 1.18 inches and t_l equal to about 1,231 minutes. The values of S, I_a and t_l are based on the CN in that their value is heavily influenced by the value of the CN.

The output results for both precipitation events in the HEC-HMS model of the Pass Creek watershed are shown in Table 7.7-8. Due to the extreme condition represented by the PMP meteorological model, the estimated PMF was reduced by a factor of 0.5. This resulted in a 50 percent estimated PMF peak discharge of approximately 32,800 cfs.

Table 7.7-8 Discharge Results for the Single Basin Model of the Pass Creek Watershed

Event	Peak Discharge (cfs)
100yr	5620
Estimated PMF	65600
50% Estimated PMF	32800

The final flow values used for input to the HEC-RAS model of Pass Creek were 5,620 cfs and 32,800 cfs representing the 100-year and extreme condition floods, respectively. These flow values resulted from a conservative approach to parameter estimation and modeling. The model used the higher CN and a single basin versus many smaller sub-basins with routing. This combination results in a larger instantaneous peak flow entering the stream channel of Pass Creek within the PAA. The extreme condition flood is only included to illustrate the extent of the flood plain during an extremely low probability flood event, and its relation to the primary facility zones. The estimated PMF and 50 percent of the estimated PMF are extremely rare events and represent conditions much more severe than the design scenarios discussed in NRC 1569 for in situ leach extraction operations.

7.7.1.5.4 Floodplain Analysis – Beaver Creek and Pass Creek

The stream channels of both Beaver Creek and Pass Creek within the PAA were each modeled using the Hydraulic Engineering Center River Analysis System (HEC-RAS) and the Geospatial River Analysis Extension (HEC-GeoRAS) to determine the spatial representation of the floodplains resulting from the simulated 100-year flood and extreme condition flood.

HEC-RAS software simulates one-dimensional steady and unsteady river hydraulics. The system can handle a full network of channels, a dendritic system, or a single river reach. HEC-RAS is capable of modeling subcritical, supercritical, and mixed flow regime water surface profiles.

The Geospatial River Analysis Extension (HEC-GeoRAS) is a set of ArcGIS tools specifically designed to process geospatial data for use with HEC-RAS. The extension enables efficient creation of a HEC-RAS import file containing geometric data from an existing digital terrain model (DTM) and a National Hydrography Dataset (NHD) flowlines shapefile. Results exported from HEC-RAS may also be processed using HEC-GeoRAS to create layers and floodplain maps in ArcMap.

The HEC-RAS model is based largely on a framework of geometric data which provides a representation of the physical characteristics of a river. For both Beaver Creek and Pass Creek, HEC-GeoRAS was used to extract the necessary elevation and geometric data for the channel and floodplain from the same DEM developed for the HEC-HMS analysis. The process for each creek was nearly the same except for the extra details required to characterize the two bridges spanning Pass Creek just downstream of the southern portion of the PAA. The road and railroad bridges had the potential to cause backwater effects and were therefore included in the Pass Creek analysis though they were outside of the PAA. The geometry and elevation data of both bridges were measured on April 12, 2008.

The geometry files generated with HEC-GeoRAS in ArcGIS were imported into HEC-RAS and inspected for completeness. For each creek, ineffective flow areas were added where necessary and Manning's n values were assigned for the left overbank, the channel, and the right overbank. Conservative Manning's n values were established during a field inspection of the Beaver Creek and Pass Creek channels within the PAA on May 21, 2008 (Table 7.7-9). Figures 7.7-8 and 7.7-9 are photos of the Beaver Creek and Pass Creek stream channels along with their floodplains taken during the site inspection.

Data entry for the bridges in the downstream section of Pass Creek was manually performed. Low flow calculation methods for the road bridge and railroad bridge included the energy and momentum methods. Pressure and weir methods were used for high flow computation of the road bridge while energy only was used for the railroad bridge.

Table 7.7-9 Manning's n Values for the Beaver Creek and Pass Creek Channels

Creek	Manning's n Value		
	Left Overbank	Channel	Right Overbank
Beaver, upstream	0.060	0.045	0.060
Beaver, downstream	0.053	0.040	0.053
Pass	0.065	0.050	0.065

Note: based on field observations

Two steady flow profiles were created for each creek: the 100-year flood and the extreme condition flood (a 500-year – 1500-year flood for Beaver Creek and 50 percent of the estimated PMF for Pass Creek). Flow estimates generated from PKFQWin and HEC-HMS were entered for each profile of Beaver Creek and Pass Creek, respectively. Downstream boundary conditions used normal depth with updated slopes of the energy grade lines.

Note: location is in the northern extent of the PAA along the South Dewey Road, looking west

Figure 7.7-8 The Beaver Creek Stream Channel and Floodplain

Note: location is in the southwest extent of the PAA, just east of the confluence with Beaver Creek. Photo taken from the road bridge along South Dewey Road, looking east.

Figure 7.7-9 The Pass Creek Stream Channel and Floodplain

7.7.1.5.5 <u>Floodplain Analysis – Results</u>

The HEC-RAS analysis involved an iterative procedure of creating a model run – based on an input geometry file and a steady flow profile(s) – and reviewing output summary tables and warning and error messages. From this process, the geometry file was revised multiple times by adding cross sections to adequately balance the energy losses throughout the model for each creek.

The final model results for the spatial representation of the 100-year floodplains for Beaver Creek and Pass Creek within the PAA are shown in Figures 7.7-10 and 7.7-11, respectively. The figures indicate the relationship of the maximum extent of the 100-year floodplain to the locations of the primary facility zones and the known ore bodies. The horizontal and vertical distances separating the primary facility zones and known ore bodies from the 100-year floodplain for each creek are shown in Table 7.7-10.

Table 7.7-10 Proximity Data for the 100 Year Floods of Beaver Creek and Pass Creek

Creek	Concern	Horizontal Distance (ft)	Vertical Distance (ft)
Beaver			
	Facilities	2,190	32
	Ore Bodies	170	15
Pass			
	Facilities	2,180	30
	Ore Bodies	340	10

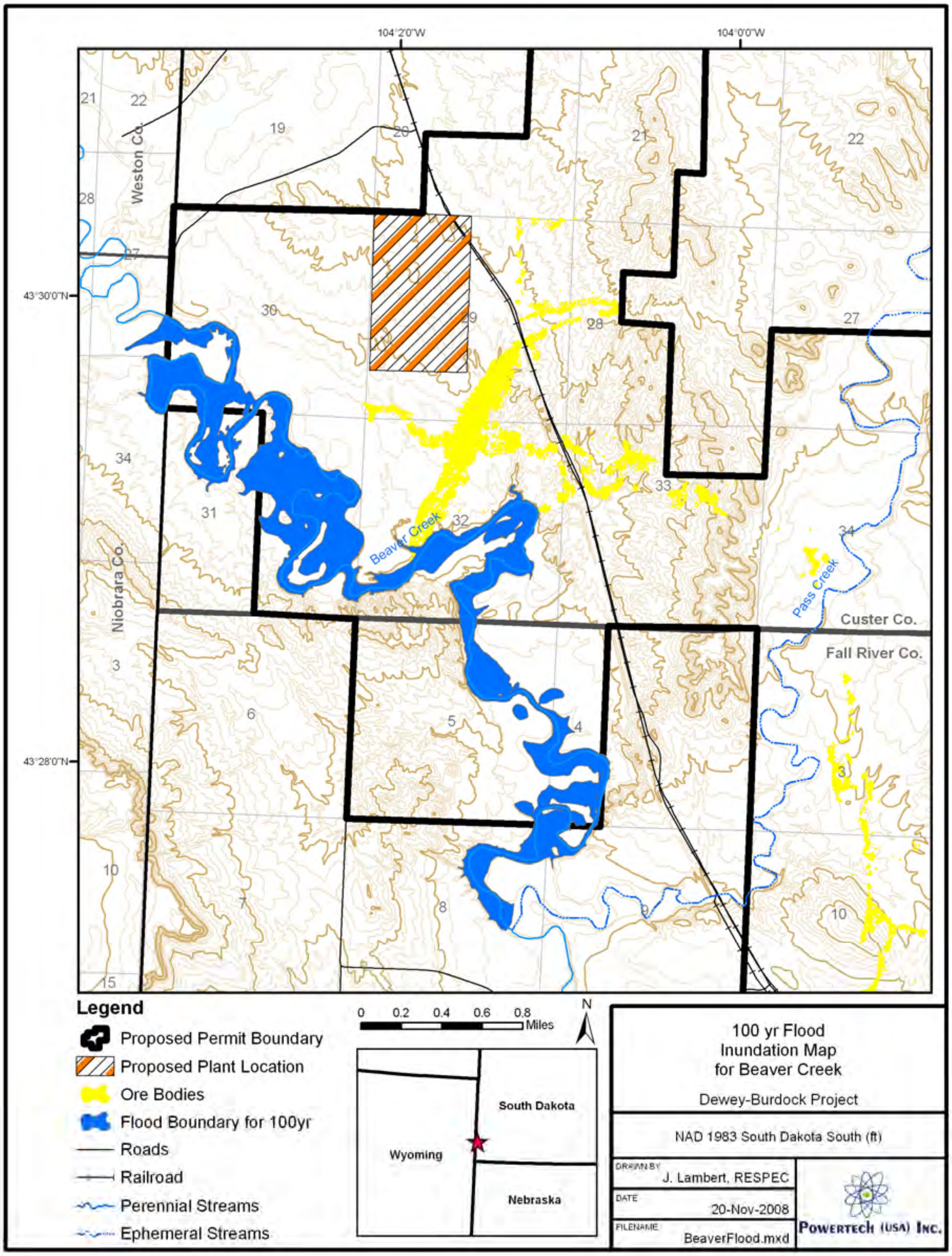


Figure 7.7-10 100 Year Inundation Map for Beaver Creek

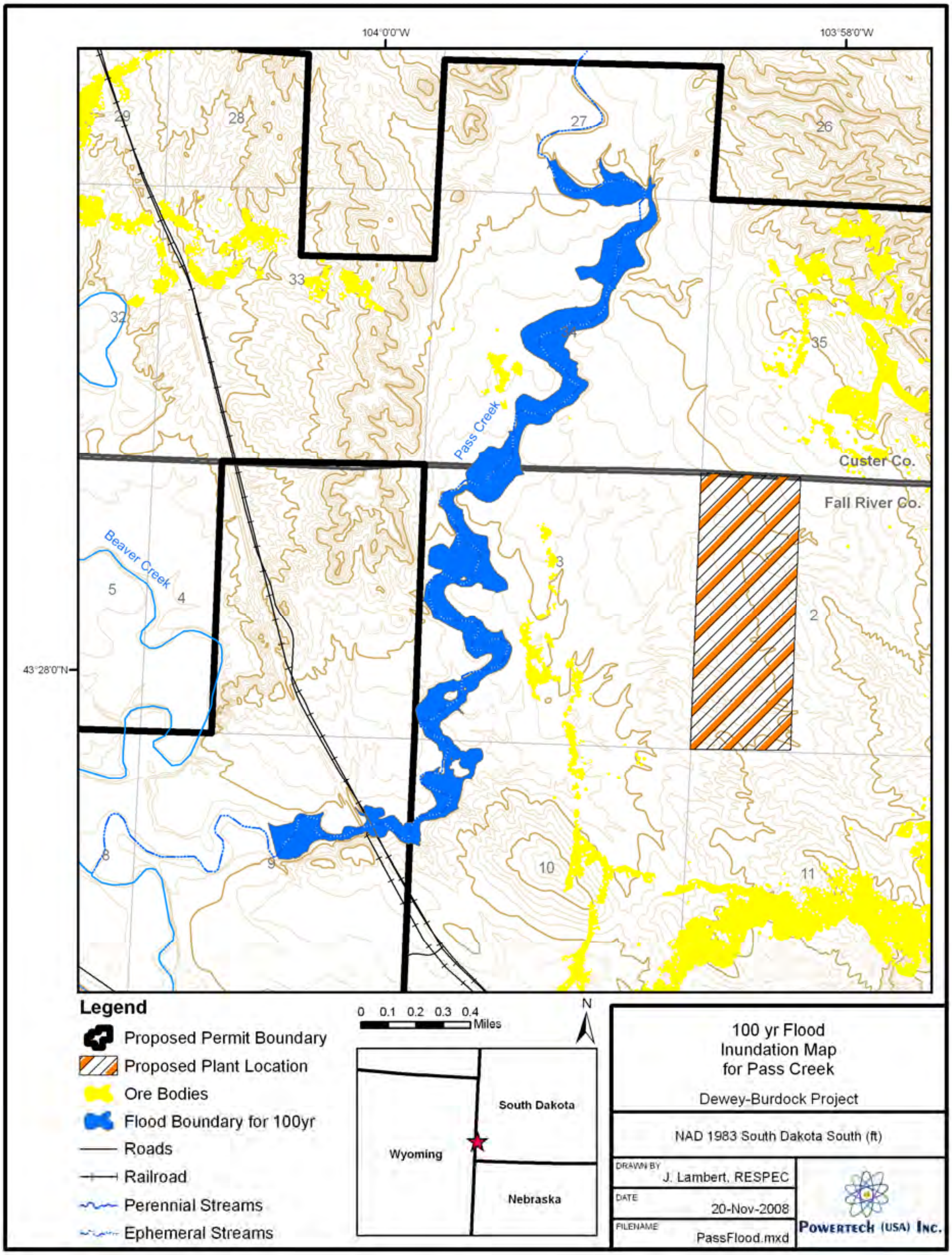


Figure 7.7-11 100 Year Inundation Map for Pass Creek

The final model results for the spatial representation of the extreme condition floodplains for Beaver Creek and Pass Creek within the PAA are shown in Figures 7.7-12 and 7.7-13, respectively. The figures indicate the relationship of the maximum extent of the extreme condition floodplain to the locations of the primary facility zones and the known ore bodies. The horizontal and vertical distances separating the primary facility zones and known ore bodies from the extreme condition floodplain for each creek are shown in Table 7.7-11. The sole purpose of including the extreme condition flood in the analysis for flood and erosion potential is to illustrate that there is very little additional land area inundated by the extreme condition floods than by the 100-year floods. The risk of flood or erosion damage to the PAA facilities from Beaver and Pass Creeks is extremely low.

The inundation maps of Pass Creek indicate that known ore bodies in the upstream section of the creek would become inundated. It is estimated that the water depths would be 15 feet for the 100-year flood and approximately 25 feet for the extreme condition flood.

Table 7.7-11 Proximity Data for the Extreme Condition Floods of Beaver Creek and Pass Creek

Creek	Concern	Horizontal Distance (ft)	Vertical Distance (ft)
Beaver			
	Facilities	2,180	27
	Ore Bodies	165	10
Pass			
	Facilities	1,960	25
	Ore Bodies	180	2

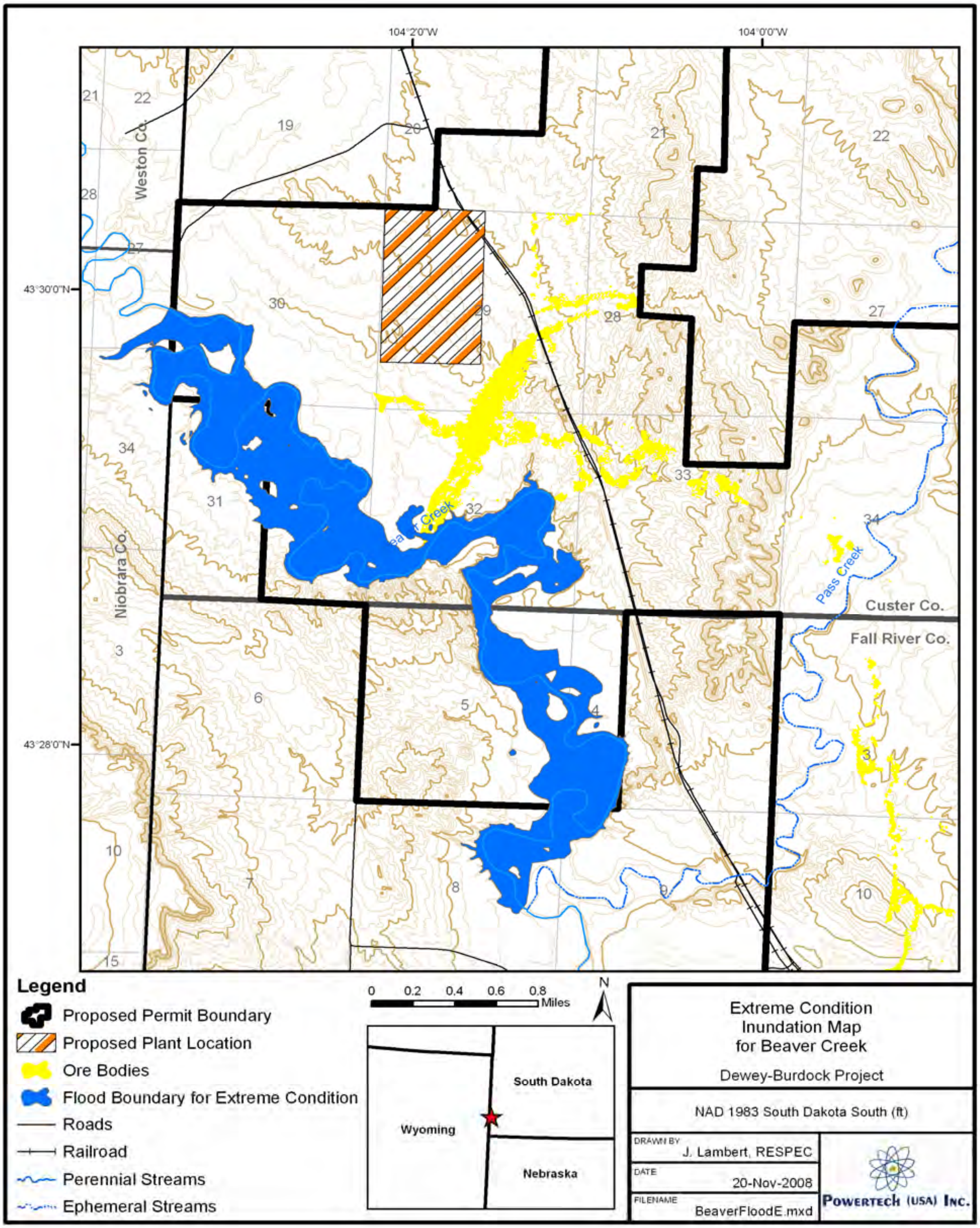


Figure 7.7-12 Extreme Condition Inundation Map for Beaver Creek

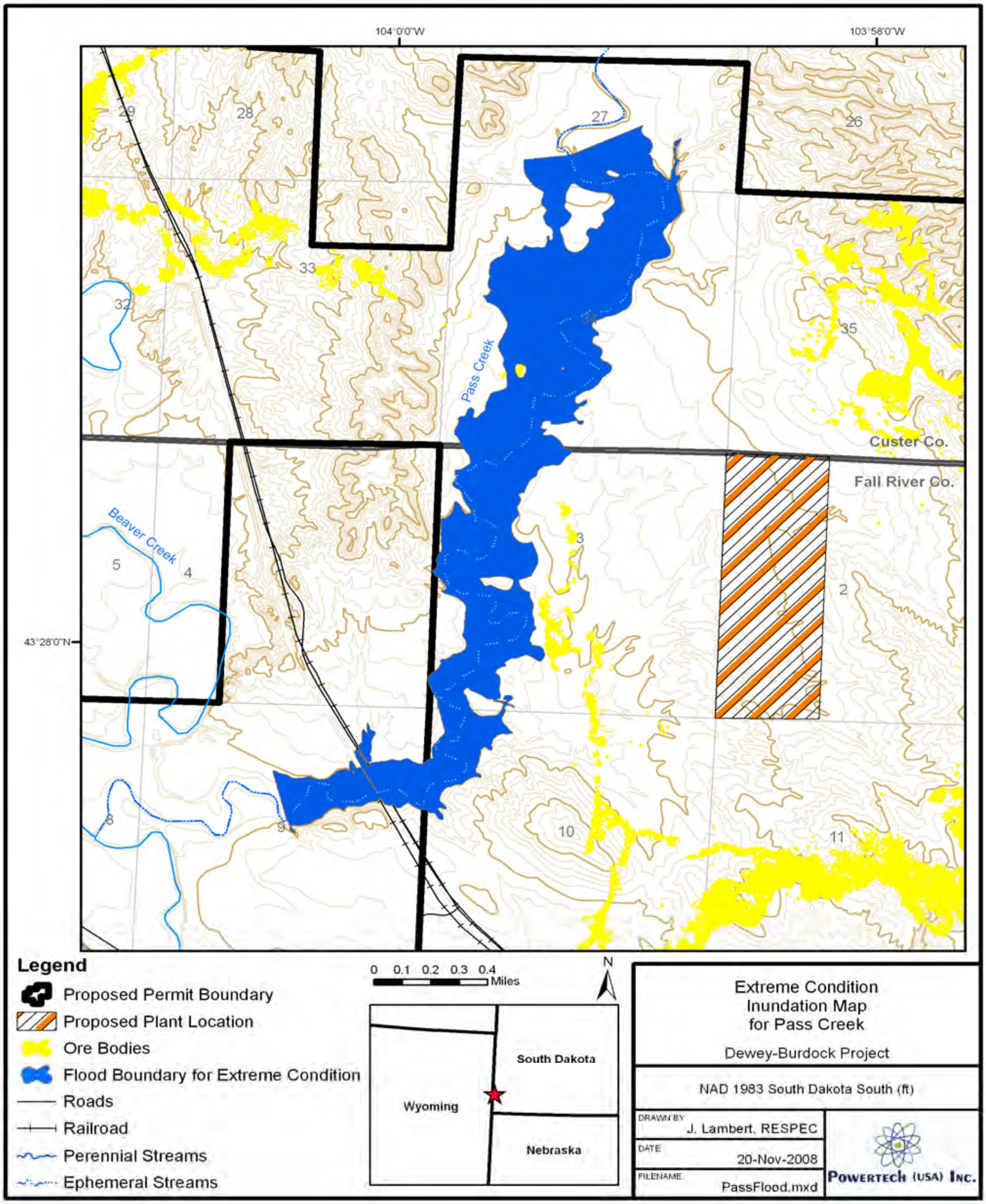


Figure 7.7-13 Extreme Condition Inundation Map for Pass Creek

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7.7.1.5.6 Flooding and Erosion in Local Drainages

There are no significant local drainage systems that could impact the primary facility zone in the western area of the project site (e.g., buildings housing critical processes, or surface impoundments). There are several small, local drainage systems that could occasionally produce flow in small channels that pass through the primary facility zone in the eastern section of the PAA. The largest system drains a 0.5 square mile catchment (measured upstream of the eastern border of the proposed eastern primary facility zone, 0.2 miles south of the Custer-Fall River County line). The average slope of this watershed is 3 percent, and the channel slope just upstream of the primary facility zone is 2 percent. The maximum length of the drainage path from the primary facility zone upstream to the drainage divide is one mile. Several other drainage systems that could occasionally carry flow through the proposed site are similar to this system, but have smaller drainage areas.

These small catchments could occasionally produce floods with significant flow but relatively short duration. Velocities of concentrated flow created by the existing rainfall runoff processes are high enough to erode these channels. The project operations can be protected from impacts due to erosion and flooding related to these local systems by applying standard engineering methods associated with urban storm water management. Specific structures and facilities should be located out of the drainage paths of these catchments. Construction should not occur in areas where the structure could alter the existing runoff hydrograph or reduce the existing stability of the drainage channels. On-site runoff due to roofs, parking lots and other impervious areas constructed for the project should be managed so that it is released to the natural channel systems without increasing the erosion that would naturally occur due to runoff from the watersheds upstream of the project facilities.

7.7.1.5.7 7.7.1.5.7 Assessment of Levels of Surface Water Bodies

The purpose of the assessment is to characterize the typical seasonal ranges and averages as well as the historical extremes of levels of surface water bodies within the PAA. Surface water bodies within the PAA are surface impoundments such as ponds and old mine pits. Historical stage data for these surface water bodies is unavailable, and the stage data that has been collected is very limited. The available data for this assessment was collected at 16 sites from October 2, 2007 to July 18, 2008. A summary of this data is shown in Table 7.7-12 which was populated according to site location (Feature ID). Stage data at three of the 16 sites was collected only once while every other site had at least two records with one site having five records. Two of the 13 sites with at least two records had data recorded within three months of each record which would not capture the potential seasonal range of the water level for those two sites. The largest positive and negative changes in water levels over the period of collection were 2.43 feet and -0.48 feet, respectively. The smallest change overall was 0.04 feet. The largest rate of change in water level for each site over its period of collection was 0.011 feet per day or about 0.13 inches per day. The surface water bodies with the largest change in water level are located near the Darrow Mine Pits approximately two miles northeast of Burdock (Feature IDs 10032, 10033 and 10052). Another surface water body is located approximately two miles south of the Darrow Mine which represents the smallest change in water level of any of the surface water bodies (Feature ID 10040). These water level changes were recorded at sites with at least two records and a minimum time span of 206 days which represents the most sufficient data available to characterize the seasonal ranges for water levels of the surface water bodies within the PAA. Further discussion about the interaction between ground water and surface water bodies is provided in the ground water report.

Table 7.7-12 Summary of Water Level Data Collected at Surface Water Bodies

Feature ID	Data Records	Time Interval of Greatest Stage Change (days)	Stage Change (ft)	Stage Change Rate (ft/day)
10024	2	32	0.19	0.0059
10025	2	229	-0.24	-0.0010
10027	1	*NA*		
10030	4	110	0.25	0.0023
10031	4	240	0.78	0.0033
10032	3	206	2.3	0.0112
10033	4	234	2.43	0.0104
10034	1	*NA*		
10039	2	89	0.52	0.0058
10040	2	206	0.04	0.0002
10050	2	234	1.35	0.0058
10051	3	215	0.54	0.0025
10052	3	229	-0.48	-0.0021
10054	3	229	0.75	0.0033
10059	1	*NA*		
10070	5	89	0.63	0.0071

Note: Feature ID denotes Surface Water Body

7.8 Regional Groundwater Hydrology

Four major aquifers are utilized as groundwater resources in the Black Hills. These main aquifers are the Inyan Kara, Minnelusa, Madison, and Deadwood. The groundwater hydrology is influenced by distribution and variation in recharge, leakage between overlying and underlying hydrogeologic units, lateral flow within the aquifers, and discharge to pumping wells, artesian wells, and springs.

Regionally, the general direction of groundwater flow is downdip or radially away from the central part of the Black Hills where the aquifers are recharged via infiltration from local rainfall. The aquifers transition from unconfined at the outcrop areas to confined away from the central highlands. At some distance away from the highlands the groundwater often is under sufficient pressures for artesian conditions and flowing artesian wells to exist.

Refer back to Figure 5.2-3, which provides an overview of the hydrologic setting and general hydrogeologic flow within the Black Hills.

7.8.1 Regional Hydrostratigraphic Units

This section summarizes the aquifers in the Black Hills, including general characteristics and hydraulic properties. Hydrologic units of interest within the Black Hills area are shown on the stratigraphic column in Figure 7.1-2. Table 7.8-1 (from Driscoll et al., 2002) summarizes hydraulic properties of major aquifers determined in previous investigations.

Table 7.8-1 Estimates of Hydraulic Conductivity, Transmissivity, Storage Coefficient, and Porosity of Major Aquifers from Previous Investigations

[ft/d, feet per day; ft^2/d, feet squared per day; --, no data; <, less than]

Source	Hydraulic conductivity (ft/d)	Transmissivity (ft^2/d)	Storage coefficient	Total porosity/ effective porosity	Area represented
Precambrian aquifer					
Rahn, 1985	--	--	--	0.03/0.01	Western South Dakota
Galloway and Strobel, 2000		450 - 1,435		0.10/--	Black Hills area
Deadwood aquifer					
Downey, 1984	--	250 - 1,000	--	--	Montana, North Dakota, South Dakota, Wyoming
Rahn, 1985	--	--	--	0.10/0.05	Western South Dakota
Madison aquifer					
Konikow, 1976	--	860 - 2,200	--	--	Montana, North Dakota, South Dakota, Wyoming
Miller, 1976	--	0.01 - 5,400	--	--	Southeastern Montana
Blankennagel and others, 1977	$2.4x10^{-5}$ - 1.9	--	--	--	Crook County, Wyoming
Woodward-Clyde Consultants, 1980	--	3,000	$2x10^{-4}$ - $3x10^{-4}$	--	Eastern Wyoming, western South Dakota
Blankennagel and others, 1981	--	5,090	$2x10^{-5}$	--	Yellowstone County, Montana
Downey, 1984	--	250 - 3,500	--	--	Montana, North Dakota, South Dakota, Wyoming
Plummer and others, 1990	--	--	$1.12x10^{-6}$ - $3x10^{-5}$	--	Montana, South Dakota, Wyo-ming
Rahn, 1985	--	--	--	0.10/0.05	Western South Dakota
Cooley and others, 1986	1.04	--	--	--	Montana, North Dakota, South Dakota, Wyoming, Nebr.
Kyllonen and Peter, 1987	--	4.3 - 8,600	--	--	Northern Black Hills
Imam, 1991	$9.0x10^{-6}$	--	--	--	Black Hills area
Greene, 1993	--	1,300 - 56,000	0.002	0.35/--	Rapid City area
Tan, 1994	5 - 1,300	--	--	0.05	Rapid City area
Greene and others, 1999	--	2,900 - 41,700	$3x10^{-4}$ - $1x10^{-3}$	--	Spearfish area
Carter, Driscoll, Hamade, and Jarrell, 2001	--	100 - 7,400	--	--	Black Hills area
Minnelusa aquifer					
Blankennagel and others, 1977	$<2.4x10^{-5}$ - 1.4	--	--	--	Crook County, Wyoming
Pakkong, 1979	--	880	--	--	Boulder Park area, South Dakota
Woodward-Clyde Consultants, 1980	--	30 - 300	$6.6x10^{-5}$ - $2.0x10^{-4}$	--	Eastern Wyoming, western South Dakota

Table7.8-1 Estimates of Hydraulic Conductivity, Transmissivity, Storage Coefficient, and Porosity of Major Aquifers from Previous Investigations (concl.)

Source	Hydraulic conductivity (ft/d)	Transmissivity (ft^2/d)	Storage coefficient	Total porosity/ effective porosity	Area represented
Minnelusa aquifer—Continued					
Rahn, 1985	--	--	--	0.10/0.05	Western South Dakota
Kyllonen and Peter, 1987	--	0.86 - 8,600	--	--	Northern Black Hills
Greene, 1993	--	12,000	0.003	0.1/--	Rapid City area
Tan, 1994	32	--	--	--	Rapid City area
Greene and others, 1999	--	267 - 9,600	$5.0x10^{-9}$ - $7.4x10^{-5}$	--	Spearfish area
Carter, Driscoll, Hamade, and Jarrell, 2001	--	100 - 7,400	--	--	Black Hills area
Minnekahta aquifer					
Rahn, 1985	--	--	--	0.08/0.05	Western South Dakota
Inyan Kara aquifer					
Niven, 1967	0 - 100	--	--	--	Eastern Wyoming, western South Dakota
Miller and Rahn, 1974	0.944	178	--	--	Black Hills area
Gries and others, 1976	1.26	250 - 580	$2.1x10^{-5}$ - $2.5x10^{-5}$	--	Wall area, South Dakota
Boggs and Jenkins, 1980	--	50 - 190	$1.4x10^{-5}$ - $1.0x10^{-4}$	--	Northwestern Fall River County
Bredehoeft and others, 1983	8.3	--	$1.0x10^{-5}$	--	South Dakota
Rahn, 1985	--	--	--	0.26/0.17	Western South Dakota
Kyllonen and Peter, 1987	--	0.86 - 6,000	--	--	Northern Black Hills

7.8.1.1 Inyan Kara Aquifer

On the prairie away from the central Black Hills, the Inyan Kara is typically the first significant aquifer encountered. The Inyan Kara aquifer is comprised of two sub-aquifers, the Lakota and the Fall River, which are separated by the Fuson shale confining unit. Regionally, the Inyan Kara ranges from 250 to 500 feet. The Inyan Kara is a very heterogeneous formation, which results in the two (2) aquifers exhibiting a large variation in local characteristics. Regionally, the Inyan Kara exhibits a large effective porosity (0.17) and the aquifer can yield considerable water from storage (Driscoll et al., 2002). Within the Black Hills, transmissivity of the Inyan Kara ranges from 1 to 6,000 ft^2/day. This high variability is an indication of the complex heterogeneity of the Inyan Kara formation. The Inyan Kara is confined below by the Morrison Formation (50-100 ft thick) and above by Cretaceous Graneros Group shale.

7.8.1.2 Minnelusa Aquifer

The Minnelusa Formation consists of interbedded siltstone, sandstone, anhydrite, and limestone (SDSM&T, 1963). The Minnelusa aquifer occurs primarily in saturated sandstone and anhydrite beds within the upper part of the formation (Williamson and Carter, 2001). Within the Black Hills, the Minnelusa ranges in thickness from 375 to 1,175 feet (Driscoll et al., 2002). The porosity is dominantly primary porosity within the sandstone beds, although secondary porosity is present in association with fractures and dissolution features (Williamson and Carter, 2001). Various studies have found the transmissivity of the Minnelusa to range from 1 to 12,000 ft^2/day (Table 7.8-1). The Minnelusa aquifer is confined above by the Opeche Shale and below by lower permeability layers at the base of the Minnelusa formation.

7.8.1.3 Madison Aquifer

Within the Black Hills, the Madison Limestone, also known as the Pahasapa Limestone, could be considered the most important aquifer because it is the source of municipal water in numerous communities including Rapid City and Edgemont. The hydraulic characteristics of the Madison Limestone aquifer have been studied for several decades in the region and Table 7.8-1 summarizes the regional findings. The Madison aquifer is mainly a dolomite unit characterized by extensive secondary porosity resulting from fractures and associated karstic features (Williamson and Carter, 2001). The thickness of the Madison ranges from 200 feet in the southern Black Hills to 1,000 feet regionally. In the Rapid City area, Greene (1993) found the transmissivity to vary widely between 1,300 and 56,000 ft^2/day. The aquifer varies from unconfined at its outcrop areas to confined, where reported storativity values range from 10^{-3} to 10^{-6} (Table 7.8-1). Regionally a paleosol and low permeability layers within the overlying Minnelusa Formation act to confine the Madison. Locally, these confining layers may be absent or their hydraulic characteristics are higher such that intercommunication between the Madison and Minnelusa occurs. The Madison may be in connection with the underlying Deadwood aquifer when the Whitewood and Winnipeg confining units are absent.

7.8.1.4 Deadwood Aquifer

Overlying the Precambrian, the Cambrian Deadwood Formation consists of basal conglomerates, sandstone, limestone, and mudstone. The thickness of the Deadwood is between zero (0) and 500 feet (Driscoll et al., 2002). Rahn (1985) estimated the effective porosity of the aquifer to be 0.05. In the northern Black Hills the effective porosity is presumably lower, in areas where the formation has undergone extensive hydrothermal alteration. The transmissivity of the Deadwood within the region is 250 to 1,000 ft^2/day (Table 7.8-1) (Downey, 1984). Regionally, "the Precambrian rocks act as a lower confining unit to the Deadwood aquifer," although local connection can exist (Williamson and Carter, 2001). The Deadwood aquifer is in contact with the overlying Madison aquifer except where the Whitewood and Winnipeg formations are present and act as semiconfining units (Strobel et al., 1999).

7.8.1.5 Minor Aquifers

In addition to the major aquifers, minor aquifers around the Black Hills include the Minnekahta Limestone, Sundance/Unkpapa, Newcastle Sandstone, and alluvium. Where present and saturated, these units may yield small amounts of water. Locally, beds within the confining units may also contain aquifers (Driscoll et al., 2002). Typically, these minor aquifers are not heavily utilized because of more reliable sources in adjacent aquifers.

7.8.1.6 Regional Hydraulic Connection of Aquifers

Because of the geologic variability across the Black Hills, several mechanisms can serve to create hydraulic connection between aquifers. Most interconnection appears to be associated with the thinning or absence of confining units between aquifers, which has been documented in local and regional geologic studies (Miller, 2005). Analyses of regional aquifer tests conducted around the Black Hills provide direct evidence of aquifer interconnection or separation. A few examples are mentioned below.

- Recent pumping tests within the Deadwood aquifer near Jewel Cave indicate that vertical leakage through a confining layer is occurring in that area (Valder, 2006).
- In Rapid City, Rahn (1989) points to different artesian pressures reported in Sioux Park wells, installed into different hydrogeologic units, as evidence that the units are hydraulically separated.

- Studies by Long and Putnam (2002) of paired Madison and Minnelusa wells at the City Quarry site indicate hydraulic connection between these units. The variation in yields between areas indicates that locally the interlaying layers may not provide hydraulic separation between the two units. Both well tests and outcrop observations show the variability of hydraulic connection between the Deadwood, Madison, and Minnelusa aquifers.
- Various sources have also suggested that breccia pipes serve as a path between aquifers. The majority of these features are believed to originate within the Minnelusa Formation and extend upward as high as the Inyan Kara (Gott et al., 1974). These breccia pipes are the result of dissolution of significant thicknesses of anhydrite from the upper Minnelusa and subsequent collapse. The greatest concentration of these breccia pipes has been noted within a few miles of the outcrop, although groups of pipes can be concentrated along joints and may extend as "high in the stratigraphic section as the Lakota Formation" (Braddock, 1963). Gott, Wolcott, and Bowles (1974) believed that these breccia pipes allowed large quantities of water to migrate upwards from the Minnelusa into the Inyan Kara.

7.8.1.7 Regional Potentiometric Surfaces

As part of the Black Hills Hydrology Study, the USGS developed 1:100,000-scale potentiometric maps for five aquifers including the Inyan Kara, Minnekahta, Minnelusa, Madison, and Deadwood (Strobel et al, 2000). The purpose of these maps is to show the potentiometric surface of the aquifers and to serve as a tool for evaluating groundwater flow directions and hydraulic gradients in the Black Hills area. The potentiometric maps were created by contouring elevations of water levels in wells completed in their respective aquifers. Structural features such as folds and faults were also considered in the contouring of the potentiometric surfaces. In areas where the potentiometric contours have been inferred (dashed), deviations between the map and actual water levels may occur. The following conclusions can be drawn from analysis of the figures:

- Regional flow within the different units is consistent for all units. Flow is radially outward from the central highlands toward the plains.
- Near the outcrop, the aquifers are unconfined. With distance, the aquifers are confined and have water levels above the top of the formation, and locally above the land surface.

7.8.1.8 Regional Groundwater Recharge

Aquifers in the Black Hills are recharged by infiltrating precipitation, streamflow losses, and minor seepage from other aquifers. The relative contribution of each of these recharge components is variable in the Black Hills. For instance, recharge is dominated by precipitation on the western limestone plateau, while streamflow dominates in parts of the southern hills (Carter et al., 2000).

The Black Hills are relatively arid with rainfall ranging from 12 to 28 inches per year in the area. Most precipitation can be accounted for as surface runoff or evapotranspiration. Regionally, the percentage of precipitation that recharges the aquifers varies from 30 percent in the northwestern Black Hills to approximately 2 percent in the drier southwestern Black Hills.

Streamflow losses can contribute to aquifer recharge if connection between the stream and underlying aquifer exists. Generally, surface water recharge to groundwater is limited to relatively shallow alluvial aquifers in relatively close proximity to the streams. The exception to this rule occurs in areas where karstic features provide preferential pathways for recharge into the subsurface.

Other sources of recharge to individual units can occur from leakage between units. Regionally, water elevations increase with depth, which provides an upward potential for ground-water flow. This limits the potential for downward recharge. Locally these flow head relationships can be reversed due to pumping of wells, thus creating localized zones where the potential for downward leakage exists.

7.8.1.9 Regional Groundwater and Surface Water Interactions

Throughout the Black Hills there are numerous springs in both the Madison and Minnelusa formations. These springs provide the headwaters for many streams in the western hills (Long and Putnam, 2002). Where these streams cross aquifer outcrops along the eastern Black Hills they lose flow into the subsurface through sinkholes and re-emerge downstream in springs and wells (Rahn, 1971 and Long and Putnam, 2002).

In alluvial aquifers, flow is often exchanged between subsurface and surface water. Many of the streams in the Black Hills are losing streams from which stream water infiltrates into the alluvial aquifers. Streams also can be gaining streams, in which they have increased discharge due to inflow from an alluvial aquifer.

The maximum amount of streamflow loss that occurs is known as the loss threshold. When streamflows are less than the loss threshold, then the discharge is the maximum that can be absorbed as recharge. If streamflow is greater than (or equal to) the loss threshold, then recharge equals the loss threshold and the stream will flow over the entire outcrop area.

Hortness and Driscoll (1998) conducted a study of streamflow loses across the Black Hills. Several factors that have been theorized to affect loss rates include streamflow rate, duration of flow across a loss zone, or deposition of large amounts of sediment. These observations are consistent with factors known to influence recharge into the surface: volume of water available, the time period during which recharge can occur, and connectivity with the subsurface as represented by thickness of overlying sediments. Hortness and Driscoll (1998) found no evidence that loss thresholds were affected by upstream flow rates.

7.9 Site Groundwater Hydrology

The site hydrostratigraphic units are consistent with the regional units discussed above. The hydrostratigraphy and surficial geology at the site are shown in Figure 7.1-2, and Figure7.2-1, respectively. Analyses of groundwater quality data for the units are provided in Section 7.14.

7.9.1 Spearfish Formation Confining Unit

In general, the Spearfish Formation is characterized by a thick sequence (250 to 450 feet) of red shale and siltstone. Based on the few exploration holes that have penetrated the entire thickness of the formation in the PAA, the Spearfish is an average of 320 feet thick. This thick sequence of shale serves as a hydrologic barrier or confining unit preventing nearly all vertical flow between the Paleozoic aquifers and the Jurassic/Cretaceous aquifers.

7.9.2 Sundance and Unkpapa Aquifers

Overlying the Spearfish formation, the Sundance and Unkpapa aquifers are considered aquifers of minor importance within the Black Hills. These aquifers are a source of water within the PAA. The Sundance Formation is composed primarily of shale and sandstone with an average thickness of 280 feet thick near the project site. Where present, the Unkpapa is 50 to 80 feet of well sorted, fine-grained, eolian sandstone. For the purpose of this study, the Sundance and Unkpapa aquifers are considered equivalent as there is no intervening confining unit separating the two.

7.9.3 Morrison Formation Confining Unit

Overlying the Sundance and Unkpapa aquifers is the Morrison Formation. The Morrison is a shale layer approximately 100 feet thick, which serves as an underlying confining unit between the Inyan Kara and the Sundance aquifers (and the Unkpapa where it exists). A core sample was collected from the upper

Morrison; results of geotechnical testing indicate that the shale has a relatively low vertical permeability of about 6.0×10^{-5} feet/day.

7.9.4 Inyan Kara Aquifer

The Inyan Kara aquifer is the principal aquifer in the region. Locally, the Cretaceous Inyan Kara Group is consistent with its regional characteristics and is composed of two formations: the Lakota (Fuson and Chilson members) and Fall River. In general, the Inyan Kara consists of interbedded sandstone, siltstone, and shale. Based on several measured outcrop sections within the Dewey Quadrangle, the Inyan Kara Group averages 350 feet thick. The Fuson member of the Lakota, underlying the Fall River, varies in thickness from 40 to 70 feet. Throughout most of the region, the Fuson is expected to be an effective interaquifer confining unit. Locally, however, results of aquifer tests at the project site indicate that the Fuson Shale is not an effective barrier in some locations. It is possible that, "interaquifer connection here could result from as-yet-unidentified structural features or old open exploration holes". As such, the Inyan Kara is treated in this report as one aquifer with the Fall River and Lakota representing sub-aquifers. The Inyan Kara is confined above by the Graneros Group, a thick sequence of dark shale that varies in thickness from zero (0) feet where the Inyan Kara crops out to more than 500 feet thick in the plains, preventing the vertical migration of water between the Inyan Kara and alluvial aquifers.

7.9.5 Graneros Group Confining Unit

The Graneros Group is composed of several geologic formations including the Skull Creek, Newcastle, Mowry, and Belle Fourche. The group acts as a single unit that confines the Inyan Kara aquifer. In the PAA, the thickness of the Graneros is zero (0) at the outcrop but increases westward to more than 500 feet thick. A core sample was collected from the lower Skull Creek shale; results of geotechnical testing indicate that the shale has a very low vertical permeability of 1.5×10^{-5} ft/day.

7.9.6 Alluvial Aquifers

For the purpose of this report, the alluvial aquifers in the vicinity of the project site consist of any saturated alluvial material along Pass Creek, Beaver Creek, and the Cheyenne River. In general, the thickness of the alluvial material varies from zero (0) to 25 feet, although it can reach 40 feet. Based on water level measurements in five alluvial piezometers, the upper 10 to 15 feet of the alluvium is unsaturated. The alluvial material is typically unconfined although localized areas of confinement may exist where weathered shale and other material has slumped on top of the alluvium. Groundwater level data and groundwater samples were collected for laboratory analyses.

7.9.7 Groundwater Flow

The hydrologic investigation of this site included measurement of water levels in wells completed in the Inyan Kara aquifer, the overlying alluvial aquifer, and the underlying aquifer (Sundance/Unkpapa). The data were used to assess groundwater flow direction as indicated by groundwater elevations, to construct potentiometric surfaces and to calculate hydraulic gradient. Data collection and analyses were started in 2007 and are ongoing in order to document pre-development conditions and changes in potentiometric head before, during, and after operations. Appendix 7.9-A lists water level data collected from wells completed in the Inyan Kara aquifer during this study.

Water level data were collected as follows:

- Monthly water levels were measured in wells listed in Table 7.9-1. This table summarizes the wells by formation as determined by well completion information or, if well completion information was not available, through analyses of water quality information. These wells were selected to provide water level data upgradient and downgradient of the proposed mine areas.
- Water levels were measured in monitoring wells listed in Table 7.9-1 as follows:

- Static water levels were measured at most wells prior to sample collection with regard to a reference elevation, usually a mark on the well or on a permanent structure above or near to the well.
- When possible, free-flowing wells were measured with a 15 lb/in^2 (psi) or 30 psi N.I.S.T.-certified pressure gauge.
- The well was shut in and the pressure was allowed to stabilize before a reading was recorded.
- Pressure values were recorded to within at least 0.1 psi and typically to within 0.01 psi.
- Wells with subsurface water levels were measured using an electric water level tape with measurements reported to within at least one tenth of a foot and typically to within a hundredth of a foot.
- Exceptions to this procedure included:
- Domestic wells that could not be accessed at the well head or were behind a pressure tank (well numbers 7, 8, 13, 16, 18, 42).
- Free-flowing wells that could not be sealed due to leaks caused by corrosion and age (wells 2, 635, 4002).
- Free-flowing wells that could not be sealed due to poor valve fittings or cracked valves (well 696).
- Free-flowing wells where existed the possibility of rupturing a line when pressurized due to age (well 7002).
- Wells that contained pumps and pump tubing making it difficult to retrieve a water level tape (well 619).
- Water level measurements from pumping and monitoring wells that were taken during the aquifer tests are given in the aquifer test report (see Appendix 7.9-B).

Table 7.9-1 Well Data

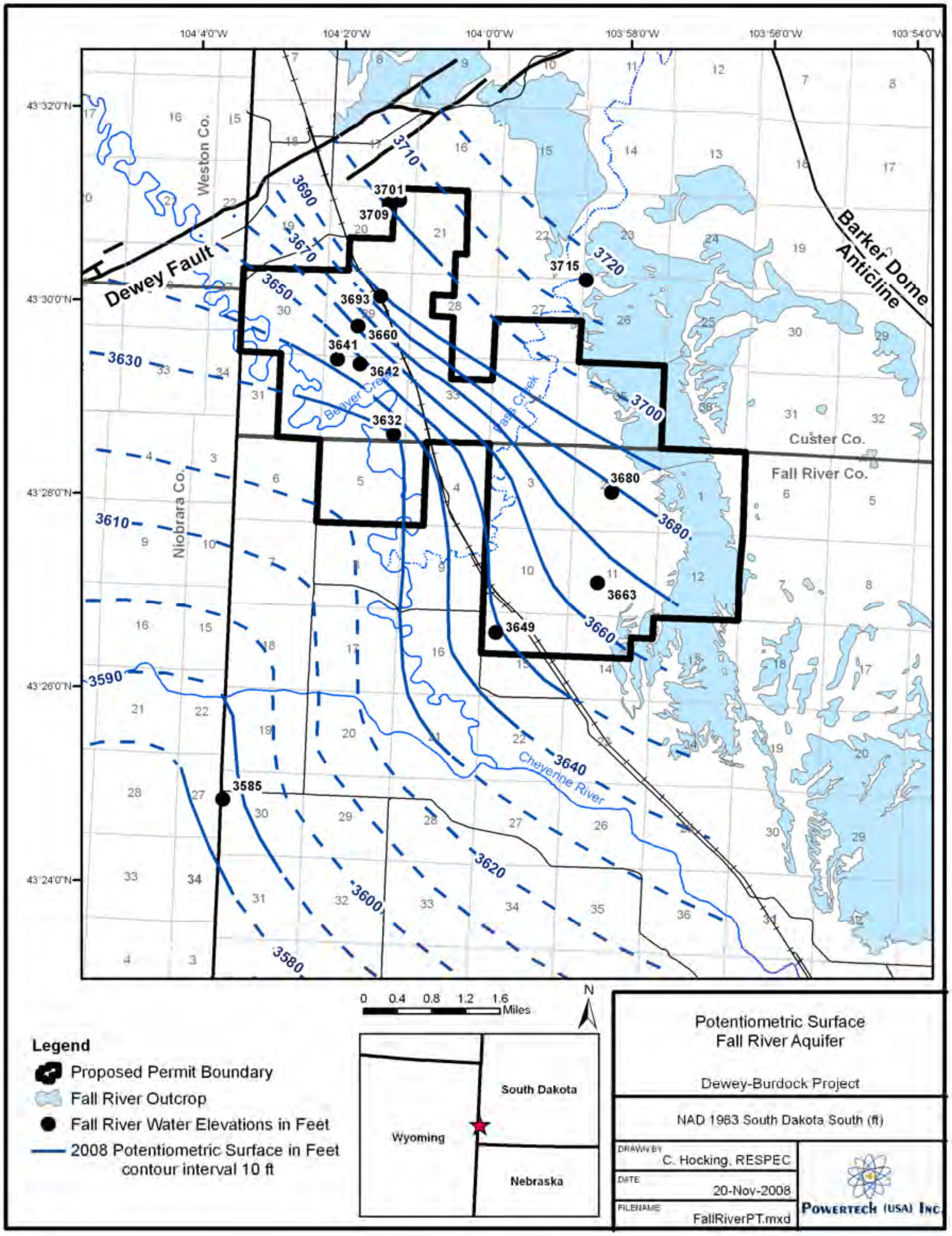
ID	SD State Plane 1983 East (ft)	North (ft)	Formation	Depth, ft	Screened interval, ft	Use
675	1015340.3	406352.2	Alluvium	14.4	4 - 14	Piezometer
676	999245.0	439891.6	Alluvium	22.5	12 - 22	Piezometer
677	991947.3	434035.9	Alluvium	14.5	4 - 14	Piezometer
678	995023.4	431834.9	Alluvium	14.5	4 - 14	Piezometer
679	1000303.0	446248.3	Alluvium	39	29 - 39	Piezometer
49	987330.6	444022.8	Fall River	600	unknown	Stock
607	980219.4	416377.6	Fall River	unknown	unknown	Piezometer
610	989998.0	447969.6	Fall River	680	630-672	Piezometer
613	990523.4	453775.8	Fall River	580	504-580	Piezometer
622	991174.5	454033.8	Fall River	520	503 - 580	Piezometer
631	1002575.7	449309.8	Fall River	80	30 - 80	Stock
681	988728.3	443725.3	Fall River	600	585 - 600	Pump Test Well
688	1003425.8	429974.4	Fall River	255	245 - 255	Piezometer
694	997116.1	426836.1	Fall River	392	377 - 392	Piezometer
695	990783.4	439312.5	Fall River	508	493 - 508	Piezometer
698	1004307.8	435651.1	Fall River	205	180 - 205	Piezometer
614	990583.8	453770.2	Fuson	620	609-620	Piezometer
12	995376.8	434378.5	Lakota	805	unknown	Stock
38	992726.9	442289.6	Lakota	494	unknown	Stock
608	980228.9	416454.6	Lakota	unknown	unknown	Piezometer
609	990133.3	447808.3	Lakota	1000	903-966	Piezometer
615	990571.0	453708.9	Lakota	800	712 - 800	Piezometer
619	1003106.9	437045.9	Lakota	280	unknown	Stock
650	1012180.5	433331.4	Lakota	unknown	unknown	Stock
680	1003476.6	429969.1	Lakota	436	426 - 436	Pump Test Well
689	988715.0	443789.2	Lakota	730	715 - 730	Piezometer
697	990748.4	439347.4	Lakota	682	667 - 682	Piezometer
3026	1012037.4	432833.2	Lakota	196	166 - 196	Stock
8002	1004651.5	418556.4	Lakota	500	unknown	Stock
628	990894.7	449719.2	Inyan Kara	unknown	unknown	Stock
668	999428.2	427450.3	Inyan Kara			
8003	1004520.9	418530.8	Inyan Kara	unknown	unknown	Garden

Maps of the current potentiometric surface for the Fall River (Figure 7.9-1), Lakota (Figure 7.9-2), and Unkpapa (Figure 7.9-3) aquifers have been generated using water level data collected in the area from September 2007 through June 2008 (Appendix 7.9-A). The regional USGS map *"Potentiometric Surface of the Inyan Kara Aquifer in the Black Hills Area, South Dakota"* was used as a general guide in areas where water level data are unavailable (Strobel et al., 2000).

The general pattern of groundwater flow is, as expected, away from the highlands and is similar for all aquifer local units. Throughout the southwestern Black Hills including the study area, the groundwater gradient is generally southwestward. Analyses of regional information indicate that similar flow patterns should exist from ground surface to the Precambrian aquifer.

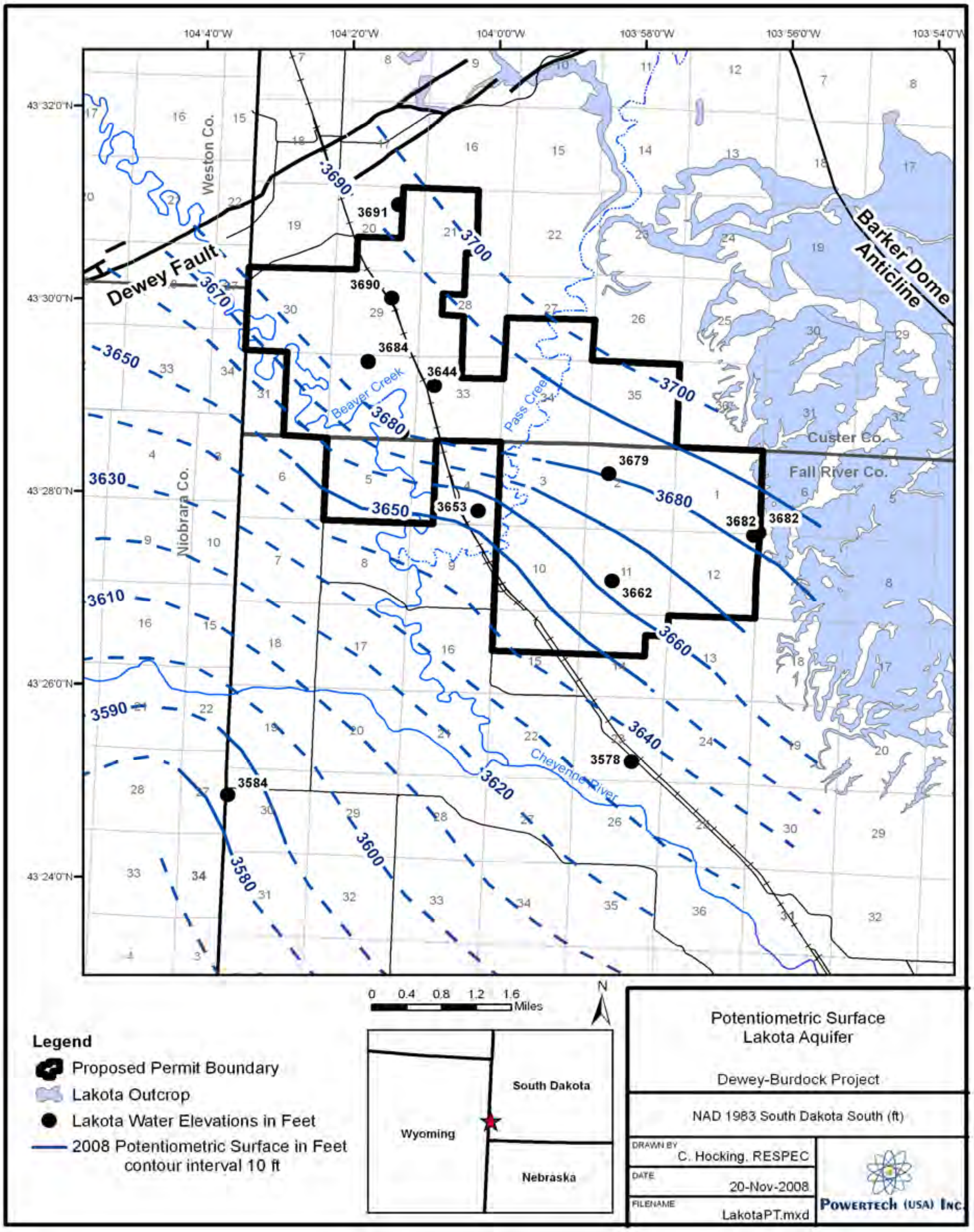
Appendix 7.9-A summarizes water levels and elevations measured in Fall River and Lakota wells. These paired wells, plus data gathered during the pumping tests, provide the capability to assess site-specific aquifer connections as follows:

- Analyses of water levels reported from wells near recharge or outcrop areas demonstrate that water levels in the Lakota Formation are somewhat higher than in the Fall River.
- With increasing distance from the recharge areas, this difference in head appears to diminish.
- Review of pumping test data from the Dewey area indicates that pumping a well located within the Fall River does not impact the Lakota heads. Where the Fuson is an ineffective confining unit, water could flow upward into the Fall River Formation. Because of this uncertain connectivity, the Fall River and Lakota Formations are considered to be one aquifer (the Inyan Kara aquifer) in this report.



Note: Potentiometric surface based on average water level values at the project site. Contours are dashed where approximate.

Figure 7.9-1 Potentiometric Surface of the Fall River Aquifer



Note: Potentiometric surface based on average water level values at the project site. Contours are dashed where approximate.

Figure 7.9-2 Potentiometric Surface of the Lakota Aquifer

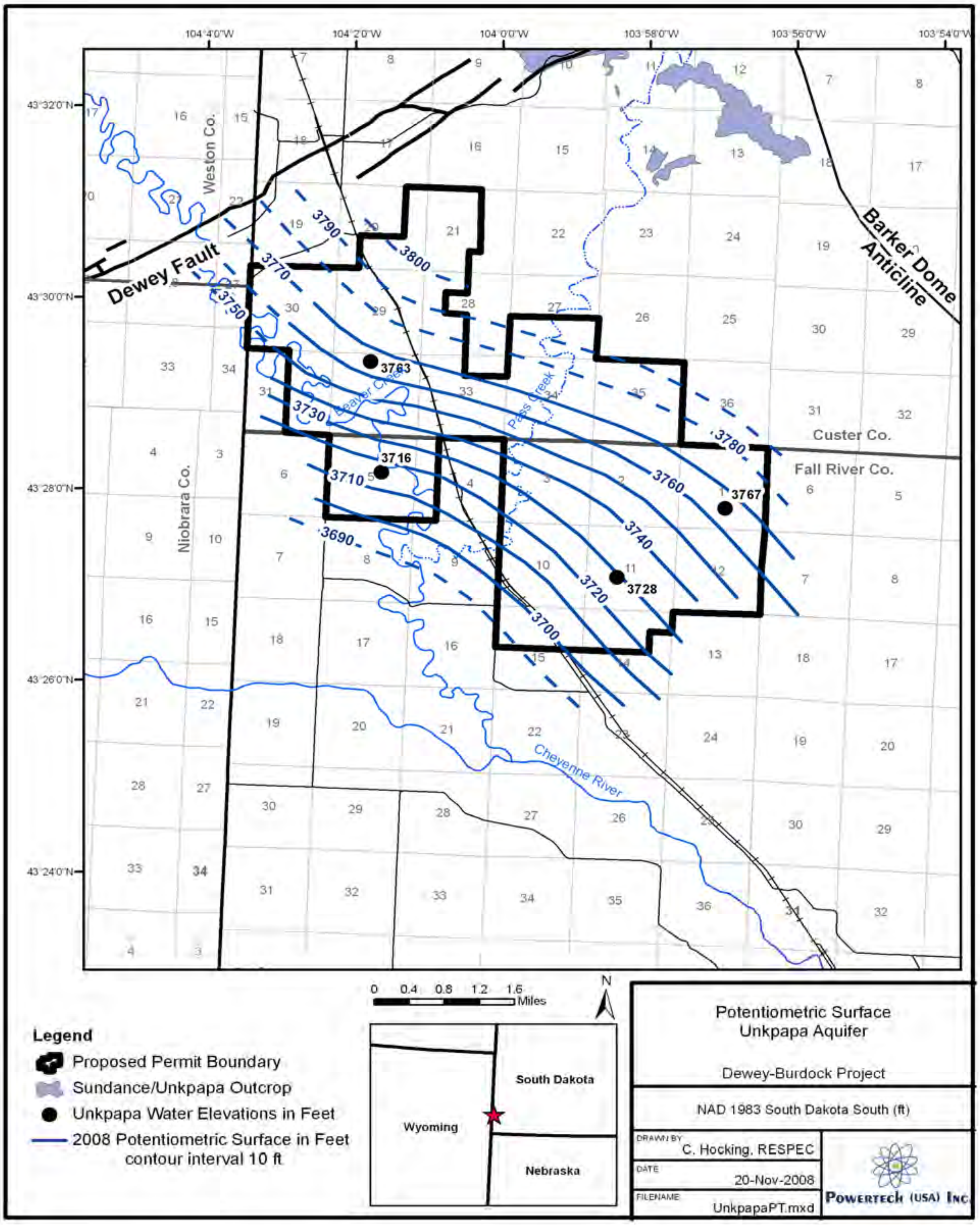


Figure 7.9-3 Potentiometric Surface of the Unkpapa Aquifer

If the aquifer materials were homogeneous, groundwater would flow in the direction of the gradient. Within the PAA, it is likely that groundwater flow is partially controlled by interfingering channels and heterogeneous beds.

North of the site, the Dewey Fault is believed to affect groundwater movement. At its greatest, the Dewey Fault has more than 400 feet of offset. This offset would place the Lakota Formation, south of the fault, against the impermeable Spearfish Formation north of the fault. Based on TVA's Dewey pumping test, the fault behaved as an impermeable zone and resulted in drawdown greater than would occur in an infinite aquifer (Boggs, 1983).

It is common practice in the area to allow artesian wells to continuously flow to prevent freezing. Undoubtedly, this practice has resulted in a decline in potentiometric head over decades.

7.9.8 Site Groundwater Recharge and Discharge

Groundwater may recharge or discharge from the site under the following mechanisms:

- Recharge via infiltration of precipitation
- Discharge via evapotranspiration
- Recharge or discharge to streams or springs
- Recharge or discharge into overlying or underlying hydrogeologic units
- Recharge or discharge along the Dewey fault zone
- Discharge to wells
- Recharging groundwater flow into the study area
- Discharging groundwater flow out of the study area.

The first three mechanisms are limited to unconfined alluvium in stream channels with depths less than 100 feet. The remaining mechanisms apply from the highland outcrop to the PAA, as the units transition from unconfined outcrops to confined units. Recharge to confined groundwater is primarily from precipitation recharge at the outcrop. Most of this recharge occurs at the highland outcrops, as shown in Figure 7.9-4. Based on data from Carter et al. (2001), an average of 0.3 to 0.5 inches of precipitation (2 to 3 percent of 16 in/yr) that falls each year recharges the Inyan Kara aquifer.

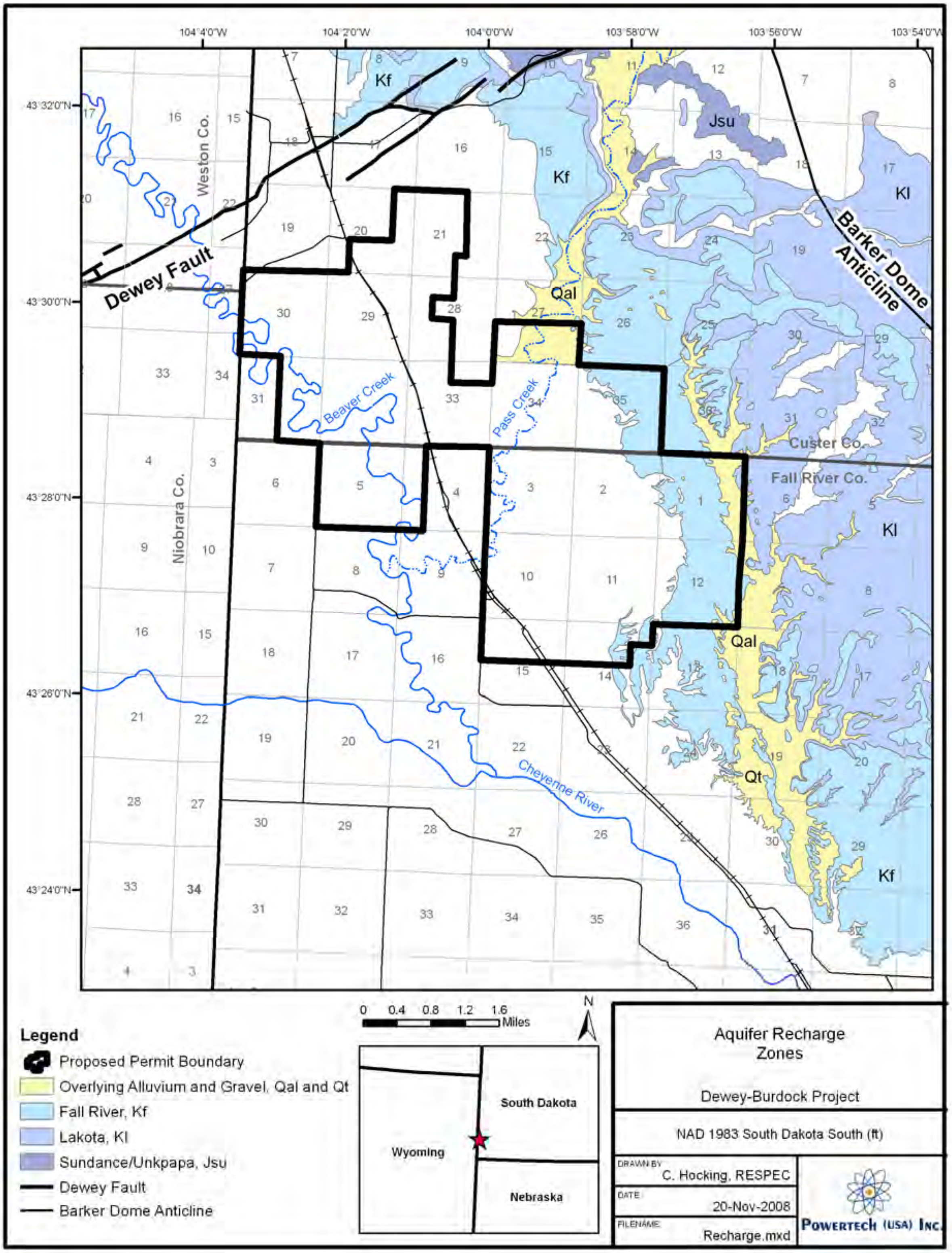


Figure 7.9-4Aquifer Recharge Zones

7.9.9 Site-Specific Groundwater/Surface Water Interactions

Near the PAA, there are several possible modes of interaction between groundwater and surface water. Groundwater becomes surface water where free-flowing artesian wells discharge into surface water impoundments. There are no natural springs in the PAA. The only other major avenue for interchange is along the alluvium where Pass Creek crosses the Inyan Kara outcrop. Here, the alluvium may either gain or lose flow to the underlying aquifer. There is currently no stream loss data for Pass Creek to quantify this interaction.

7.9.10 Hydraulic Properties of the Inyan Kara at the Project Site

This section describes past and recent aquifer pumping tests and the insight on hydraulic properties that were gained.

7.9.10.1 Summary of Previous Pump Test Results

The TVA conducted groundwater pumping tests from 1977 through 1982 as part of a uranium mine development project near the towns of Edgemont and Dewey, South Dakota. TVA produced two summary pumping test reports, "Analysis of Aquifer Tests Conducted at the Proposed Burdock Uranium Mine Site" (Boggs and Jenkins, 1980) and "Hydrogeologic Investigations at Proposed Uranium Mine near Dewey, South Dakota" (Boggs, 1983). In addition, TVA prepared a Draft Environmental Statement (DES) for the proposed Edgemont Uranium Mine in 1979.

TVA first conducted two unsuccessful tests in 1977 at the Burdock test site. The results of the 1977 tests were considered inconclusive because of various problems including questionable discharge measurements, some observation wells improperly constructed, and some pressure gauges malfunctioned. No data from the 1977 tests are currently available.

TVA conducted three successful pumping tests, two in 1979 near the current Burdock Project Area, and one in 1982 about two miles north of the current PAA. The results of these successful tests are described in separate sections, below. However, no data for these tests, in particular electronic records of drawdown, are available, other than information contained in the reports.

7.9.10.1.1 Dewey Proposed Action Area

The Dewey test was conducted in 1982 northeast of Dewey Road at the location shown on Figure 7.9-5. The test consisted of pumping in the Lakota formation for 11 days at an average rate of 495 gallons per minute [gpm]. The test developed the following information:

- Transmissivity of the Lakota averaged about 4,400 gallons per day per foot (gpd/ft) which is equivalent to 590 feet squared per day (ft^2/day).
- Storativity of the Lakota was about 1.0×10^{-4} (dimensionless).
- There was response between the Fall River and Lakota formations through the intervening Fuson shale-siltstone member that was manifested at relatively late time (3000 to 10000 minutes).
- The vertical hydraulic conductivity of the Fuson aquitard using the Neuman-Witherspoon ratio method (Neuman and Witherspoon, 1973) was 2×10^{-4} ft/day; storativity of the Fuson Member was not determined and specific storage was about 7×10^{-7} ft^{-1}.
- A barrier boundary, or a decrease in transmissivity due to lithologic changes with distance from the test site, or both, were observed; a possible geologic feature corresponding to a barrier was noted to be the Dewey Fault Zone, located about 1.5 miles north of the test site, where the Lakota and Fall River formations are structurally offset.

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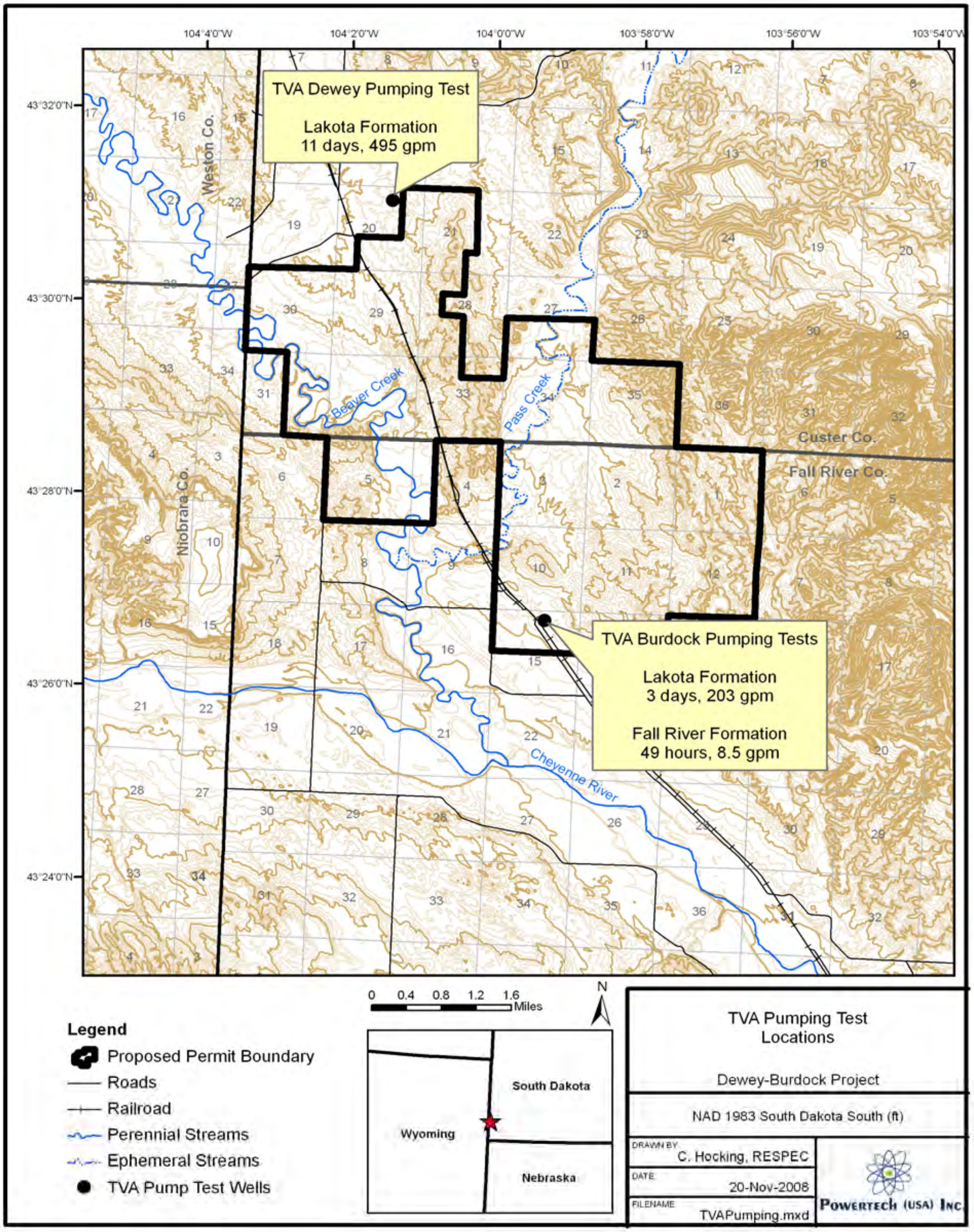

Figure 7.9-5 Location of Historical TVA Pumping Tests

7.9.10.1.2 Burdock Project Area

The Burdock tests were conducted in 1979 near Dewey Road at the location shown on Figure 7.9-5. The Burdock tests consisted of separate pumping tests from the Lakota (Chilson) and Fall River Aquifer, respectively in April and July of 1979. The tests used the same pumping well with packers to alternately isolate screens open to the respective formations. Test durations were 73 hours for the Lakota test and 49 hours for the Fall River test. Pumping rates were about 200 gpm from the Lakota aquifer and 8.5 gpm from the Fall River. The reason for the unexpected low pumping rate from the Fall River aquifer was not specified in the TVA report.

The tests developed the following information:

- Interpreted transmissivity of the Lakota was based on analysis of later time data and inferred decreasing transmissivity with distance from the test site due to changes in lithology; overall transmissivity averaged about 1,400 gpd/ft (190 ft^2/day) and storativity about 1.8 x 10^4 (dimensionless); maximum transmissivity from early time data was about 2,300 gpd/ft (310 ft^2/day).
- Transmissivity of the Fall River averaged about 400 gpd/ft (54 ft^2/day) and storativity about 1.4 x 10^5 (dimensionless).
- There was communication between the Fall River and Lakota formations through the intervening Fuson shale-siltstone member; leaky behavior was observed in the Fall River formation and believed to exist in Lakota although “leakage effects in the Lakota drawdown data are masked by the conflicting effect of a decreasing transmissivity in site vicinity” (p. 16 in Boggs and Jenkins, 1980).
- The vertical hydraulic conductivity of the Fuson aquitard the Neuman-Witherspoon ratio method (Neuman and Witherspoon, 1973) ranged from 10^{-3} to 10^{-4} ft/day; storativity was not determined, and specific storage was assumed to be about 10^{-6} ft^{-1}.

7.9.10.1.3 2008 Pumping Tests

In 2008 pumping tests were performed at both the project areas, along with laboratory tests on related core samples, to determine aquifer properties at the site. A work plan (Knight Piésold, 2008a) was prepared and distributed to interested representatives of state and federal agencies, including the South Dakota DENR and the EPA.

A detailed description of the aquifer testing methodology and analysis of the results are contained in the aquifer test report (Knight Piésold, 2008b), Appendix 7.9-B. The report results are briefly summarized in the following sections.

7.9.10.1.4 Burdock Project Area

7.9.10.1.4.1 Summary of Burdock Pumping Test Results

A summary of aquifer parameters for the 2008 Burdock pumping test (conducted in the Chilson member of the Lakota formation) and related laboratory core testing is as follows:

- Nine determinations of transmissivity (Table 7.9-2) ranged from 120 to 223 ft^2/day with the median value of 150 ft^2/day.
- Four storativity determinations (Table 7.9-2) ranged from 6.8 x 10^{-5} to 1.9 x 10^{-4} with the median value of 1.2 x 10^{-4}.
- The radius of influence of the pumping test determined by a distance-drawdown plot was 2,100 ft.
- The pumping well in the lower Lakota formation was determined to be moderately efficient: 80 to 83 percent by the empirical distance-drawdown method and 65 percent the USGS (Halford and Kuniansky, 2002) theoretical method.

- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 7.9-3) were made on sandstone layers similar to that tested in the pump test; measured horizontal hydraulic conductivity ranged from 5.9 to 9.1 ft/d, the mean value was 7.4 ft/d and the mean ratio of horizontal to vertical hydraulic conductivity in Burdock area sandstone was 2.47:1.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 7.9-3) were made on shale layers from the two major confining units for the Lakota formation in the pump test area with the following results:
  - Fuson Shale: the laboratory core data indicate vertical permeabilities of about 2×10^{-7} to 1×10^{-8} cm/sec (average 2.7×10^{-4} ft/d) for shale samples from within the Fuson member overlying the Lakota formation.
  - Morrison Shale: the laboratory core data for the shales in the underlying Morrison formation indicate vertical permeabilities of 9×10^{-9} to 3×10^{-8} cm/sec (average 6.0×10^{-5} ft/d).
- The range of hydraulic conductivities determinable from test transmissivities was 0.9 to 15.0 ft/d, which is considered an appropriate range that is also verified by the sandstone core sample results falling in the middle of the range; it is noted that the lower end of the hydraulic conductivity range is probably appropriate for use with the entire formation thickness (shale layers included) and the upper end represents the most permeable sandstone layers such as the ore zone areas tested in the pump test.

Table 7.9-2 Summary of Aquifer Hydraulic Characteristics for the Burdock Pumping Test

Well I.D.	Well Type	Radial Dist. (ft)	Interpretation Method	Transmissivity (ft2/day)	u or u' (unitless)	Storativity (unitless)	Note
Ore zone (lower Lakota Sandstone)							
11-11C	Pumping	0.25 (0.33)	Theis DD(1)	145	-	2.9E-09(a)	-
			CJ DD (3)	150	<0.01	-	-
Pumping Well Efficiency = 65%(3)							
			CJ Recovery (3)	140	<0.01	-	-
11-15	Obs #1	243	Theis DD(1)	67	-	1.3E-03	-
			CJ Recovery (3)	100	<0.1	-	-
11-14C	Obs #2	250	Theis DD(1)	128	-	6.8E-05	-
			H-J DD(1)	120	-	6.9E-05	--
			Theis Recovery(1)	174	<0.01	-	-
			CJ Recovery (3)	160	<0.01	-	-
11-02	Obs #3	1,292	Theis DD(1)	223	-	1.9E-04	-
			H-J DD(1)	185	-	1.7E-04	-
			CJ Recovery (3)	260	<0.15	-	-
Upper Lakota Sandstone							
11-19	Obs	50	Theis DD(2)	260	-	1.0E-01	-
			CJ Recovery (3)	190	<0.15	-	-
Fall River (lower sandstone layer)							
11-17	Obs	50	Noordbergum Effect and response cannot be interpreted analytically				
Unkpapa Formation							
11-18	Obs	35	No response during pumping test.				-
Distance Drawdown (11-14C, 11-15, 11-02)(2)				145	<0.08	2.2E-04	r2 = 0.76 (3 point line)
Pumping Well Efficiency = 61% to 63%							
Summary:	Median			150		1.20E-04	
Average/Geometric Mean(5)				158		1.12E-04	
	TVA(4)			190		1.8E-04	

(1) Calculated by automated curve fitting in AquiferWin32™ software (ESI, 2003).
(2) Knight Piésold spreadsheet after methods in Driscoll (1986).
(3) Spreadsheet methods in U.S. Geol. Surv. Open File Rept. 02-197, Halford and Kuniansky (2002).
(4) Summary values from p. 17 in Boggs and Jenkins (1980).
(5) Average value calculated for Transmissivity, Geometric Mean value calculated for Storativity.
(a) Storativity not valid at pumping well.
(b) Based on 6 inch casing (8 inch borehole).
'158' = Accepted value based on conformance with theory discussed in the text

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Table 7.9-3 Laboratory Core Analyses at Project Site

Sample Number	Depth (ft)	Confining Stress (psig)	Porosity (%)	Air Intrinsic Permeability(1) k_a (mD)	Particle Density (g/cm3)	Notes	Water Hydraulic Conductivity(2)(3) K_w (cm/s)	Core K_h (ft/day)	Core K_v (ft/day)
DB 07-11-11C	**Burdock**								
1H	252.20	600	10.50	1.040	2.356	Fuson Shale	8.0073E-07		
1V	252.35	600	10.15	0.228	2.356	Fuson Shale	1.7555E-07		
4H	412.30	600	9.68	0.041	2.511	Fuson Shale	3.1567E-08		
4V	412.45	600	9.59	0.015	2.514	Fuson Shale	1.1549E-08		
DB 07-29-1C	**Dewey**								
2H	480.70	600	8.90	0.078	2.613	Skull Creek	6.0055E-08		
2V	480.80	600	9.30	0.007	2.610	Skull Creek	5.3896E-09		
3H	609.10	600	12.26	0.073	2.603	Fuson Shale	5.6205E-08		
3V	609.10	600	10.84	0.008	2.793	Fuson Shale	6.1595E-09		
DB 07-11-14C	**Burdock**								
5H	423.60	600	29.56	3,207	2.645	Lakota Sand	2.4692E-03	7.0	
5V	423.35	600	30.34	1,464	2.645	Lakota Sand	1.1272E-03		3.2
6H	430.20	600	31.90	4,161	2.640	Lakota Sand	3.2037E-03	9.1	
6V	430.35	600	30.16	939	2.646	Lakota Sand	7.2297E-04		2.1
7H	453.50	600	10.86	1.000	2.519	Morrison Shale	7.6994E-07		
7V	453.45	600	11.82	0.043	2.543	Morrison Shale	3.3107E-08		
DB-07-11-16C	**Burdock**								
8H	420.40	600	30.50	2,697	2.643	Lakota Sand	2.0765E-03	5.9	
8V	420.10	600	30.17	1,750	2.651	Lakota Sand	1.3474E-03		3.8
9H	455.90	600	6.99	0.004	2.536	Morrison Shale	3.0797E-09		
9V	455.45	600	7.65	0.012	2.556	Morrison Shale	9.2392E-09		
10H	503.30	600	12.96	0.697	2.474	Morrison Shale	5.3665E-07		
10V	503.45	600	No data						
DB 07-32-4C	**Dewey**								
11H	573.25	600	29.15	2,802	2.641	Fall River Sand	2.1574E-03	6.1	
11V	573.40	600	29.04	619	2.645	Fall River Sand	4.7659E-04		1.4
Summary									
Average Lakota Sand K_h, K_v								7.4	3.0

7.9.10.1.4.2 Burdock Pumping Test Conclusions

The Burdock pumping test in 2008 may be directly compared to the 1979 TVA test for the Lakota (Chilson) aquifer as the tests were nearly at the same location (Figure 7.9-5). The average transmissivity and storativity values determined from the TVA tests were 190 ft^2/d and 1.8×10^{-4} (see p. 17 in Boggs and Jenkins, 1980). Comparing median transmissivity of 150 ft^2/d and storativity of 1.2×10^{-4}determined in the 2008 test to the TVA test, the new aquifer parameters for the lower Lakota are respectively about 80 and 70 percent of the 1979 results. Because transmissivity and storativity depend on aquifer thickness, comparing the results suggests that there may be some scaling effect between the tests due to the differing lengths of screened intervals.

Therefore, the 1979 TVA test transmissivity of 190 ft^2/d is considered representative of the entire Lakota aquifer for a regional application, such as a groundwater flow model where an average hydraulic conductivity of about 1 ft/d over a thickness of 170 ft could be specified. The 2008 test provides specific data at the operational-scale of a prospective ISL well field where local hydraulic conductivities of up to 15 ft/d could be specified for the most permeable ore zones horizons.

Within the Lakota formation, vertical communication throughout the entire formation is indicated by the delayed response at the upper Lakota observation well (11-19). The 160-minute delay in response at the upper Lakota observation well 11-19 is attributed to lateral and vertical anisotropy due to the shale interbeds seen on the conceptual stratigraphic cross-sections for the pump test site (Knight Piésold, 2008b). The extent and continuity of the shale interbeds are unknown. Whether the shale interbeds in the Lakota aquifer are sufficiently thick and continuous to serve as vertical confinement for ISL operations will probably need to be evaluated by analyzing cores from borings as well fields are drilled.

The 2008 test indicates that the lower and upper portions of the Lakota formation behave as a single, confined, leaky aquifer. Confinement and leakage from the overlying Fuson member is evident in the matches to the Hantush-Jacob type curves seen most clearly at observation wells 11-14C and 11-2. These results are more definitive than the 1979 TVA test where confined, leaky behavior for the Lakota was predicted but not demonstrated with curve match results.

Hydraulic communication through the Fuson member between the Lakota and Fall River aquifers is evidenced by the response at observation well 11-17, screened in the lower Fall River formation. The first response in the lower Fall River is interpreted as a Noordbergum effect where water levels monitored above the pumping zone aquitard temporarily increased due to three-dimensional deformation caused by ground water withdrawal from a confined aquifer (Hseigh, 1997). The Noordbergum effect appears characteristic of the Inyan Kara formation based on its occurrence in a 1985 pumping test in the Eastern Black Hills near Wall, South Dakota (Rahn, 1985) and also the previous TVA test at the Burdock site (Boggs and Jenkins, 1980). However, drawdown continued at the Fall River observation well 11-17, indicating that leakage was established through the underlying Fuson formation.

The laboratory core data indicate an average vertical permeability of 9.3×10^{-8} (2.7×10^{-4} ft/d) for shale samples from within the Fuson member. The shale core permeability values are about one to two orders of magnitude less permeable than the pumping test values determined in the 1979 TVA test at Burdock, where the vertical hydraulic conductivity of the Fuson aquitard was calculated using the Neuman-Witherspoon ratio method to be about 10^3 ft/day (see pg. (i) in Boggs and Jenkins, 1980).

The potentiometric surface in the Fall River aquifer is close to that in the Lakota aquifer at the Burdock pump test site, indicating some local connection between the two formations through the intervening Fuson member. In other locations in the Inyan Kara, the Fuson member is known to have sandstone layers that are downcut into the Lakota member (Gott et al., 1974). Therefore, determining the degree of vertical confinement for ISL operations by the Fuson will probably need to be evaluated by analyzing cores from borings as well fields are drilled, and with well field-scale pumping tests that are proposed to be conducted prior to startup of each particular mine unit.

The aquifer tests in 1979 and 2008 indicate that the Lakota formation is a confined aquifer with a leaky confining layer, which is demonstrably the Fuson member. The laboratory core data for the shales in the underlying Morrison formation indicate an average vertical permeability of 2.1×10^{-8} cm/sec (6×10^{-5} ft/d). Together with the pump test data, the core data indicate that the underlying Morrison formation and overlying Fuson member can serve as aquitards for ISL operations.

For the Lakota sandstone, the laboratory core data indicate an average horizontal hydraulic conductivity of 7 ft/d, and as high as 9.1 ft/d. Interpretation of the test results calculates that horizontal permeability may be as great as 15 ft/d throughout one of the ore zones. Within the lower Lakota formation, the test results indicate transmissive response between pumping and observation wells up to 250 feet apart with 17 feet of drawdown. Response was nearly 3 feet of drawdown at 1,290 ft distance. This indicates the aquifer was stressed to produce good quality analytical results.

7.9.10.1.5 Dewey Project Area

7.9.10.1.5.1 Summary of Dewey Pumping Test Results

A summary of aquifer parameters for the 2008 Dewey pumping test (conducted in the Fall River formation) and related laboratory core testing is as follows:

- Ten determinations of transmissivity (Table 7.9-4) ranged from 180 to 330 ft^2/day with the median value of 255 ft^2/day.
- Five storativity determinations (Table 7.9-4) ranged from 2.3×10^{-5} to 2.0×10^{-4} with the median value of 4.6×10^{-5}.
- The radius of influence of the pumping test determined by a distance-drawdown plot was 5,700 feet.
- The pumping well in the Fall River formation was determined to be highly efficient: 93 to 95 percent by the empirical distance-drawdown method and 81 percent by the USGS (Halford and Kuniansky, 2002) theoretical method.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 7.9-4) were made in core sample from the sandstone layer similar to that tested in the pump test; measured horizontal hydraulic conductivity was 6.1 ft/d, and the ratio of horizontal to vertical hydraulic conductivity was 4.5:1.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 7.9-4) were made on shale samples from the two major confining units overlying and underlying the pump test area with the following results:
  - Skull Creek shale: laboratory core data for the shale sample from the overlying Skull Creek formation indicate a vertical permeability of 5.4×10^{-9} cm/sec (1.5×10^{-5} ft/d).
  - Fuson Formation: laboratory core data for the shale sample from the underlying Fuson formation indicate a vertical permeability of 6.2×10^{-9} cm/sec (1.8×10^{-5} ft/d).

7.9.10.1.6 Dewey Pumping Test Conclusions

The Dewey pumping test in 2008 in the Fall River aquifer is not directly comparable to the 1982 TVA test because the underlying Lakota aquifer was tested in 1982. As demonstrated above for the Lakota aquifer (Section 7.9.10.1.3.1), a scaling effect may be assumed between total formation transmissivity and storativity (i.e., regional-scale) and the 2008 operational-scale test. However, there are several lines of evidence that the 2008 test transmissivity and storativity results are representative of the entire Fall River aquifer at the Dewey test site, as follows:

- Thickness of the sandstone layer screened by the pumping well is about one-half the total formation thickness (see drawings 4.1 and 4.2 in Appendix 7.9-B).

- Response at the stock tank well (GW-49at 1,400 ft distance) was within the acceptable range for a confined aquifer; this is interpreted to indicate that the effects of partial penetration (due to elevation differences between the pumping well screen and the observation well open to the upper half of the aquifer) were diminished at the 1,400 ft distance and 40 minute response time.
- The delay in response at the upper Fall River observation well 32-9C was a relatively brief, 11 minutes (see Table 4.2 in Appendix 7.9-B), compared to 160 minutes in the Burdock test; together with (2) above, these responses suggest that the vertical anisotropy due to shale interbeds overlying the lower sandstone layer does not extend laterally for more than about 1,400 feet.

The 2008 test indicates that the lower and upper sandstone portions of the Fall River formation behave as a single, confined, aquifer with some form of lateral barrier due to changing lithology, such as a channel boundary. The TVA test in 1982 observed a barrier boundary in the underlying Lakota formation which was attributed to either a change in lithology or the Dewey Fault zone. Apparently, both the Lakota and Fall River formations in the general Dewey Project Area are highly transmissive and show barrier boundaries. These test results are more definitive than the 1982 TVA test concerning the proximity of the barrier boundary, because the 2008 radius of influence was about one mile compared to greater than two to three miles distance to the fault zone.

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Table 7.9-4 Summary of Aquifer Hydraulic Characteristics for the Dewey Pumping Test

Dewey Test Site Pumping Test Interpretations							
	Well	**Radial Dist.**	**Interpretation**	**Transmissivity**	**u or u'**	**Storativity**	**Note**
Well I.D.	**Type**	**(ft)**	**Method**	**(ft^2/day)**	**(unitless)**	**(unitless)**	
Ore zone (lower Fall River Sandstone)							
32-3C	Pumping	0.25 (0.33)	Theis DD(1)	250	-	1.2E-06(d)	-
			CJ DD (3)	250	<0.01	-	-
Pumping Well Efficiency = 80%(3)							
			CJ Recovery (3)	270	<0.01	-	-
32-5	Obs #1	243	Theis DD(1)	294	-	3.3E-05	--
			Theis Recovery(1)	260	<0.01	-	-
			CJ Recovery(3)	280	<0.01	-	-
32-4C	Obs #2	467	Theis DD(1)	333	-	5.6E-05	-
			CJ Recovery (3)	120(a)	<0.01	-	
29-7	Obs #3	2,400	Theis DD(2)	178	-	2.0E-04	
			CJ Recovery (3)	Insufficient recovery for analysis			-
Fall River Aquifer Stock Well (Screened in top half of Fall River)							
GW-49	Stock	1,400	Theis DD(1)	177	-	2.3E-05	-
			CJ Recovery (3)	110	<0.05	-	-
Upper Fall River Sandstone							
32-9C	Obs	41	Theis DD(1)	217	-	1.6E-02	-
			CJ Recovery (3)	150	<0.05	-	--
Lakota Sandstone Layer							
32-10	Obs	61	No response during pumping test.				--
Unkpapa Formation							
32-11	Obs	50	No response during pumping test.				-
Distance Drawdown (32-5, 32-4C, 29-7, GW-49)(2)				218	<0.05	4.6E-05	r^2 = 0.78 (4 point line)
Pumping Well Efficiency = 93% to 95%							
				-			
Summary:	Median			255		4.60E-05	
Average/Geometric Mean(4)				251		5.23E-05	

Notes/References: DD = drawdown, CJ = Cooper -Jacob, Obs = Observation Well
(1) Calculated by automated curve fitting in AquiferWin32™ software (ESI, 2003).
(2) Knight Piésold spreadsheet after methods in Driscoll (1986).
(3) Spreadsheet methods in U.S. Geol. Surv. Open File Rept. 02-197, Halford and Kuniansky (2002).
(4) Average value calculated for Transmissivity, Geometric Mean value calculated for Storativity.
(a) only slope satisfying u 'criterion occurs after intersection with barrier boundary.
(b) not accepted due to anomalous response at well, see text.

Vertical flow throughout the entire Fall River Formation is indicated by the delayed response at the upper Fall River observation well (32-9C). Within the Fall River Formation, the 11 minute delay in response at the upper observation well is attributed to lateral and vertical anisotropy due to the shale interbeds seen on the conceptual stratigraphic cross-sections for the pump test site (see Drawings 4.1 and 4.2 in Appendix 7.9-B). The extent and continuity of the shale interbeds are not known. Whether the shale interbeds in the Fall River Aquifer are sufficiently thick and continuous to serve as vertical confinement for ISL operations will need to be evaluated by analyzing cores from borings as well fields are drilled.

Leakage from a confining layer, presumably the Fuson member, was observed in the 1982 TVA test of the Lakota formation. However, the leakage was observed only relatively late in the TVA tests, at 3,000 to 10,000 minutes, with a much greater pumping rate (495 gpm) and radius of influence. The large-scale vertical hydraulic conductivity value of 2 x 10^{-4} ft/day (7.1 x 10^{-8} cm/sec) determined in the 1982 TVA regional test at Dewey using the Neuman-Witherspoon ratio method is sufficiently impermeable to be considered an aquitard or aquiclude.

Hydraulic flow through the Fuson member between the Fall River and underlying Lakota aquifers is not indicated by the 2008 response at observation well 32-10. The 2008 test demonstrates that vertical leakage through the Fuson may not occur over a mile-wide radius. As described in Section 5.2.4, the Lakota and Fall River aquifers at the Dewey test site appear to be locally hydraulically isolated by the intervening Fuson member with nearly 40 feet head difference. The laboratory core data indicate a very low vertical permeability of 6.2 x 10^{-9} cm/sec (1.8 x 10^{-5} ft/d) for the shale sample from within the Fuson shale member.

The laboratory core data for the shale sample from the Skull Creek formation, overlying the Fall River formation, indicate a very low vertical permeability of 5.4 x 10^{-9} cm/sec (1.5 x 10^{-5} ft/d), also appropriate for an aquitard or aquiclude.

For the Fall River sandstone, the laboratory core data indicate a horizontal hydraulic conductivity of 6.1 ft/d, and interpretation of the test results calculates that horizontal permeability may be as great as 17 ft/d throughout one of the ore zones. Within the lower Fall River formation, the test results indicate transmissive, rapid response (two to three minutes) between pumping and observation wells up to 467 feet apart with nearly 10 feet of drawdown. Response was nearly 9 feet of drawdown at 1,400 feet distance. This indicates the aquifer was stressed to produce good quality analytical results.

7.9.10.1.7 Hydraulic Connection of Aquifers at the Project Site

Regionally, the Inyan Kara is a confined aquifer. At the project site, the Graneros Group shale serves as the overlying confining unit that prevents upward migration. There are also no major aquifers above the Inyan Kara from which connection could occur. Below the Inyan Kara, the Morrison Formation serves as a relatively impermeable confining unit. At the project site, results from recent pump tests show that the Morrison effectively confines the Unkpapa aquifer below since no measurable drawdown in the Unkpapa was observed while pumping in the Inyan Kara. However, a minor amount of communication between the Inyan Kara and underlying aquifers (including the Unkpapa, Sundance, and Minnelusa) may occur in yet undiscovered areas where the Morrison is thin or absent or along undiscovered breccia pipes. For a more detailed discussion on the regional and site hydrostratigraphic units see Sections 7.8.1 and 7.9.

Within the Inyan Kara, the Fuson member of the Lakota is expected to be an effective interaquifer confining unit. Results of aquifer tests at the project site indicate that the Fuson Shale is not an effective barrier in some locations (Boggs and Jenkins, 1980). Locally unidentified structural features or more likely old, unplugged exploration holes enhance this interaquifer connection. The exact location of these potentially unplugged holes is undeterminable. However, over 95 percent of exploration holes never penetrated deeper than the lower Lakota and upper Morrison, so this potential venue of connection is limited to within the Inyan Kara itself. Flow from these open holes could potentially reach the ground surface, although swelling of overlying clays and associated collapse are probably preventing this situation from occurring. Because of such interaquifer connection, the Inyan Kara is treated in this report as one aquifer with the Fall River and Lakota representing sub-aquifers.

Section 8.0 - References

Section 3.0 References

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POWERTECH (USA) INC.

APPENDIX 1.1-A

REQUEST FOR OCCUPANCY

POWERTECH (USA) INC.

JOHN M. MAYS
Chief Operating Officer

November 19, 2014

Ms. Chip Kimball
Field Manager
United States Department of the Interior
Bureau of Land Management
South Dakota Field Office
310 Roundup Street
Belle Fourche, SD 57717-1698

VIA EMAIL

Re: Concurrence for Occupancy Request for the Dewey-Burdock Project
Custer and Fall River Counties, South Dakota

Dear Ms. Kimball:

Information requested by the BLM in its July 8, 2014, request for additional information regarding the Dewey-Burdock Project Plan of Operations includes a concurrence for occupancy request in accordance with 43 CFR §3715.2. This letter constitutes the request by Powertech (USA), Inc. (Powertech) regarding concurrence for occupancy of BLM-administered lands within the Dewey-Burdock Project boundary in Custer and Fall River Counties, South Dakota.

The Dewey-Burdock Project is a proposed uranium *in situ* recovery (ISR) facility licensed by the U.S. Nuclear Regulatory Commission (NRC) under source and byproduct materials license SUA-1600, which was issued April 8, 2014 (NRC ADAMS Accession No. ML14043A392). In accordance with 43 CFR §3715.2, Powertech seeks concurrence for installing facilities and fences on BLM-administered lands. The response to the July 8, 2014, request for additional information, provided under separate cover, describes the facilities and project infrastructure planned on BLM-administered surface during the initial year of project development and potential future facilities planned during the life of the project. These include power lines, access roads, culverts, ISR production/injection wells, monitor wells, buried pipelines, and well field fences. The concurrence for occupancy is requested since these facilities are proposed to remain on BLM-administered lands for longer than 14 days. Proposed facilities are necessary for the extraction and beneficial use of uranium mineral resources and constitute substantially regular work items that are integral to the search for and development of mineral deposits occurring within the Dewey-Burdock Project boundary.

Consultation with BLM before beginning occupancy is being satisfied through submittal of this request, information provided in the October 2009 Plan of Operations, and through discussions held during teleconferences with BLM representatives Phil Perlewitz, Nate Arave, Dan Benoit, and Marian Atkins on May 29, 2014, and BLM representatives Nate Arave, Greg Fesko, Linda Reder, and others on August 6, 2014.

As required by 43 CFR §3715.3-2, Powertech submits the following information to support its request for concurrence for occupancy of public lands as defined in 43 CFR §3715.0-5.

- Overview maps of the project area were provided with the 2009 Plan of Operations as Exhibits 1.1-1 and 1.1-2. Maps showing facilities planned on BLM-administered lands during the initial year of project development and potential future facilities were provided as Exhibits 1.1-3 and 1.1-4, respectively, in Powertech's response to BLM's July 8, 2014, request for additional information, provided under separate cover.

- The purpose of the fencing proposed on BLM-administered lands is to control livestock and human access to well fields. Signs will be posted in accordance with NRC license requirements at the access point for each well field warning of the potential for radioactive material. The purpose of the proposed access roads and culverts is to provide safe passage for employees and visitors to project facilities. The purpose of the monitor wells and potential future well fields is to conduct monitoring, uranium extraction, and groundwater restoration operations. The purpose of the pipelines is to transport various ISR solutions between the well fields and the central processing plant (CPP, which is not located on BLM-administered lands) during uranium extraction and groundwater restoration operations. The purpose of the power lines is to provide electricity to the well field equipment (e.g., production well pumps and header houses).

- The access roads, culverts, power line, fences, and wells all involve observable, on-the-ground activities that BLM may physically inspect and verify in accordance with 43 CFR §3715.7.

POWERTECH (USA) INC.

- Appropriate, maintained and operable equipment will be used.

- Powertech does not plan to install fences and gates that will completely exclude the general public from crossing BLM-administered lands. Fences are proposed only around the immediate perimeter of proposed well fields as shown on Exhibit 1.1-4 provided with Powertech's response to BLM's July 8, 2014, request for additional information. It is noted that BLM-administered lands occurring within the Dewey-Burdock Project boundary are surrounded by private property and cannot be accessed without permission from private landowners.

- Powertech estimates that construction of the initial well field, CPP, and ancillary facilities including wastewater treatment and storage ponds (which will not be located on BLM-administered lands) will take 1-2 years. Well fields will be developed sequentially along with supporting infrastructure, including header houses and pipelines. Uranium recovery operations are anticipated to last approximately 8 years, with groundwater restoration occurring as soon as practicable following production in each wellfield. Wellfield decommissioning will proceed sequentially as production and restoration activities are completed in each well field and will be followed by decommissioning of the processing facilities. The maximum project life is anticipated to be up to about 20 years.

- Powertech employees will be present at the Dewey-Burdock Project site 24 hours a day, 7 days a week during operations.

If additional information related to Powertech's request for concurrence for occupancy is required, please do not hesitate to contact me at 303-790-7528.

Sincerely,

John Mays

John M. Mays, P.E.
Chief Operating Officer

cc: Nate Arave, BLM (email and 2 hardcopies)
Greg Fesko, BLM (email only)
Ronald Burrows, NRC (email only)

POWERTECH (USA) INC.

APPENDIX 4.3-A

POND DESIGN REPORT

Knight Piésold
CONSULTING

Powertech (USA) Inc.
Dewey-Burdock Project

Pond Design Report

August 2009

prepared by:

Knight Piésold and Co.

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KP Project No. DV102.00279.01

Rev. No.	Date	Description	Knight Piésold	Client
0	August 2009	Issued as Final	Paul Bergstrom	John Mays

Knight Piésold
CONSULTING

Powertech (USA) Inc.
Dewey-Burdock Project
Pond Design Report

Executive Summary

This report provides the preliminary pond design for the land application option and for the deep well disposal option at the Dewey-Burdock project. These designs have been completed following United States Nuclear Regulatory Commission (USNRC) Regulatory Guide 3.11, NUREG 1569, 10 CFR Part 40, Appendix A, Criterion 5 and State of South Dakota Administrative Rule 74:29:11:23.

Land Application Option

The land application option includes six categories of ponds:

- Radium settling ponds containing bleed and restoration water and used to settle radium out of solution
- Outlet ponds used to intercept treated water from the radium settling ponds and to store stormwater falling on the radium settling ponds
- Storage ponds used to store treated water during the non-irrigation season
- A central plant pond containing brine produced at the Burdock Plant site
- Spare ponds used for emergency containment should the radium settling or central plant ponds fail
- Spare storage ponds used for emergency containment should any of the storage ponds fail, or portions of the land application system become temporarily inoperable

The design makes allowance for the following:

- Two radium settling ponds, one each at the Dewey and Burdock having a storage capacity of 39.4-acre-ft each
- Two outlet ponds, one each at the Dewey and Burdock sites having a storage capacity of 4.9-acre-ft each
- Two sets of storage ponds:
    - A system of four ponds constructed at the Dewey Site each having a storage capacity of 63.8-acre-ft

- A system of four ponds constructed at the Burdock Site each having a capacity of 63.8-acre-ft

- Two spare storage ponds, one each at the Dewey and Burdock Sites having a storage capacity of 63.8-acre-ft each
- A central plant pond at the Burdock site having a capacity of 36.2-acre-ft
- Two spare ponds, one each at the Dewey and Burdock Sites having a capacity of 39.4-acre-ft each

<u>Deep Well Disposal Option</u>

The deep well disposal option includes five categories of ponds:

- Radium settling ponds, containing bleed water and restoration water and used to settle radium out of solution
- Outlet ponds used to intercept treated water from the radium settling ponds and to store stormwater falling on the radium settling ponds
- Surge ponds, containing water that has been treated and which is to be pumped to the disposal wells
- Spare ponds, used for emergency containment should any of the ponds fail
- A central plant pond containing brine produced at the Burdock Plant site

The design makes allowance for the following:

- Two radium settling ponds, one each at the Dewey and Burdock having a storage capacity of 15.9-acre-ft each
- Two outlet ponds, one each at the Dewey and Burdock sites having a storage capacity of 5.1-acre-ft each
- Two surge ponds, one each at the Dewey and Burdock sites having a storage capacity of 8.4-acre-ft each
- A central plant pond at the Burdock site having a capacity of 15.9-acre-ft
- Two spare ponds, one each at the Dewey and Burdock sites having a capacity of 15.9-acre-ft each

The ponds have been designed to store water reporting to them while maintaining 3 feet (ft) of freeboard. The geometry and storage characteristics of the radium settling ponds have also been checked to verify that they will allow the efficient removal of radium from solution.

The radium settling, spare and central plant ponds will be provided with the following lining system:

- An 80-milli-inch (mil) high density polyethylene (HDPE) primary liner
- A 60-mil-HDPE secondary liner
- A 1-ft-thick clay liner below the secondary liner
- A geonet drainage layer sandwiched between the primary and secondary HDPE liners
- A leak detection sump and access port system

All other ponds will contain treated water that is either to be used for land application or deep well disposal. These ponds will include a single 40-mil-HDPE liner underlain by a 1-ft-thick clay liner.

The results of the stability analyses calculated for the embankments using three different methods of analysis; Bishop Method, Janbu Method, and Morgenstern-Prices Method indicate that the slopes are stable under both static and MCE seismic loading conditions.

Precipitation falling in the land application areas will be contained within those areas and in evaporation pans located adjacent to them, from where it will evaporate. The Soil Plant Air Water (SPAW) modeling indicates that there will be no percolation beyond the base of the soil profile from the land application system and therefore no potential impact to groundwater. Also the underlying Graneros Group provides a low permeability barrier to any potential seepage from land application.

The ponds provided for the land application design all have larger storage volumes than the ponds provided for the deep well disposal option, which is discussed in Section 4.0. Therefore, the land application ponds would also operate satisfactorily for deep well disposal.

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Powertech (USA) Inc.
Dewey-Burdock Project
Pond Design Report

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List of Acronyms and Abbreviations

acre-ft	unit of volume (1 acre-foot = 43,560.2 cubic feet)
Client	Powertech (USA) Inc.
cm/sec	centimeters per second
CPP	central processing plant
ft	feet
ft^3/year	cubic feet per year
gpm	gallons per minute
HDPE	high density polyethylene
H:V	horizontal to vertical
Knight Piésold	Knight Piésold and Co.
MCE	maximum credible earthquake
mil	milli-inch (one thousandth of an inch)
SAR	sodium adsorption ratio
SOC	soil organic carbon
SPAW	Soil Plant Air Water
USNRC	United States Nuclear Regulatory Commission

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Powertech (USA) Inc.
Dewey-Burdock Project
Pond Design Report

1.0 Introduction

1.1 Background

Knight Piésold was retained by Powertech (USA) Inc. to design the water containment storage ponds associated with land application and deep well disposal at the proposed Dewey-Burdock Project. The project is located in the Fall River and Custer Counties in South Dakota, on the southwest flank of the Black Hills uplift. It will involve in situ leaching to recover uranium from the Fall River and Lakota Formations.

This report describes the results of the pond design and stability, seepage and seismic analysis in accordance with NRC Regulatory Guide 3.11, NUREG 1569, 10 CFR Part 40 Appendix A, Criterion 5 and South Dakota Administrative Rule 74:29:11:23. These regulatory requirements are provided in Appendix A. The ponds have been sized to store and treat water resulting from the in situ leach process, stormwater runoff from the land application areas, and the 100-year, 24-hour design storm event.

1.2 Limitations and Disclaimer

This report titled Dewey-Burdock Project Pond Design Report has been prepared by Knight Piésold and Co. (Knight Piésold) for the exclusive use of Powertech (USA) Inc. (Client). No other party is an intended beneficiary of this report or the information, opinions, and conclusions contained herein. Any use by any party other than the Client of any of the information, opinions, or conclusions is the sole responsibility of said party. The use of this report shall be at the sole risk of the user regardless of any fault or negligence of the Client or Knight Piésold.

The information and analyses contained herein have been completed to a level of detail commensurate with the objectives of the assignment and in light of the information made available to Knight Piésold at the time of preparation. This report and its supporting documentation have been reviewed and/or checked for conformance with industry-accepted norms and applicable government regulations. Calculations and computer simulations have been checked and verified for reasonableness, and the content of the report has been reviewed for completeness, accuracy, and appropriateness of conclusions. To the best of the information and belief of Knight Piésold, the information presented in this report is accurate to within the limitations specified herein.

This report is Knight Piésold pdf file: Dewey-Burdock Project Pond Design Report Rev 0.pdf. Any reproductions or modifications of this report are uncontrolled and may not be the most recent revision.

1.3 Contributors and Approvals

This report was prepared, reviewed, and approved by the undersigned.

Prepared by:

Steven F. Truby, Pr. Eng.
Project Engineer

Reviewed by:

Paul D. Bergstrom, C.E.P.
Senior Executive Project Manager

Approved by:

James R. Kunkel, Ph.D., P.E.
Senior Executive Project Manager

2.0 Site Investigation

2.1 General

Knight Piésold carried out a site investigation at the Dewey-Burdock site during July 2008. The investigation was limited to excavating test pits and was targeted at obtaining the following:

- Parameters required for land application modeling
- Engineering characteristics of the soils for pond design

Eleven test pits were excavated as part of the investigation, ranging in depth form 6 to 13 ft. Five of the test pits were excavated at the Dewey Site, with the remainder being excavated at the Burdock Site. The locations of the test pits in relation to land application and irrigation, and to deep well disposal options are illustrated in Figures 2.1-1 and 2.1-2, respectively. Test pit logs are included in Appendix B. Samples obtained from the test pits were tested at Knight Piésold's geotechnical laboratory in Denver for the following properties:

- Visual classification
- Particle size distribution
- Specific gravity
- Natural moisture content
- Dry bulk density
- Atterberg limits
- Compaction testing
- Triaxial testing
- Flexible wall permeability

Samples were also sent to an outside laboratory where they were evaluated for sodium absorption ratio (SAR) and soil organic carbon (SOC).

2.2 Subsurface Conditions

The soils underlying the site consist primarily of lean clays, lean clays with sand, fat clays, and fat clays with sand. Clayey gravel was encountered in test pit TP03 and sandy lean clay was encountered in test pits TP04 and TP08. Bedrock, where encountered, consisted of either claystone or shale. Results from the laboratory tests indicate that the materials are suitable for the construction of the proposed ponds. Stability analysis results that are presented in Sections 3.11 and 4.9 confirm this.

Test pit logs are provided in Appendix B, and geotechnical laboratory test results are provided in Appendix C.

3.0 Land Application Pond Design

3.1 SPAW Modeling Assumptions

The design of the land application system was developed based on modeling using the SPAW model, as described further in Appendix D. Two land application areas, one at the Dewey site and one at the Burdock site will be used. The total irrigated area at any given time at the Dewey site would be 315 acres, consisting of four 50-acre pivots, four 25-acre pivots, plus one 15-acre pivot. In addition, there would be one 50-acre pivot and one 15-acre pivot on standby (total pivots at Dewey is five 50-acre pivots, four 25-acre pivots, and two 15-acre pivots). Pumping at Dewey would occur for 24 hours every day from March 29 to May 10 at a rate of 297 gallons per minute (gpm); from May 11 to September 24 at a rate of 653 gpm; and from September 25 to October 31 at a rate of 297 gpm.

The total irrigated area at any given time at the Burdock site would also be 315 acres (six 50-acre pivots plus one 15-acre pivot). In addition, there would be two 25-acre pivots and one 15-acre pivot on standby. The total pivots at Burdock would be six 50-acre pivots, two 25-acre pivots, and two 15-acre pivots. Pumping at Burdock would also occur for 24 hours on every day from March 29 to May 10 at 297 gpm, from May 11 to September 24 at a rate of 653 gpm, and from September 25 to October 31 at a rate of 297 gpm.

Precipitation falling in the land application areas will be contained within those areas and in evaporation pans located adjacent to them, from where it will evaporate. The SPAW modeling indicates that there will be no percolation beyond the base of the soil profile from the land application system and therefore no potential impact to groundwater. Also the underlying Graneros Group provides a low permeability barrier to any potential seepage from land application (reference Plates 315, 335, 337 and 338).

Four single-lined impoundments (ponds) would be constructed at the Dewey site for the temporary storage of the irrigation water. Each pond will be 465 ft wide x 465 ft long x 30 ft deep including 3 ft of freeboard, with an operating capacity of 61.8-acre-ft. In addition to the storage ponds, double-lined radium settling and spare ponds with leak detection, and single-lined spare storage and outlet ponds will also be constructed at Dewey. The radium settling pond and spare ponds will be 880 ft long x 200 ft wide x 25.5 ft deep, including 3 ft of freeboard, and will have an operational storage of 39.4-acre-ft. The outlet pond will be 280 ft wide x 162 ft long x 14 ft deep including 3 ft of freeboard, and will have an operational storage of 4.9-acre-ft. The spare storage pond will be geometrically identical to the storage ponds.

Four single-lined impoundments (ponds) would be constructed at the Burdock site for the temporary storage of the irrigation water. Each pond will be 465 ft wide x 465 ft long x 30 ft deep including 3 ft of freeboard, with an operating capacity of 61.8-acre-ft. In addition to the storage ponds, double-lined radium settling, spare, and central plant ponds with leak detection, and single-lined spare storage and outlet ponds will also be constructed at Burdock. The radium settling and spare ponds will be 880 ft wide x 200 ft long x 25.5 ft deep, including 3 ft of freeboard, and will have an operational storage of 39.4-acre-ft. The central plant pond will be 362 ft wide x 362 ft long x 25 ft deep including 3 ft of freeboard, and will have an operational storage of 36.2-acre-ft. The outlet pond will be 280 ft wide x 162 ft long x 14 ft deep including 3 ft of freeboard, and will have an operational storage of 4.9-acre-ft. The spare storage pond will geometrically identical to the storage ponds

The ponds provided for the land application design all have larger storage volumes than the ponds provided for the deep well disposal option, which is discussed in Section 4.0. Therefore, the land application ponds would also operate satisfactorily for deep well disposal.

3.2 Design Flows

Three water streams resulting from mining activities report to the ponds:

- Bleed water from the production wells
- Restoration water from the restoration wells
- Process water from the plant

Bleed and restoration water is pumped to the radium settling ponds where it is treated before overflowing into the outlet pond and pumped to the storage ponds where it is used for land application. Process water from the central processing plant (CPP) is pumped to the central plant pond, where it is stored. Allowance has been made for all ponds to store water resulting from the 100-year, 24-hour storm event while maintaining 3 ft of freeboard.

3.2.1 Production Well Bleed Water

The in situ leach process includes for up to 3 percent of the water pumped from the production wells to be bled from the system. Total production water is approximately 4,000 gpm, resulting in a bleed flow of approximately 120 gpm. This water will be pumped to the radium settling ponds.

3.2.2 Wellfield Restoration Water

This water, having a flow rate of approximately 500 gpm, will be used to flush the mineralized target zone following uranium recovery. Once it returns to the surface, the water will be pumped to the radium settling ponds.

3.2.3 Process Water

The uranium recovery process will result in a brine stream of approximately 12 gpm. Allowance has been made for some of this water to be stored in a central plant pond.

3.2.4 Precipitation

All precipitation falling on the land application areas will be stored within those areas where it will either evaporate or infiltrate into the soil. Water falling directly on the pond surfaces will be stored in the ponds and used for land application.

3.3 Pond Design Requirements

Active storage requirements for the radium settling, outlet, storage, and central plant ponds are provided below. In addition to the active storage requirements and the design storm event, all ponds will be provided with 3 ft of freeboard. The catchment areas of the ponds will be minimized by grading all roads away from them, and by providing stormwater diversions to prevent water from upstream catchments from reporting to them.

Figure 3.3-1 provides the Burdock Plant Site Plan and Figures 3.3-2 and 3.3-3 includes the pond cross sections.

Figure 3.3-4 provides the Dewey Plant Site Plan and Figures 3.3-5 and 3.3-6 include the pond cross sections.

3.3.1 Radium Settling Ponds

Radium is settled out of solution by adding barium chloride to the water. Co-precipitation of radium occurs when natural sulfate (SO_4) in the water combines with radium (Ra) and barium (Ba) to form $RaBaSO_4$. The requirements for efficient settlement of solids out of a solution have been incorporated into the design of the ponds and include the following:

- Sufficient retention time for the settlement of radium out of solution
- Providing adequate surface area to prevent the development of large surface currents
- Providing a pond geometry or arrangement that will prevent short circuiting of flows through the pond

Radium is settled out of solution by adding barium chloride to the water. Co-precipitation of radium occurs when natural sulfate (SO_4) in the water combines with radium (Ra) and barium (Ba) to form $RaBaSO_4$. All discussions in the following sections, therefore, refer to the settlement of radium barium sulfate.

3.3.1.1 Retention Time and Storage

Water in the ponds must be retained for sufficient length of time to allow radium barium sulfate to settle out of solution. A literature survey of radium settling ponds indicated that typical retention times range from eight to 14 days. A retention time of 14 days has been adopted for this project. This requires that the ponds have a minimum storage volume of 38.4-acre-ft. In addition, the ponds are expected to accumulate 790-cubic-ft per year (ft^3/year) of radium barium sulfate sludge. For a 10-year project life, this will amount to 0.18-acre-ft of storage. The design allows identical radium settling ponds to be constructed at Dewey and Burdock Sites, capable of storing 39.4-acre-ft each, allocated as follows:

- 39.2-acre-ft for bleed and restoration water
- 0.2-acre-ft for sludge accumulation

Stormwater will overflow into the outlet pond, which has been sized to accommodate the 100-year, 24-hour storm event from both itself and the radium settling pond.

3.3.1.2 Surface Area

To promote settling, the pond surface area should be large enough to prevent significant surface currents from developing. Should these develop, they could keep the radium barium sulfate in suspension. They could also result in short circuiting, with water flowing directly from the pond inlet to the outlet.

The literature survey indicated that a minimum area of 0.6 acres should be allowed for every 100 gpm of flow. For a flow of 620 gpm, this results in area of 3.72 acres with the designed ponds having a water surface area of 3.85 acres.

3.3.1.3 Pond Geometry

Unless baffles are provided, the length of a settling pond should ideally be at least four times its width. The radium settling ponds have a crest length of 880 ft and a width of 220 ft, satisfying this requirement.

3.3.2 Outlet Ponds

Identical outlet ponds have been designed for the Dewey and Burdock Sites. They have been sized to accommodate one day's production water, equating to 2.7-acre-ft, and precipitation from the 100-year, 24-hour storm event falling on both the radium settling and outlet pond.

The ponds have been designed to store the following:

- 2.7-acre-ft for treated irrigation water
- 1.7-acre-ft for the 100-year, 24-hour design storm event falling on the radium settling pond
- 0.4-acre-ft for the 100-year, 24-hour design storm event falling on the radium settling pond

3.3.3 Storage Ponds

Outflow from the storage ponds to land application areas exceeds water inflow during the period of land application (March 29 to October 31). However, water generated during the remainder of the year needs to be stored until it can be used for land application. Total storage requirements were modeled using the SPAW Model, and were calculated to be 216.4-acre-ft at both the Dewey satellite plant site and the Burdock central processing plant site. Allowance has been made for an additional 27.5-acre-ft of storage at each site to allow for the possibility that the start of the land application may be delayed.

The design allows four storage ponds to be constructed at both the Dewey and Burdock Sites, for a total of eight ponds, each capable of storing 63.8-acre-ft, allocated as follows:

- 61.8-acre-ft for treated irrigation water
- 2-acre-ft for the 100-year, 24-hour design storm event

3.3.4 Central Plant Pond

The central plant pond is located at the Burdock Site, and has been sized to accommodate a discharge of 10.81 gpm over a period of two years, equating to 34.9-acre-ft.

The pond has been designed to store the following:

- 35-acre-ft for brine from the CPP
- 1.2-acre-ft for the 100-year, 24-hour design storm event

3.3.5 Spare Ponds

The spare ponds have been designed to be identical to the radium settling ponds, which are the largest double-lined ponds in the system. The spare ponds are located adjacent to the radium settling pond. They have been designed to accommodate water from any of the radium settling or central plant ponds, should the ponds fail.

A spare storage pond has been designed at both the Dewey and Burdock sites to provide emergency containment for the single-lined storage and outlet ponds.

3.4 Water Flow Configurations

Water will be routed through the storage ponds to maximize retention time. Figure 3.4-1 provides the Burdock Plant Site Flow Diagram and Figure 3.4-2 provides the Dewey Plant Site Flow Diagram.

3.5 Pond Lining Systems

The lining system for the radium settling, spare and central plant ponds will consist of the following:

- An 80-mil-textured primary HDPE liner.
- A 60-mil-smooth secondary HDPE liner.
- A 12-inch-thick compacted clay liner, having a maximum permeability of $1x10^{-7}$ cm/sec. This liner will be constructed below the secondary HDPE liner.
- A geonet sandwiched between the primary and secondary HDPE liners.

The outlet and storage ponds will contain treated water that will be used for land application. The liner requirement on these ponds is therefore less stringent, and will consist of the following:

- An 40-mil-textured HDPE liner.
- A 12-inch-thick compacted clay liner, having a maximum permeability of $1x10^{-7}$ cm/sec. This liner will be constructed below the HDPE liner.

3.6 Leak Detection Systems

The radium settling, spare and central plant ponds will include a geonet drainage layer installed between the primary and secondary HDPE liners. The geonet will drain into a leak detection sump. A minimum grade of 2 percent will be maintained across the bottom of the ponds to facilitate the drainage of water into the leak detection sump should a leak develop. A leak detection access port and pump will be provided at the sump to allow any water collecting there to be pumped out and monitored. Pipes feeding into the double-lined ponds will be dual contained, with the carrier and containment pipes being connected to the primary and secondary HDPE liners, respectively. The leak detection system is shown on Figure 3.6-1.

3.7 Foundation Preparation

Foundation preparation on the ponds will include the following:

- Removing vegetation, existing structures and unsuitable foundation materials
- Subgrade preparation
- Site grading

More detail on the items listed above is provided in Table 3.7-1.

Table 3.7-1 – Foundation Preparation Requirements

Item	Description
Vegetation	Clear and grub vegetation
Structures	Remove any existing structures
Surface soils	- Strip organic soil matter for a minimum of 10 ft beyond the pond embankment limits. - Place the stripped soil in temporary stockpiles for final reclamation. - Stockpiles should be located as close to the stripped areas as possible. - Proposed stockpile locations are indicated on Figures 3.7-1, 3.3-1, and 3.3-3.
	Scarify, moisture condition and compact the top 6-inches of the stripped ground surface in fill areas to a minimum of 90 percent of the maximum Modified Proctor Dry Density (ASTM D 1557).
Site Grading	Undertake site grading cut and fill. Compact graded materials to a minimum of 90 percent of the maximum dry density (ASTM D 1557) within ± 2 percent of the optimum moisture content.

3.8 Embankment Drainage

An embankment drainage system will be installed in the outer face of all embankments to prevent the outer toe of the embankment from becoming saturated should a HDPE liner system fail. Water collected by the drain system will be conveyed to a sump from where it will be pumped back to the ponds.

3.9 Pond Connectivity

All storage ponds will be connected via spillways. The radium settling and spare ponds will also be connected to the outlet pond via a spillway. The proposed flow of water through the ponds system is shown on Figures 3.4-1 and 3.4-2.

3.10 Pond Seepage Analysis

Seepage analyses were undertaken for the outer embankments of the ponds to model the phreatic surface through the outer embankments of the ponds should the HDPE liners fail. The phreatic surface determined from the seepage analysis was then used to model embankment slope stability for that condition.

All ponds will be HDPE lined, with the HDPE liner being underlain by a 1-ft-thick clay liner. Negligible seepage is expected from them under normal operating conditions.

3.10.1 Material Properties

Flexible wall permeability tests were undertaken on both undisturbed and remolded samples collected from site. The results were further subdivided depending on which site the samples were collected at, and are summarized in Table 3.10-1.

Table 3.10-1 – Permeability Test Results

Site	Test Type*	No. of Samples	Permeability (cm/sec)			
			Min	Max	Average	Median
Dewey	Undisturbed	12	$2.30x10^{-7}$	$4.90x10^{-4}$	$7.63x10^{-5}$	$2.80x10^{-5}$
	Remolded	11	$3.70x10^{-9}$	$2.90x10^{-6}$	$5.45x10^{-7}$	$8.70x10^{-8}$
Burdock	Undisturbed	10	$4.20x10^{-8}$	$5.70x10^{-4}$	$8.03x10^{-5}$	$7.20x10^{-6}$
	Remolded	8	$7.90x10^{-9}$	$9.30x10^{-5}$	$1.87x10^{-5}$	$7.55x10^{-6}$

*Undisturbed samples were collected using Shelby tubes; remolded samples were compacted to 95 percent of maximum dry density.

The median undisturbed permeabilities have been assumed for the in situ soils, while the median remolded permeabilities have been assumed for the embankments. In addition, regulatory requirements specify that a 1-ft-thick clay liner having a maximum permeability of $1x10^{-7}$ be used below the HDPE liners in the ponds. Material from the pond excavation will be selected to meet this criterion. If necessary, borrow areas will be developed to source this material.

Sand used in the embankment drainage system was assumed to have a permeability of $5x10^{-4}$ cm/sec.

3.10.2 Analysis

For the seepage analysis, it was assumed that the HDPE liners in the ponds fail completely, with the 1-ft-thick clay liner providing the only barrier to seepage through the embankment. The seepage analysis was completed using the GeoStudio 2007 software package.

3.11 Pond Stability Analyses

Stability analyses on the pond embankments were completed using the GeoStudio 2007 software package. The sections selected for the analysis are located at the highest points of the embankments.

3.11.1 Analyses

The following analyses were conducted on each of the ponds:

- A static stability analysis, assuming that the liners are intact (no phreatic surface in the embankment)

- A pseudostatic analysis, assuming the liners are intact and modeling the Maximum Credible Earthquake (MCE) acceleration
- A static analysis, assuming that the liners have completely failed, allowing a phreatic surface to develop in the embankment
- A pseudostatic analysis, assuming that the liners have completely failed, allowing a phreatic surface to develop in the embankment, and modeling the MCE acceleration

3.11.2 Soil Strengths

Soil strengths were obtained from three tri-axial tests that were conducted on material samples collected during the site investigation. The results from these tests are provided in Table 3.11-1.

Table 3.11-1 – Material Strength Characteristics

Site	Sample Number	Angle of Friction (°)	Cohesion (ksi)	Description
Dewey	TP 02-7	25.0	0.10	Lean clay with sand
Burdock	TP 08-6	28.5	0.06	Sandy lean clay
	TP 09-4	27.0	0.15	Lean clay with sand

Test pits TP 08-6 and TP 09-4 are located close to the Burdock Site, with test pit TP 02-7 being located close to the Dewey Site. As the material strength values obtained from test pit TP 09-4 are lower than those obtained from test pit TP 08-6, those values were used for the analyses undertaken at the Burdock Site. The material strength values obtained from test pit TP 02-7 were used for the analyses undertaken on the ponds at the Dewey Site.

3.11.3 Material Densities

In situ material densities were obtained from undisturbed samples collected during the site investigation. The densities of embankment materials were obtained from compaction tests undertaken on samples collected from site. Results for the Dewey and Burdock Sites are summarized separately in Table 3.11-2.

Table 3.11-2 – Soil Densities

Site	Test Type	No. of Samples	Moist Soil Density (pcf)			
			Min	Max	Average	Median
Dewey	Undisturbed	12	86.3	113.3	98.3	97.6
	Compaction test	7	120.4	124.2	123.0	124.0
Burdock	Undisturbed	11	92.4	101.0	97.9	98.3
	Compaction test	6	123.7	130.7	127.4	126.7

Median undisturbed densities have been assumed for in situ soils, while the median densities from the compaction tests have been assumed for the embankments and clay liners.

3.11.4 Seismic Ground Acceleration Values

MCE ground accelerations were obtained from the document "Dewey-Burdock Project, Application for NRC Uranium Recovery License, Fall River and Custer Counties, South Dakota, Technical Report," dated February 2009. The MCE was determined in Section 2.6.6 of the report to have a maximum ground acceleration of 0.09 g.

3.11.5 Stability Analysis Results

The factors of safety for the embankments are provided in Table 3.11-3. The table provides results for three methods of analysis, namely:

- Bishop method
- Janbu method
- Morgenstern-Price method

The analyses shown in Table 3.11-3 below indicate that the outer slopes of the ponds have a minimum factor of safety of approximately 2.51 under normal static loading conditions assuming that the HDPE liners remain intact, preventing a phreatic surface from developing in the embankment. The minimum factor of safety reduces to approximately 1.79 during the MCE seismic event.

Should the HDPE liner fail, a drain installed in the embankment will help to lower the phreatic surface and prevent the downstream toe from becoming saturated. The factors of safety do reduce, with the minimum factor of safety under normal static loading conditions reducing to approximately 1.67. Under MCE seismic loading conditions the minimum factor of safety reduces to approximately 1.15.

The inner slope is less critical in terms of preventing a breach of the embankment, but was evaluated for stability assuming the HDPE liners remain intact. The minimum factor of safety under normal static loading conditions was calculated to be 1.90, while under MCE seismic loading conditions this reduces to approximately 1.47.

The factors of safety indicate that both the inner and outer the slopes are stable under both static and MCE seismic loading conditions.

Table 3.11-3 – Stability Analysis Factors of Safety

Pond	Description	Analysis	Factor of Safety		
			Bishop	Janbu	Morgenstern-Price
Dewey Radium Settling Pond	Outer slope – assuming intact HDPE liner	Static	2.87	2.63	2.87
		Seismic (MCE)	2.04	1.89	2.04
	Outer slope – assuming HDPE liner has failed	Static	2.10	1.87	2.11
		Seismic (MCE)	1.44	1.29	1.45
	Inner slope – assuming intact HDPE liner	Static	2.03	1.91	2.03
		Seismic (MCE)	1.56	1.47	1.56
Dewey Outlet Pond	Outer slope – assuming intact HDPE liner	Static	3.00	2.76	3.00
		Seismic (MCE)	2.14	1.98	2.14
	Outer slope – assuming HDPE liner has failed	Static	2.23	1.95	2.23
		Seismic (MCE)	1.51	1.35	1.52
	Inner slope – assuming intact HDPE liner	Static	2.99	2.79	2.99
		Seismic (MCE)	2.13	1.99	2.13
Dewey Storage Ponds	Outer slope – assuming intact HDPE liner	Static	2.68	2.51	2.68
		Seismic (MCE)	1.91	1.79	1.91
	Outer slope – assuming HDPE liner has failed	Static	1.97	1.74	1.98
		Seismic (MCE)	1.36	1.22	1.37
	Inner slope – assuming intact HDPE liner	Static	2.58	2.43	2.58
		Seismic (MCE)	1.83	1.73	1.83
Burdock Radium Settling/Spare Ponds	Outer slope – assuming intact HDPE liner	Static	2.93	2.74	2.93
		Seismic (MCE)	2.08	1.96	2.09
	Outer slope – assuming HDPE liner has failed	Static	2.03	1.80	2.04
		Seismic (MCE)	1.40	1.25	1.41
	Inner slope – assuming intact HDPE liner	Static	2.12	1.98	2.12
		Seismic (MCE)	1.63	1.53	1.63
Burdock Outlet Pond	Outer slope – assuming intact HDPE liner	Static	2.93	2.76	2.93
		Seismic (MCE)	2.09	1.97	2.10
	Outer slope – assuming HDPE liner has failed	Static	2.01	1.80	2.02
		Seismic (MCE)	1.38	1.24	1.40
	Inner slope – assuming intact HDPE liner	Static	3.14	2.92	3.14
		Seismic (MCE)	2.24	2.09	2.24
Burdock Storage Ponds	Outer slope – assuming intact HDPE liner	Static	2.75	2.60	2.75
		Seismic (MCE)	1.94	1.84	1.95
	Outer slope – assuming HDPE liner has failed	Static	1.87	1.67	1.87
		Seismic (MCE)	1.28	1.15	1.29
	Inner slope – assuming intact HDPE liner	Static	2.46	2.33	2.46
		Seismic (MCE)	1.81	1.72	1.82

Table 3.11-3 – Stability Analysis Factors of Safety

Pond	Description	Analysis	Factor of Safety		
			Bishop	Janbu	Morgenstern-Price
Central Plant Pond (Burdock)	Outer slope – assuming intact HDPE liner	Static	3.04	2.86	3.04
		Seismic (MCE)	2.16	2.02	2.16
	Outer slope – assuming HDPE liner has failed	Static	2.09	1.86	2.10
		Seismic (MCE)	1.45	1.29	1.46
	Inner slope – assuming intact HDPE liner	Static	2.03	1.90	2.03
		Seismic (MCE)	1.59	1.48	1.59

3.12 Embankment Settlement

Elastic theory was used to obtain an estimate of embankment settlements using material characteristics derived from the triaxial test results. Assuming a maximum embankment height of 30 ft, elastic theory predicts that the elastic settlement of an embankment having a crest width of 40 ft and 1(v):4.5(h) side slopes is likely to be less than 1 ft. This settlement will occur during construction, and will be accommodated by placing fill to ensure that final design crest elevations are achieved. Due to the relatively low embankments that are being constructed, settlement due to consolidation is not expected to be significant.

3.13 Summary of Pond Characteristics

Table 3.13-1 summarizes the pond characteristics at the Dewey-Burdock Uranium Project.

Table 3.13-1 – Pond Characteristics and Design Features

Parameter	Radium Settling/Spare Ponds	Central Plant Pond	Outlet Ponds	Storage and Spare Storage Ponds
Number of Ponds:				
Dewey	1 Radium Settling 1 Spare	-	1	4 Storage 1 Spare Storage
Burdock	1 Radium Settling 1 Spare	1	1	4 Storage 1 Spare Storage
Active Storage (per pond):				
Process water and stormwater from land application areas	39.4*	35.0	2.8	61.8
Stormwater falling on ponds	0**	1.2	2.1	2.0
Total	**39.4**	**36.2**	**4.9**	**63.8**
Crest width	220 ft	465 ft	162 ft	362 ft
Crest length	880 ft	465 ft	280 ft	362 ft
Depth	Varies 10.0 to 25.5 ft	Varies: 18.4 to 25.0 ft	Varies 12.3 to 14.0 ft	Varies 27.1 to 30.0 ft
Freeboard	3 ft	3 ft	3 ft	3 ft
Upstream embankment slope	3H:1V	3H:1V	4.5H:1V	4.5H:1V
Downstream embankment slope	4.5H:1V	4.5H:1V	4.5H:1V	4.5H:1V
Exterior embankment crest width	40 ft	40 ft	40 ft	40 ft
Interior embankment crest width	30 ft	N/A	30 ft	30 ft
Bottom grade	2 percent - graded towards leak detection sump		1 percent - graded towards a corner	
Lining system	Prepared subgrade or compacted random fill 1-ft-thick soil liner compacted to 95 percent standard proctor density 60-mil-smooth HDPE bottom (secondary) geomembrane 80-mil-textured HDPE top (primary) geomembrane Leak detection system consisting of geonet placed between primary and secondary geomembranes Leak detection sump and access port system 3-ft-deep by 3-ft-wide geomembrane anchor trench		Prepared subgrade or compacted random fill 1-foot-thick soil liner compacted to 95 percent standard proctor density 40-mil-textured HDPE geomembrane 3-ft-deep by 3-ft-wide geomembrane anchor trench	

*Includes 0.2-acre-ft storage for sludge

**Stormwater from the radium settling pond overflows into the outlet pond where it is stored

4.0 Deep Well Disposal Pond Design

4.1 Design Flows

Three water streams resulting from mining activities report to the ponds:

- Bleed water from the production wells
- Restoration water from the restoration wells
- Brine from the CPP

Bleed and restoration water is pumped to the radium settling ponds, where it is treated and used for deep well disposal. Some water from the CPP will be pumped to the CENTRAL PLANT pond where it will be stored. Allowance has been made for all ponds to store water resulting from the 100-year, 24-hour storm event while maintaining 3 ft of freeboard.

4.1.1 Production Well Bleed Water

The in situ leach process includes for up to 3 percent of the water pumped from the production wells to be bled from the system. Total production water is approximately 4,000 gpm, resulting in a bleed flow of approximately 120 gpm.

4.1.2 Wellfield Restoration Water

This water, having a flow rate of approximately 500 gpm, will be used to flush the mineralized target zone following uranium recovery. Once it returns to the surface, 120 gpm of this will be pumped to the radium settling ponds for treatment and deep well disposal, with the remainder being recycled as restoration water.

4.1.3 Brine from the Central Processing (Burdock) Plant Site

This water, having a flow rate of approximately 12 gpm, will be produced as part of the uranium extraction process.

4.1.4 Precipitation

Water falling directly on the pond surfaces will be stored in the ponds and either used for restoration water or deep well disposal.

4.2 Pond Design Requirements

Active storage requirements for the radium settling, outlet, surge and central plant ponds are provided below. In addition to active storage requirements, all ponds will be provided with 3 ft of freeboard. The catchment areas of the ponds will be minimized by grading all roads away from them, and by providing stormwater diversions to prevent water from upstream catchments from reporting to them.

Figure 4.2-1 provides the Dewey Plant Site Plan, and Figure 4.2-2 includes the pond cross sections.

Figure 4.2-3 provides the Burdock Plant Site Plan, and Figure 4.2-4 includes the pond cross sections.

4.2.1 Radium Settling Ponds

Radium is settled out of solution by adding barium chloride to the water. Co-precipitation of radium occurs when natural sulfate (SO_4) in the water combines with radium (Ra) and barium (Ba) to form $RaBaSO_4$. The requirements for efficient settlement of solids out of a solution include have been incorporated into the design of the ponds and include the following:

- Sufficient retention time for the settlement of radium out of solution
- Providing adequate surface area to prevent the development of large surface currents
- Providing a pond geometry or arrangement that will prevent short circuiting of flows through the pond

Radium is settled out of solution by adding barium chloride to the water. Co-precipitation of radium occurs when natural sulfate (SO_4) in the water combines with radium (Ra) and barium (Ba) to form $RaBaSO_4$. All discussions in the following sections, therefore, refer to the settlement of radium barium sulfate.

4.2.1.1 Retention Time and Storage

Water in the ponds must be retained for sufficient length of time to allow barium radium sulfate to settle out of solution. A literature survey of radium settling ponds indicated that typical retention times range from eight to 14 days. A retention time of 14 days has been adopted for this project. For a flow rate of 252 gpm, this requires that the pond have a minimum storage volume of 15.6-acre-ft. In addition, the ponds are expected to accumulate 321 ft^3/year of radium barium sulfate sludge. For a 10-year project life, this will amount to 0.074-acre-ft of storage. The design allows identical radium settling ponds to be constructed at the Dewey and Burdock Sites, capable of storing 15.9-acre-ft each, allocated as follows:

- 15.8-acre-ft for bleed and restoration water
- 0.1-acre-ft for sludge accumulation

Stormwater will overflow into the outlet pond, which has been designed to accommodate the 100-year, 24-hour storm event for both itself and the radium settling pond.

4.2.1.2 Surface Area

To promote settling, the pond surface area should be large enough to prevent significant surface currents from developing. Should these develop, they could keep the radium barium sulfate in suspension. They could also result in short circuiting, with water flowing directly from the pond inlet to the outlet.

The literature survey indicated that a minimum area of approximately 0.6 acre should be allowed for every 100 gpm of flow. For a flow of 252 gpm, this results in area of 1.51 acres. The radium settling pond has been designed to have a water surface area of 2.20 acres.

4.2.1.3 Pond Geometry

Unless baffles are provided, the length of a settling pond should ideally be at least 4 times its width. To meet this criterion, the radium settling pond has been designed to have a crest length of 680 ft and a crest width of 170 ft.

4.2.2 Outlet Ponds

Identical outlet ponds have been designed for the Dewey and Burdock Sites. They have been designed to accommodate approximately three day's production water, equating to 3.3-acre-ft, and precipitation from the 100-year, 24-hour storm event falling on both the radium settling and outlet ponds. The ponds have been designed to store the following:

- 3.4-acre-ft for treated water for deep well injection
- 1.2-acre-ft for the 100-year, 24-hour design storm event falling on the radium settling pond
- 0.5-acre-ft for the 100-year, 24-hour design storm event falling on the outlet pond

4.2.3 Surge Ponds

Identical surge ponds have been designed for the Dewey and Burdock Sites. They serve as a volume buffer for water flowing out of the radium settling ponds and have been sized to accommodate seven day's production water. They have been designed to have a total storage of 8.4-acre-ft, allocated as follows:

- 7.8-acre-ft for treated water for deep well injection
- 0.6-acre-ft for the 100-year, 24-hour design storm event falling on the pond surface

4.2.4 Central Plant Pond

The central plant pond is located at the Burdock Site, and is provided to store brine from the plant. The central plant pond has been designed to have the same active storage as the spare pond, and has a total storage of 15.9-acre-ft, allocated as follows:

- 15.2-acre-ft brine
- 0.7-acre-ft for the 100-year, 24-hour design storm event falling on the pond surface

4.2.5 Spare Pond

The spare ponds have been designed to be identical to the radium settling ponds, which are the largest ponds in the system. The spare ponds are located adjacent to the radium settling ponds, and have been designed to accommodate water from any of the other ponds should their liners fail.

4.3 Water Flow Configurations

Water will be routed through the radium settling ponds to maximize retention time and facilitate the settlement of barium sulfate. Figure 4.3-1 provides the Dewey Plant Site Flow Diagram and Figure 4.3-2 provides the Burdock Plant Site Flow Diagram.

4.4 Pond Lining Systems

The lining system for the radium settling, spare and central plant ponds will consist of the following:

- An 80-mil-textured primary HDPE liner.
- A 60-mil-smooth secondary HDPE liner.

- A 12-inch-thick compacted clay liner, having a maximum permeability of $1x10^{-7}$ cm/sec. This liner will be constructed below the secondary HDPE liner.
- A geonet sandwiched between the primary and secondary HDPE liners.

The outlet and surge ponds will contain treated water that will be used for deep well injection. The liner requirement on those ponds is therefore less stringent, and will consist of the following:

- An 40-mil-textured HDPE liner.
- A 12-inch-thick compacted clay liner, having a maximum permeability of $1x10^{-7}$ cm/sec. This liner will be constructed below the HDPE liner.

4.5 Leak Detection Systems

The radium settling, spare and central plant ponds will include a geonet drainage layer installed between the primary and secondary HDPE liners. The geonet will drain into a leak detection sump. A minimum grade of 2 percent will be maintained across the bottom of the ponds to facilitate the drainage of water into the leak detection sump should a leak develop. A leak detection access port and pump will be provided at the sump to allow any water collecting there to be pumped out and monitored. Pipes feeding into the double-lined ponds will be dual contained, with the carrier and containment pipes being connected to the primary and secondary HDPE liners, respectively. The leak detection system is shown on Figure 4.5-1.

4.6 Foundation Preparation

Foundation preparation on all ponds will include the following:

- Removing vegetation, existing structures and unsuitable foundation materials
- Subgrade preparation
- Site grading

More detail on the items listed above is provided in Table 4.6-1.

Table 4.6-1 – Foundation Preparation Requirements

Item	Description
Vegetation	Clear and grub vegetation
Structures	Remove any existing structures
Surface soils	- Strip organic soil matter for a minimum of 10 ft beyond the pond embankment limits - Place the stripped soil in temporary stockpiles for final reclamation - Stockpiles should be located as close to the stripped areas as possible - Proposed stockpile locations are indicated on Figures 4.6-1, 4.2-1, and 4.2-3
	Scarify, moisture condition and compact the top 6 inches of the stripped ground surface in fill areas to a minimum of 90 percent of the maximum Modified Proctor Dry Density (ASTM D 1557)
Site Grading	Undertake site grading cut and fill. Compact graded materials to a minimum of 90 percent of the maximum dry density (ASTM D 1557) within ± 2 percent of the optimum moisture content

4.7 Embankment Drainage

An embankment drainage system will be installed in the outer face of all embankments to prevent the outer toe of the embankment from becoming saturated should a HDPE liner system fail. Water collected by the drain system will be conveyed to a sump, from where it will be pumped back to the ponds.

4.8 Pond Seepage Analyses

Seepage analyses were undertaken for the outer embankments of the ponds to model the phreatic surface through the outer embankments of the ponds should the HDPE liners fail. The phreatic surface determined from the seepage analysis was then used to model embankment slope stability for that condition.

All ponds will be HDPE lined, with the HDPE liner being underlain by a 1-ft-thick clay liner. Negligible seepage is expected from them under normal operating conditions.

4.8.1 Material Properties

Flexible wall permeability tests are summarized in Table 3.10-1. The median undisturbed permeabilities have been assumed for the in situ soils, while the median remolded permeabilities have been assumed for the embankments. In addition, regulatory requirements specify that a 1-ft-thick clay liner having a maximum permeability of $1\text{x}10^{-7}$ be used below the HDPE liners in the ponds. Material from the pond excavation will be selected to meet this criterion. If necessary, borrow areas will be developed to source this material.

Sand used in the embankment drainage system was assumed to have a permeability of $5x10^{-4}$ cm/sec.

4.8.2 Analysis

For the seepage analysis, it was assumed that the HDPE liners in the ponds fail completely, with the 1-ft-thick clay liner providing the only barrier to seepage through the embankment. The seepage analysis was completed using the GeoStudio 2007 software package.

4.9 Pond Stability Analyses

Stability analyses on the pond embankments were completed using the GeoStudio 2007 software package. The sections selected for the analysis are located at the highest points of the embankments.

4.9.1 Analyses

The following analyses were conducted on each of the ponds:

- A static stability analysis, assuming that the liners are intact (no phreatic surface in the embankment)
- A pseudostatic analysis, assuming the liners are intact and modeling the MCE acceleration
- A static analysis assuming that the liners have completely failed, allowing a phreatic surface to develop in the embankment
- A pseudostatic analysis assuming that the liners have completely failed, allowing a phreatic surface to develop in the embankment, and modeling the MCE acceleration

4.9.2 Soil Strengths

Soil strengths were obtained from three tri-axial tests that were conducted on material samples collected during the site investigation, and are presented in Table 3.11-1.

The material strength values obtained from test pit TP 02-7 were used for the analyses undertaken on the ponds at the Dewey Site.

4.9.3 Material Densities

In situ material densities were obtained from undisturbed samples collected during the site investigation. The densities of embankment materials were obtained from compaction tests undertaken on samples collected from site, and are summarized in Table 3.11-2.

Median undisturbed densities have been assumed for in situ soils, while the median densities from the compaction tests have been assumed for the embankments and clay liners.

4.9.4 Seismic Ground Acceleration Values

MCE ground accelerations were obtained from the document "Dewey-Burdock Project, Application for NRC Uranium Recovery License, Fall River and Custer Counties, South Dakota, Technical Report" dated February 2009. The MCE was determined in Section 2.6.6 of the report to have a maximum ground acceleration of 0.09 g.

4.9.5 Stability Analysis Results

The factors of safety for the embankments are provided in Table 4.9-1. The table provides results for three methods of analysis, namely:

- Bishop method
- Janbu method
- Morgenstern-Price method

Table 4.9-1 – Stability Analysis Factors of Safety

Pond	Description	Analysis	Factor of Safety		
			Bishop	Janbu	Morgenstern-Price
Dewey Radium Settling/Spare Ponds	Outer slope – assuming intact HDPE liner	Static	3.00	2.76	3.00
		Seismic (MCE)	2.14	1.97	2.14
	Outer slope – assuming HDPE liner has failed	Static	2.22	1.97	2.23
		Seismic (MCE)	1.52	1.36	1.53
	Inner slope – assuming intact HDPE liner	Static	2.19	2.04	2.19
		Seismic (MCE)	1.69	1.57	1.69
Dewey Outlet Pond	Outer slope – assuming intact HDPE liner	Static	2.88	2.66	2.87
		Seismic (MCE)	2.05	1.90	2.05
	Outer slope – assuming HDPE liner has failed	Static	2.10	1.86	2.11
		Seismic (MCE)	1.44	1.29	1.46
	Inner slope – assuming intact HDPE liner	Static	3.09	2.86	3.08
		Seismic (MCE)	2.17	2.02	2.18
Dewey Surge Pond	Outer slope – assuming intact HDPE liner	Static	3.57	3.20	3.56
		Seismic (MCE)	2.52	2.28	2.52
	Outer slope – assuming HDPE liner has failed	Static	2.64	2.35	2.65
		Seismic (MCE)	1.78	1.59	1.79
	Inner slope – assuming intact HDPE liner	Static	2.97	2.77	2.97
		Seismic (MCE)	2.09	1.96	2.09
Burdock Radium Settling Pond	Outer slope – assuming intact HDPE liner	Static	3.02	2.81	3.02
		Seismic (MCE)	2.15	2.01	2.15
	Outer slope – assuming HDPE liner has failed	Static	2.16	1.92	2.17
		Seismic (MCE)	1.49	1.33	1.50
	Inner slope – assuming intact HDPE liner	Static	2.33	2.18	2.33
		Seismic (MCE)	1.79	1.68	1.79
Burdock Outlet Pond	Outer slope – assuming intact HDPE liner	Static	2.93	2.74	2.93
		Seismic (MCE)	2.09	1.96	2.09
	Outer slope – assuming HDPE liner has failed	Static	2.07	1.84	2.07
		Seismic (MCE)	1.42	1.28	1.43
	Inner slope – assuming intact HDPE liner	Static	3.35	3.11	3.35
		Seismic (MCE)	2.35	2.19	2.35
Burdock Surge Pond	Outer slope – assuming intact HDPE liner	Static	3.17	2.93	3.17
		Seismic (MCE)	2.26	2.10	2.26
	Outer slope – assuming HDPE liner has failed	Static	2.30	2.03	2.30
		Seismic (MCE)	1.57	1.41	1.59
	Inner slope – assuming intact HDPE liner	Static	3.07	2.85	3.06
		Seismic (MCE)	2.18	2.04	2.19

Table 4.9-1 – Stability Analysis Factors of Safety

Pond	Description	Analysis	Factor of Safety		
			Bishop	**Janbu**	**Morgenstern-Price**
Central Plant Pond (Burdock)	Outer slope – assuming intact HDPE liner	Static	3.10	2.88	3.10
		Seismic (MCE)	2.21	2.06	2.21
	Outer slope – assuming HDPE liner has failed	Static	2.22	1.96	2.22
		Seismic (MCE)	1.52	1.36	1.53
	Inner slope – assuming intact HDPE liner	Static	2.19	2.03	2.19
		Seismic (MCE)	1.70	1.58	1.70

The above analyses indicate that the outer slopes of the ponds have a minimum factor of safety of approximately 2.66 under normal static loading conditions assuming that the HDPE liners remain intact, preventing a phreatic surface from developing in the embankment. The minimum factor of safety reduces to approximately 1.90 during the MCE seismic event.

Should the HDPE liner fail, a drain installed in the embankment will help to lower the phreatic surface and prevent the downstream toe from becoming saturated. The factors of safety do reduce, with the minimum factor of safety under normal static loading conditions reducing to approximately 1.84. Under MCE seismic loading conditions the minimum factor of safety reduces to approximately 1.28.

The inner slope is less critical in terms of preventing a breach of the embankment, but was evaluated for stability assuming the HDPE liners remain intact. The minimum factor of safety under normal static loading conditions was calculated to be 2.03, while under MCE seismic loading conditions this reduces to approximately 1.58.

The above factors of safety indicate that the slopes are stable under both static and MCE seismic loading conditions.

4.9.6 Embankment Settlement

Elastic theory was used to obtain an estimate of embankment settlements using material characteristics derived from the triaxial test results. Assuming a maximum embankment height of 30 ft, elastic theory predicts that the elastic settlement of an embankment having a crest width of 40 feet and 1(v):4.5(h) side slopes is likely to be less than 1 ft. This settlement will occur during construction, and will be accommodated by placing fill to ensure that final design crest elevations are achieved. Due to the relatively low embankments that are being constructed, settlement due to consolidation is not expected to be significant.

4.9.7 Summary of Pond Characteristics

Table 4.9-2 summarizes the pond characteristics at the Dewey-Burdock Project.

Table 4.9-2 – Pond Characteristics and Design Features

Parameter	Radium Settling/Spare Ponds	Central Plant Pond	Outlet Ponds	Surge Ponds
Number of Ponds:				
Dewey	1 Radium Settling 1 Spare	-	1	1
Burdock	1 Radium Settling 1 Spare	1	1	1
Active Storage (per pond):				
Process water and stormwater from land application areas	15.9*	15.2	3.4	7.8
Stormwater falling on ponds	0**	0.7	1.7	0.6
Total	**15.9**	**15.9**	**5.1**	**8.4**
Crest width	170	275	160	250
Crest length	680	275	370	250
Depth	Varies 7.5 to 19.5 ft	Varies: 15.8 to 20.5 ft	Varies 11.4 to 14.0 ft	Varies 15.0 to 16.5 ft
Freeboard	3 ft	3 ft	3 ft	3 ft
Upstream embankment slope	3H:1V	3H:1V	4.5H:1V	4.5H:1V
Downstream embankment slope	4.5H:1V	4.5H:1V	4.5H:1V	4.5H:1V
Exterior embankment crest width	40 ft	40 ft	40 ft	40 ft
Interior embankment crest width	30 ft	N/A	30 ft	N/A
Bottom grade	2 percent - graded towards leak detection sump		1 percent - graded towards a corner	
Lining system	Prepared subgrade or compacted random fill 1-foot-thick soil liner compacted to 95 percent standard proctor density 60-mil-smooth HDPE bottom (secondary) geomembrane 80-mil-textured HDPE top (primary) geomembrane Leak detection system consisting of geonet placed between primary and secondary geomembranes Leak detection sump and access port system 3-ft-deep by 3-ft-wide geomembrane anchor trench		Prepared subgrade or compacted random fill 1-foot-thick soil liner compacted to 95 percent standard proctor density 40-mil-textured HDPE geomembrane 3-ft-deep by 3-ft-wide geomembrane anchor trench	

*Includes 0.1 acre-ft storage for sludge

**Stormwater from the radium settling pond overflows into the outlet pond where it is stored

5.0 References

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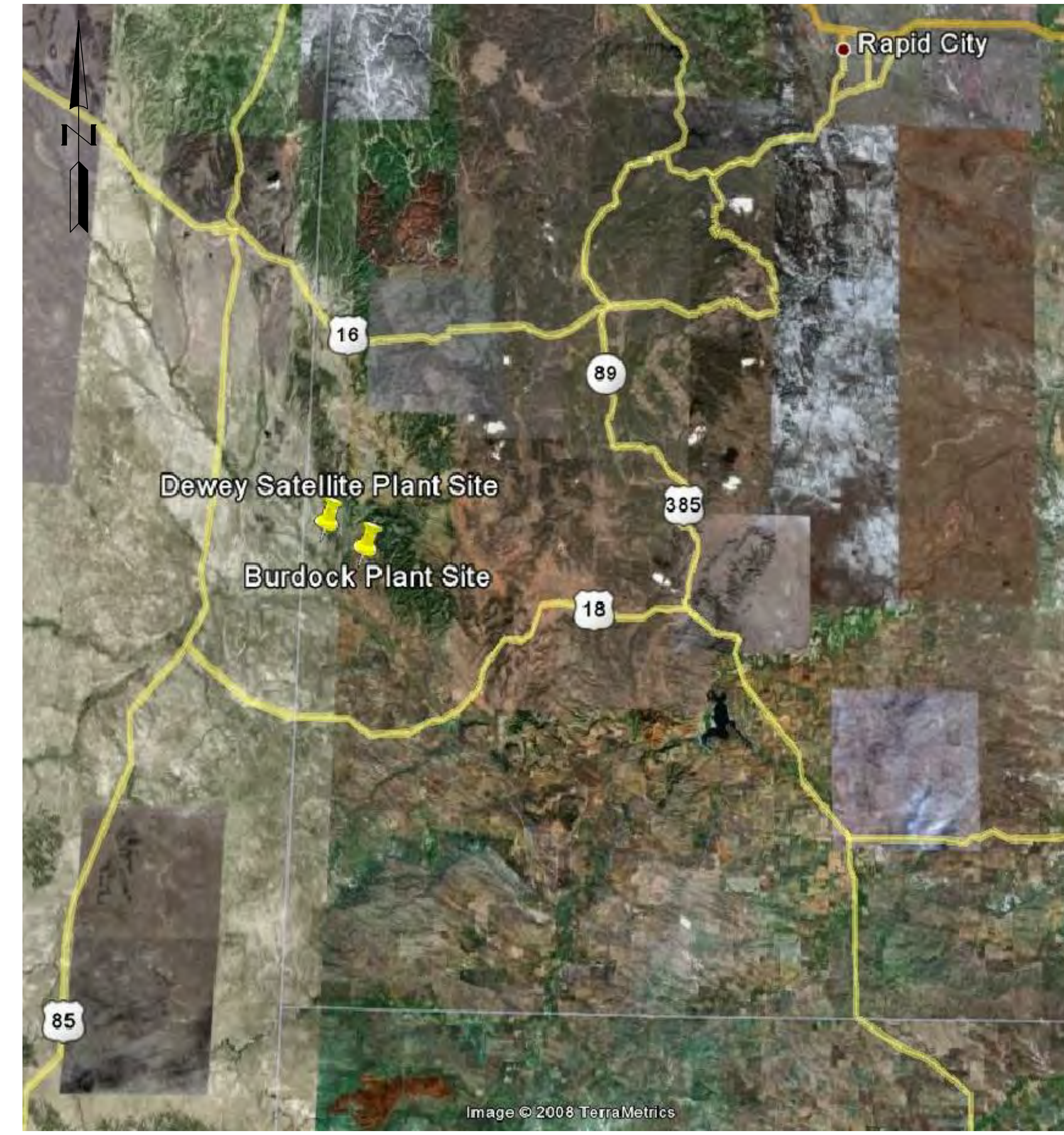
Figures

INDEX OF FIGURES



LOCATION MAP

COMMON ABBREVIATIONS

℄	CENTER LINE
DIA	DIAMETER
EL	ELEVATION
NTS	NOT TO SCALE
REQ'D	REQUIRED
SCH	SCHEDULE
SDR	STANDARD DIMENSION RATIO
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
(TYP)	TYPICAL
FT	FEET

SYMBOLS AND DESCRIPTIONS

3:1	3 (HORIZONTAL) TO 1 (VERTICAL) SLOPE
E 371000	EASTING COORDINATE
N 364500	NORTHING COORDINATE
1 / 100	DETAIL IDENTIFICATION; DRAWING REFERENCE NUMBER
A / 100	PROFILE OR CROSS SECTION IDENTIFICATION; DRAWING REFERENCE NUMBER
	DIRECTION OF FLOW
	EXISTING GROUND SURFACE OR BOTTOM OF EXCAVATION
6525	EXISTING GROUND SURFACE AND EL, FEET
	SLOPE INDICATOR
	TOP OF ROCK OR ROCK SURFACE
	WATER LEVEL

SYMBOLS AND DESCRIPTIONS

A / 100	SECTION CALLOUT WITH LOCATION REFERENCE
	DETAIL OR DIMENSION BREAK
	FENCE LINE
1 / 2	SLOPE INDICATOR (DETAIL)

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	INDEX, GENERAL SITE LOCATION MAP AND SYMBOLS

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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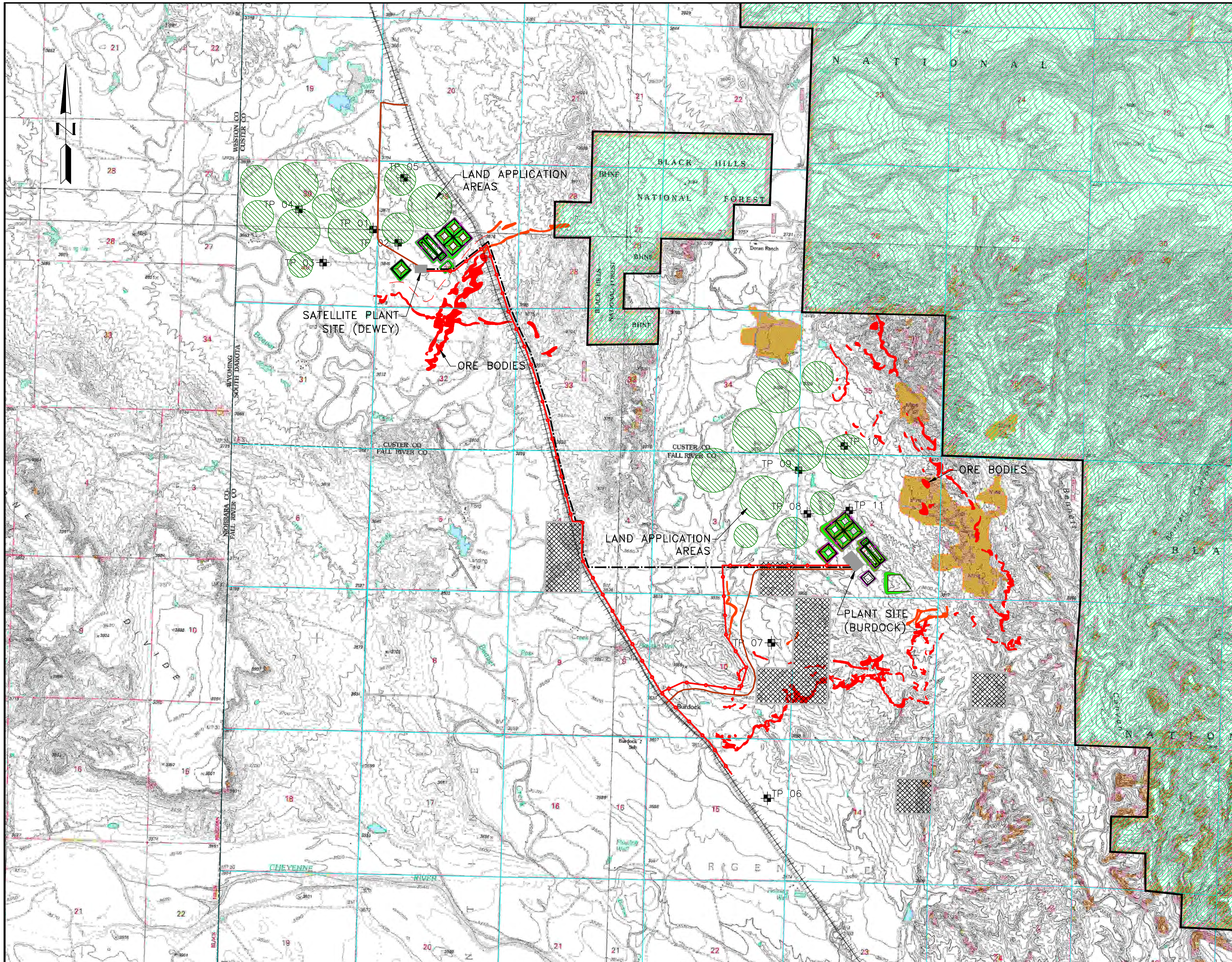

LEGEND:

REGRADED CONTOURS

NEW ROADS

RAILROAD

POWER LINE

PIPELINE

ORE BODIES

LAND APPLICATION AREAS

NATIONAL FOREST

BLM AREAS

TP 05 TEST PIT

PLAN

2000 0 2000 4000 FEET

1" = 2000' AT FULL SIZE (ANSI D)
1" = 4000' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION SITE INVESTIGATION – TEST PIT LOCATIONS

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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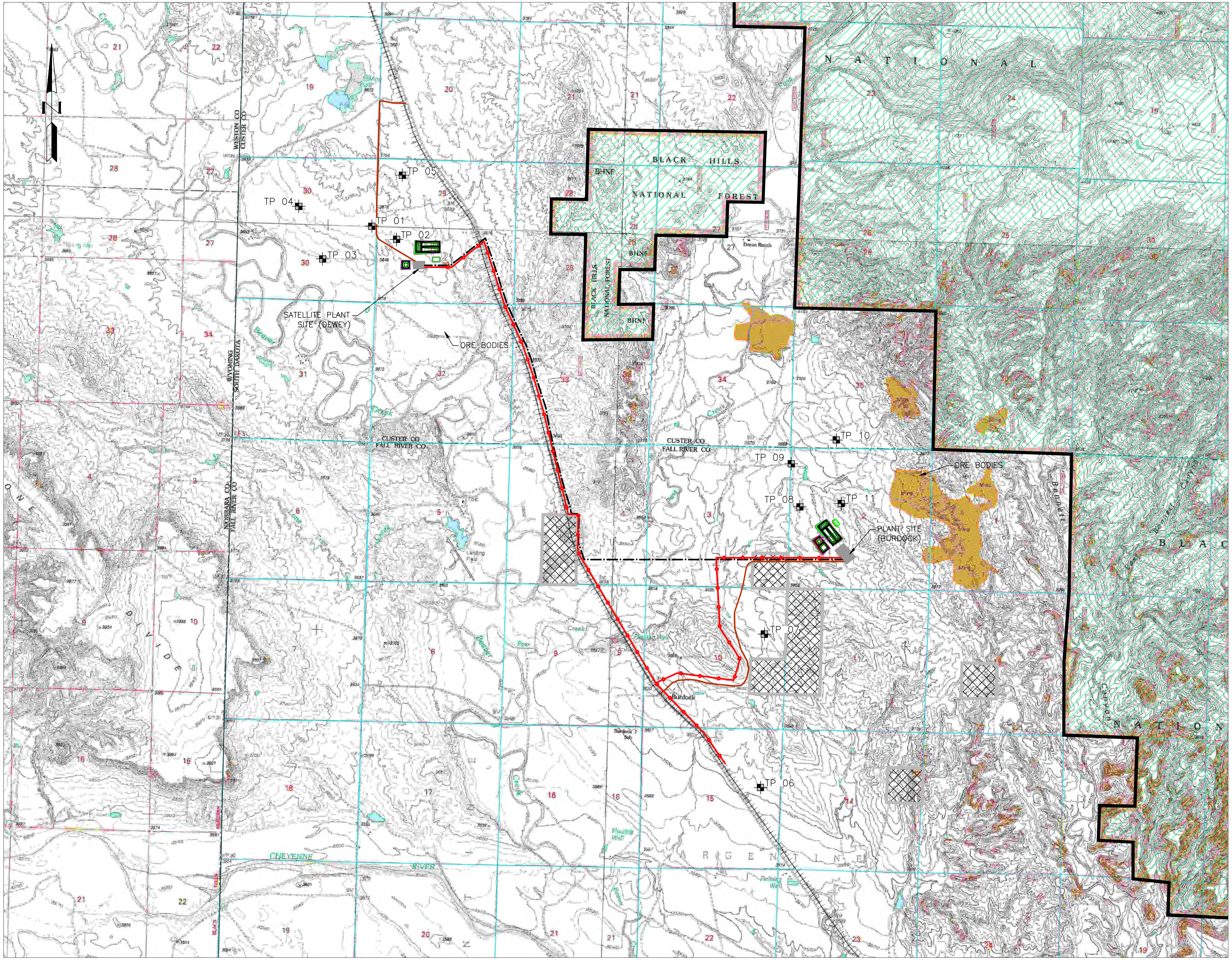

PLAN

2000 0 2000 4000 FEET

1" = 2000' AT FULL SIZE (ANSI D)
1" = 4000' AT HALF SIZE (ANSI B)

LEGEND:

- REGRADED CONTOURS
- EXISTING ROAD
- NEW ROADS
- RAILROAD
- POWER LINE
- PIPELINE
- ORE BODIES
- NATIONAL FOREST
- BLM AREAS
- TP 05 TEST PIT

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT
POWERTECH (USA) Inc.

PROJECT
DEWEY-BURDOCK PROJECT

TITLE
DEEP WELL DISPOSAL
SITE INVESTIGATION – TEST PIT LOCATIONS

Knight Piésold
CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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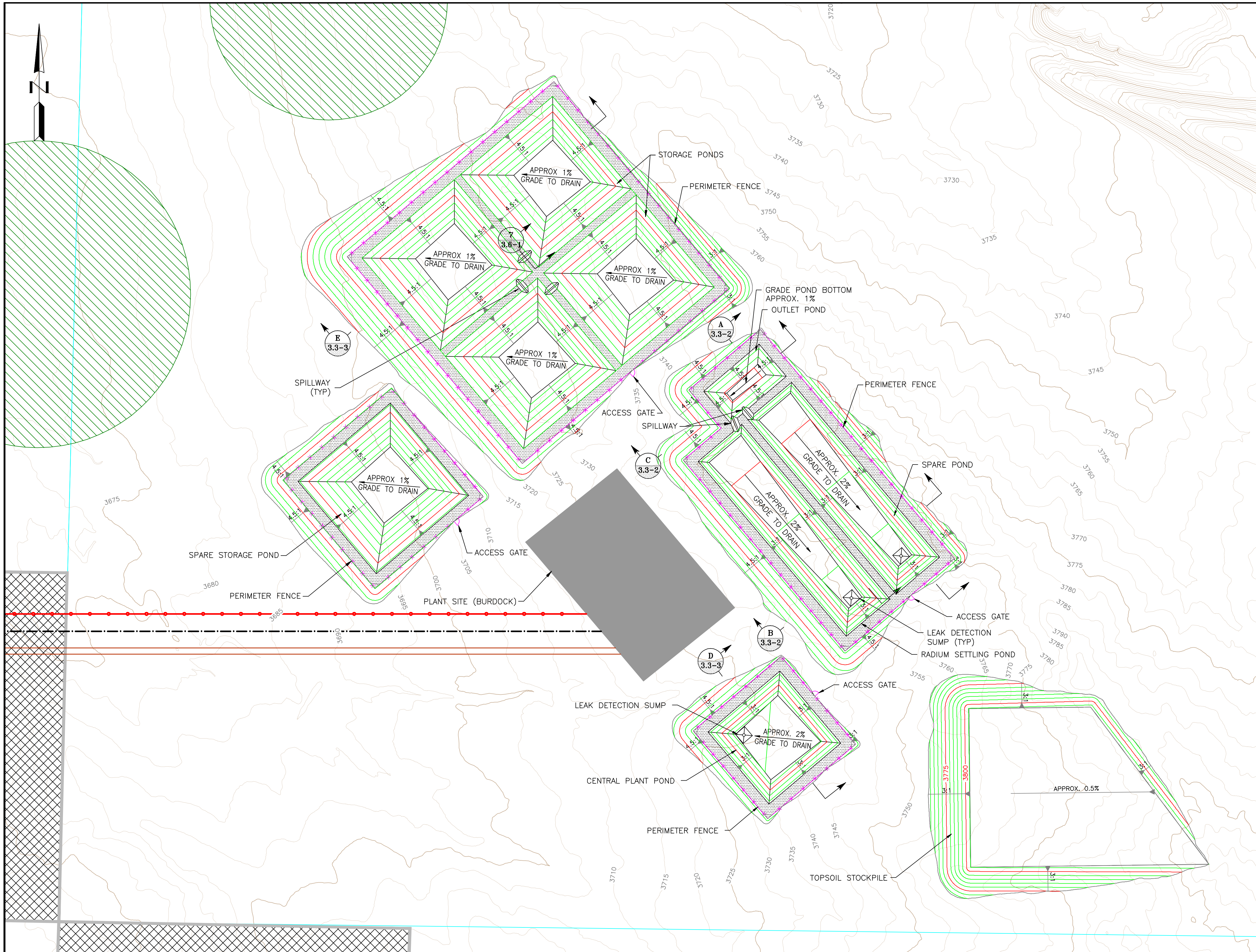

LEGEND:

- EXISTING CONTOURS
- REGRADED CONTOURS
- EMBANKMENT ROAD
- NEW ROADS
- PERIMETER FENCE
- POWER LINE
- PIPELINE
- EXISTING STREAM
- LAND APPLICATION AREAS
- BLM AREAS

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).

PLAN – BURDOCK PLANT SITE

200 0 200 400 FEET

1" = 200' AT FULL SIZE (ANSI D)
1" = 400' AT HALF SIZE (ANSI B)

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CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION BURDOCK PLANT SITE PLAN

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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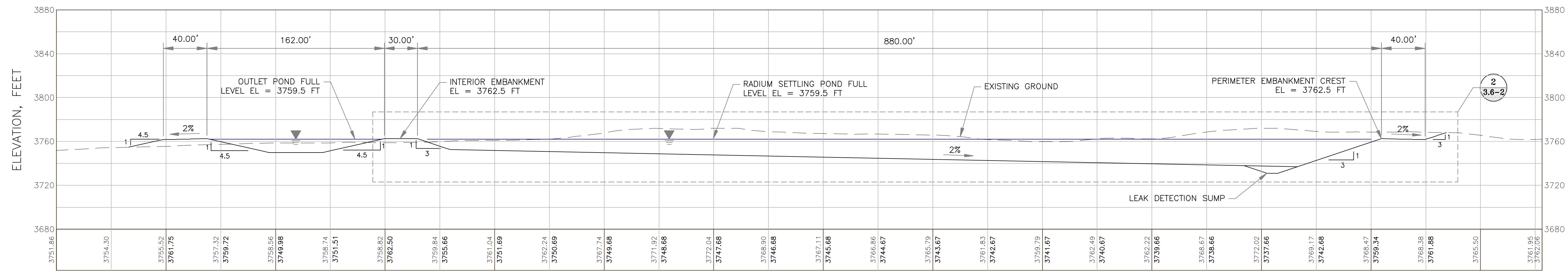

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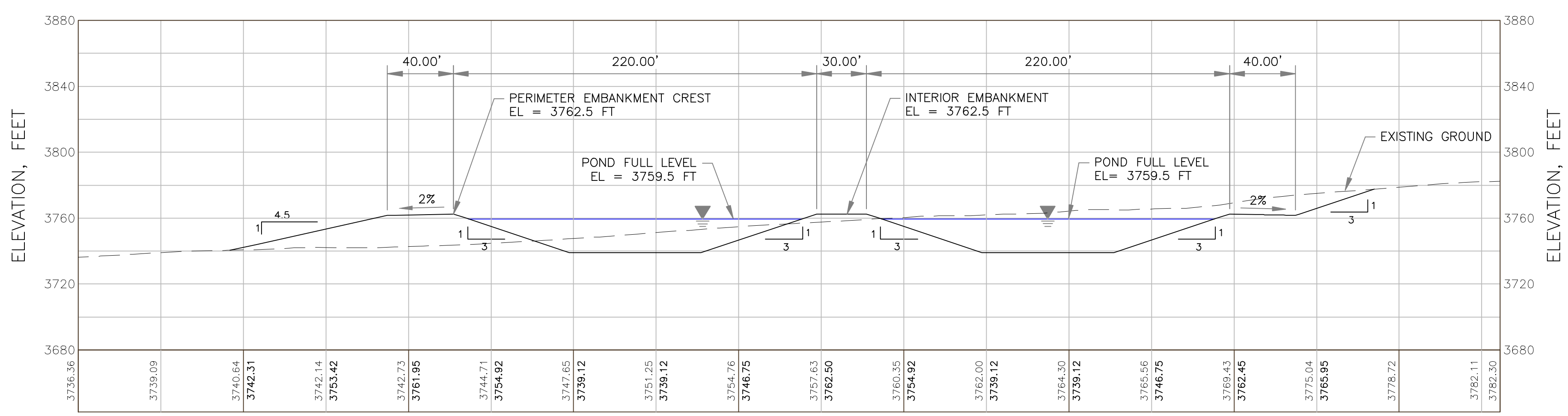

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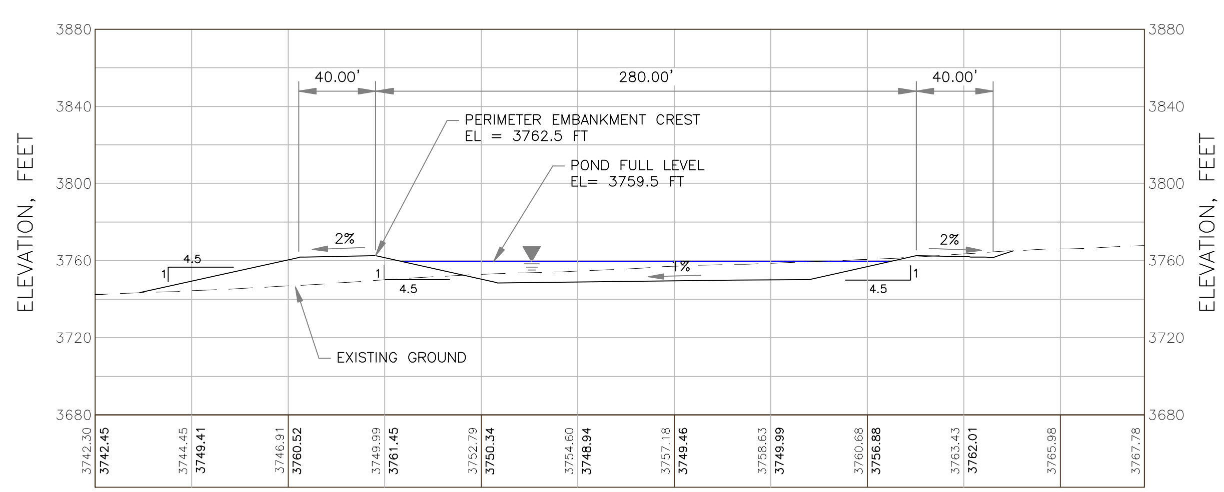

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3.3-1
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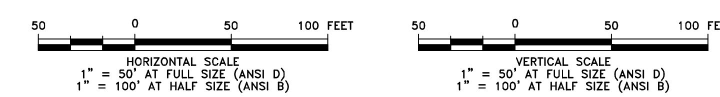

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION BURDOCK POND SECTIONS SHEET 1 OF 2

Knight Piésold CONSULTING

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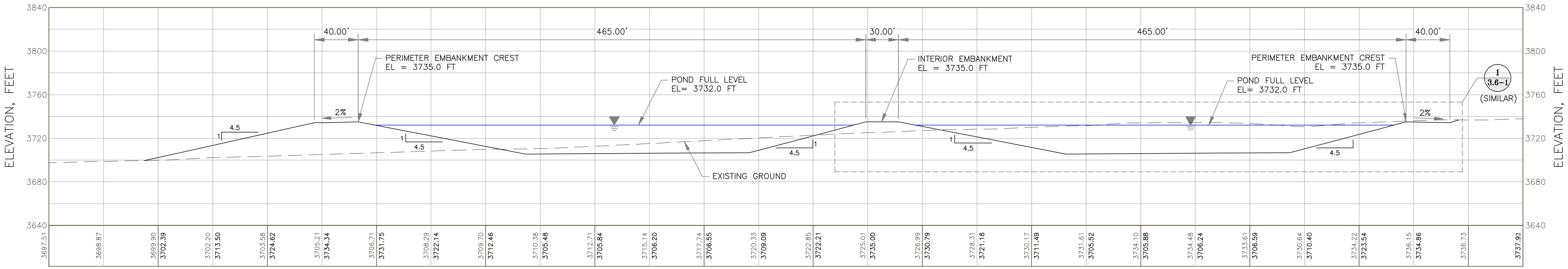

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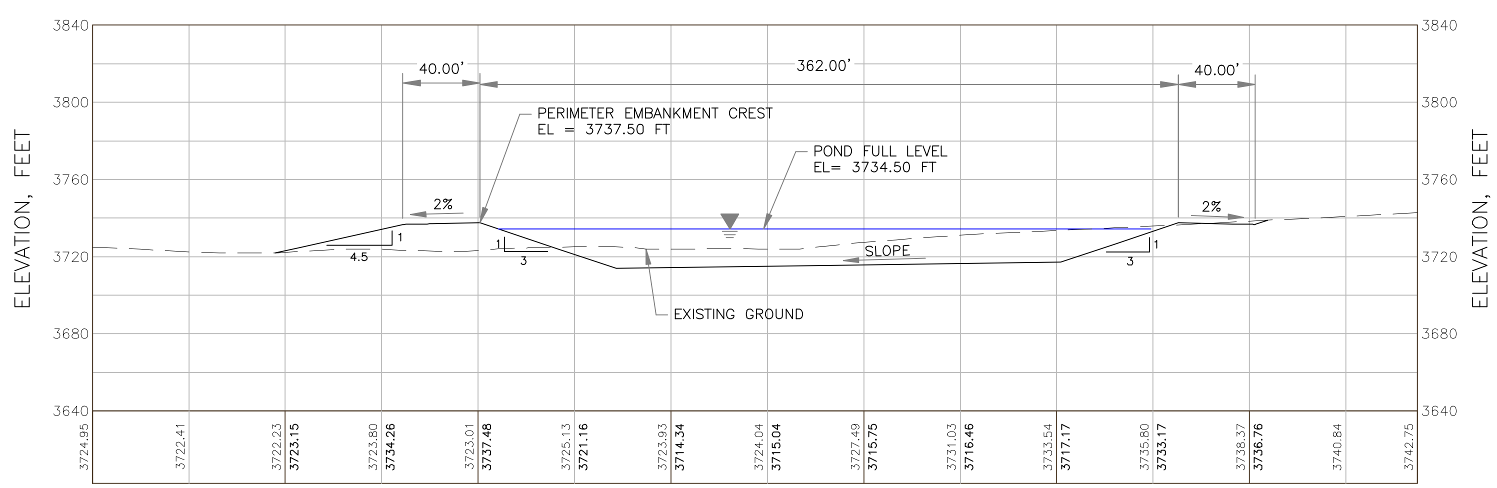
BURDOCK STORAGE PONDS
SECTION



D
3.3-1
CENTRAL PLANT POND
SECTION

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HORIZONTAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

50 0 50 100 FEET
VERTICAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION BURDOCK POND SECTIONS SHEET 2 OF 2

Knight Piésold
CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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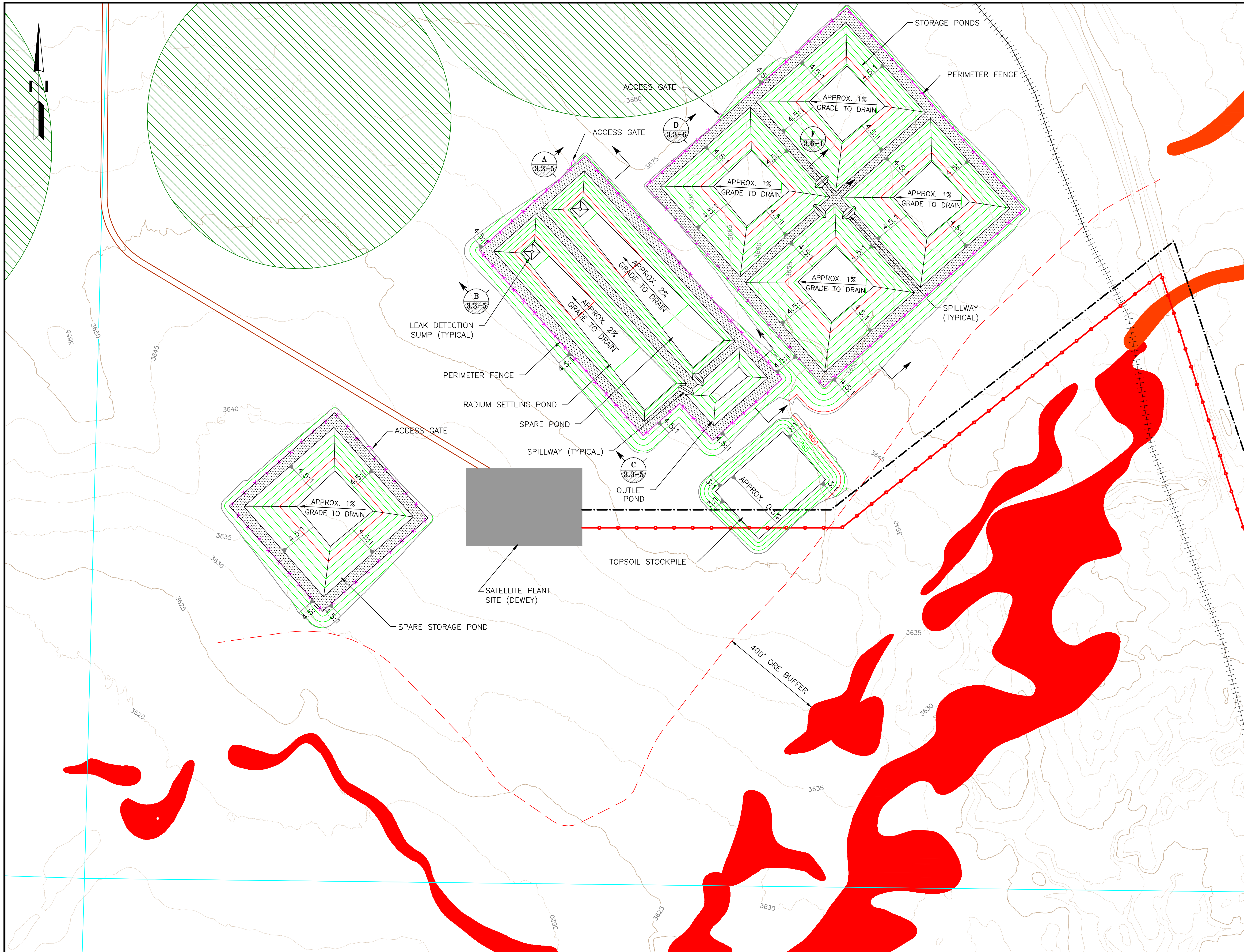

LEGEND:

- EXISTING CONTOURS
- REGRADED CONTOURS
- EMBANKMENT ROAD
- RAILROAD
- PERIMETER FENCE
- PIPELINE
- POWER LINE
- EXISTING STREAM
- LAND APPLICATION AREAS
- ORE BODIES

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

PLAN – DEWEY SATELLITE PLANT SITE

200 0 200 400 FEET

1" = 200' AT FULL SIZE (ANSI D)
1" = 400' AT HALF SIZE (ANSI B)

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION DEWEY PLANT SITE PLAN

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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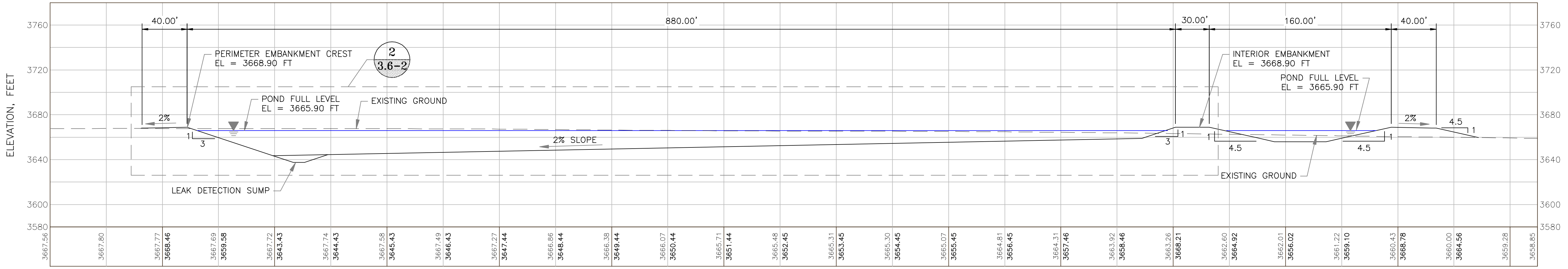

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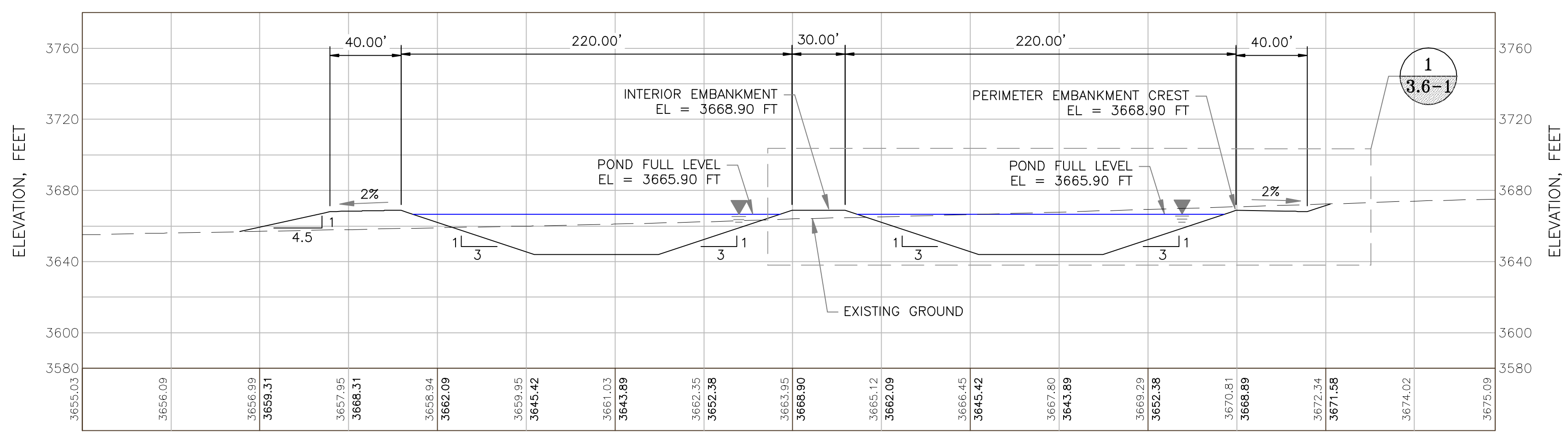
3.3-4
DEWEY RADIUM SETTLING AND OUTLET PONDS
SECTION



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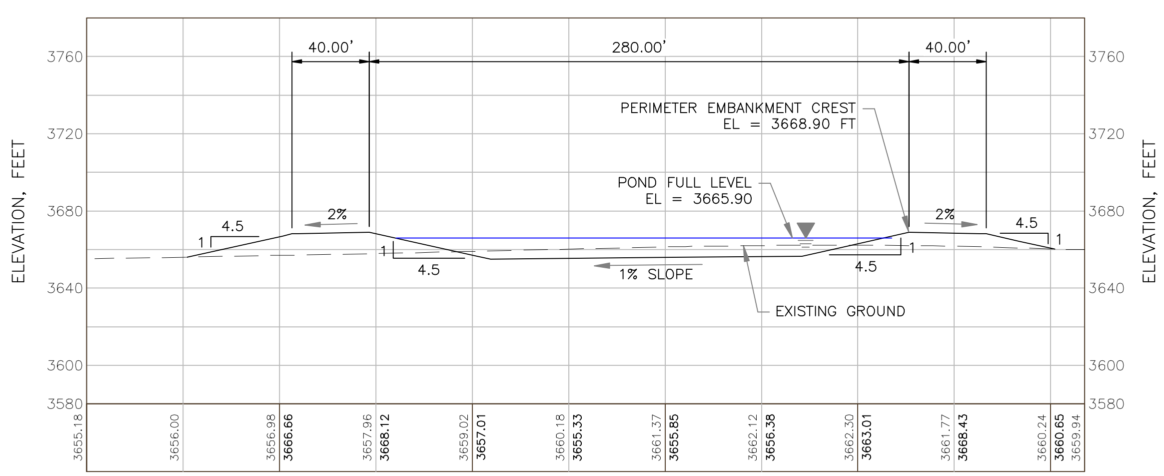

C
3.3-4
DEWEY OUTLET POND
SECTION

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HORIZONTAL SCALE
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1" = 100' AT HALF SIZE (ANSI B)

50 0 50 100 FEET
VERTICAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT: POWERTECH (USA) Inc.

PROJECT: DEWEY-BURDOCK PROJECT

TITLE: LAND APPLICATION AND IRRIGATION
DEWEY POND SECTIONS
SHEET 1 OF 2

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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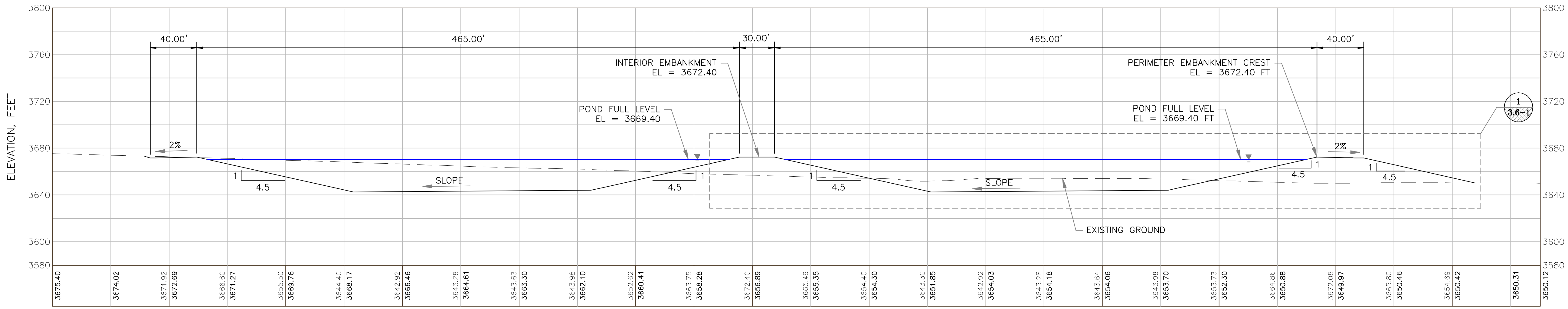

D 3.3-4 DEWEY STORAGE PONDS SECTION

HORIZONTAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

VERTICAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION DEWEY POND SECTIONS SHEET 2 OF 2

Knight Piésold CONSULTING

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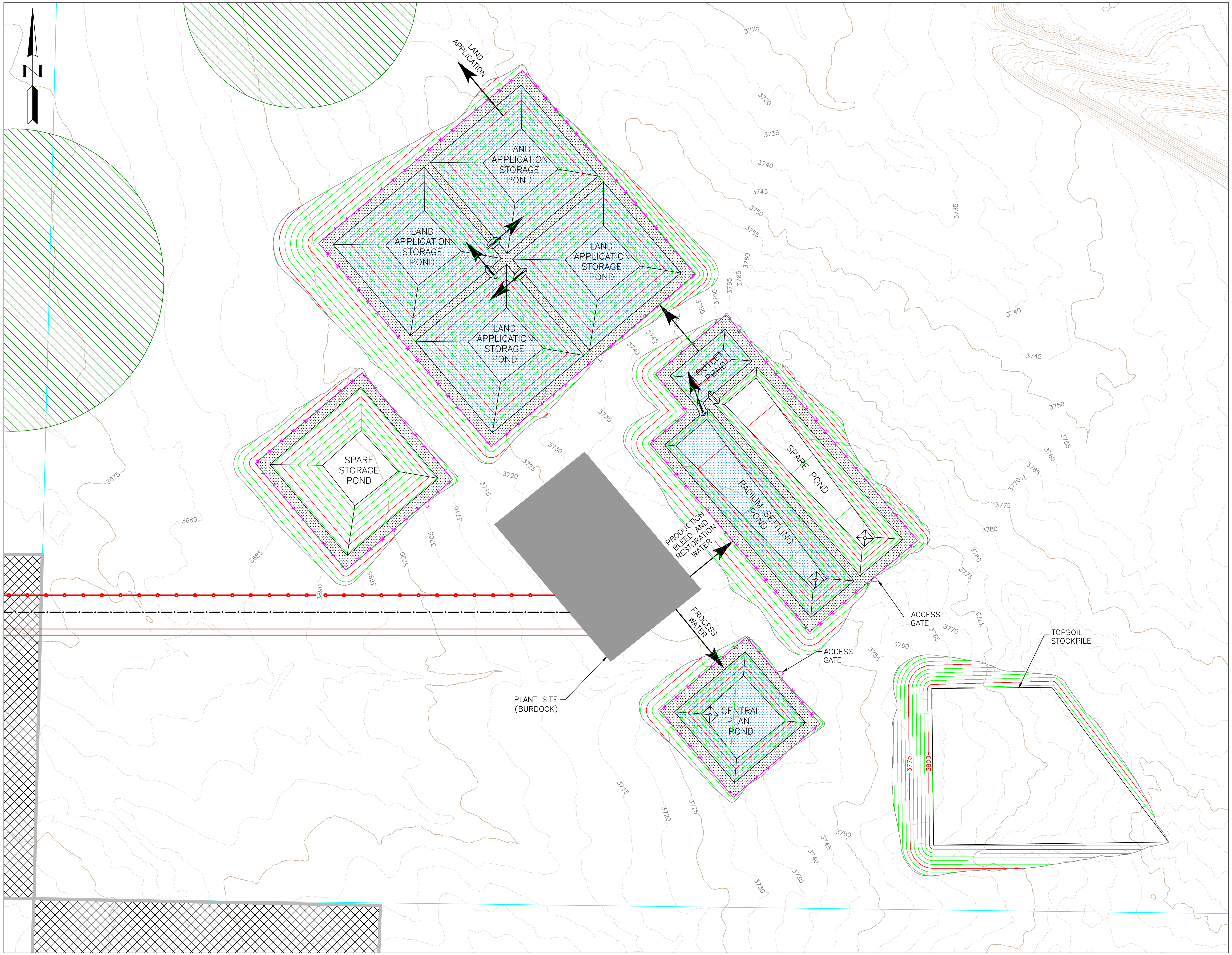

LEGEND:

- EXISTING CONTOURS
- REGRADED CONTOURS
- EMBANKMENT ROAD
- NEW ROADS
- RAILROAD
- PERIMETER FENCE
- POWER LINE
- PIPELINE
- EXISTING STREAM
- LAND APPLICATION AREAS
- BLM AREAS
- DIRECTION OF WATER FLOW

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN – BURDOCK PLANT SITE

200 0 200 400 FEET

1" = 200' AT FULL SIZE (ANSI D)
1" = 200' AT HALF SIZE (ANSI B)

LAST SAVED BY: RBOWLING
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CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION BURDOCK PLANT SITE FLOW DIAGRAM

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
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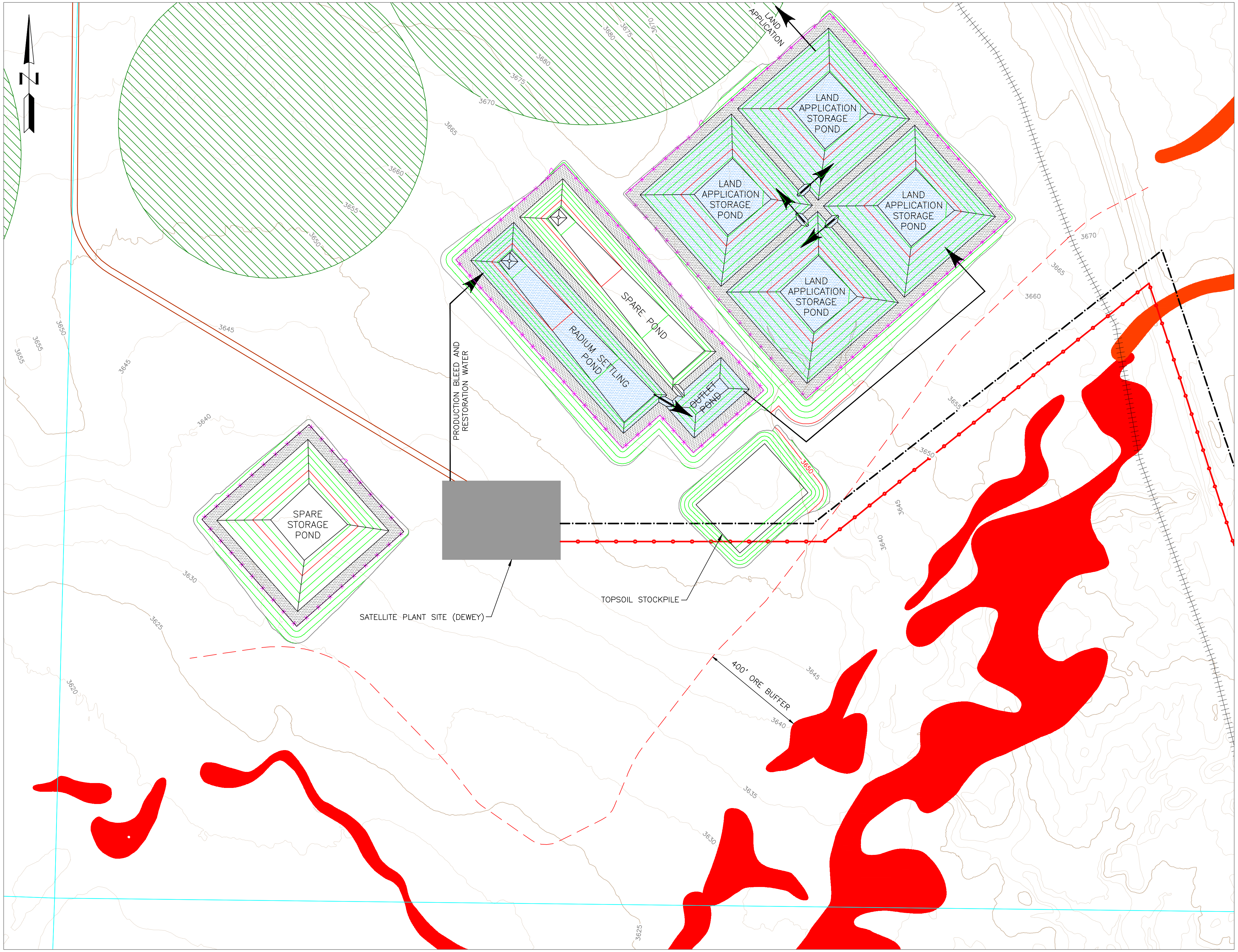

LEGEND:

- EXISTING CONTOURS
- REGRADED CONTOURS
- EMBANKMENT ROAD
- RAILROAD
- PERIMETER FENCE
- POWER LINE
- ORE BODIES
- PIPELINE
- EXISTING STREAM
- LAND APPLICATION AREAS
- DIRECTION OF WATER FLOW

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN – DEWEY SATELLITE PLANT SITE

200 0 200 400 FEET

1" = 200' AT FULL SIZE (ANSI D)
1" = 400' AT HALF SIZE (ANSI B)

LAST SAVED BY: RBOWLING
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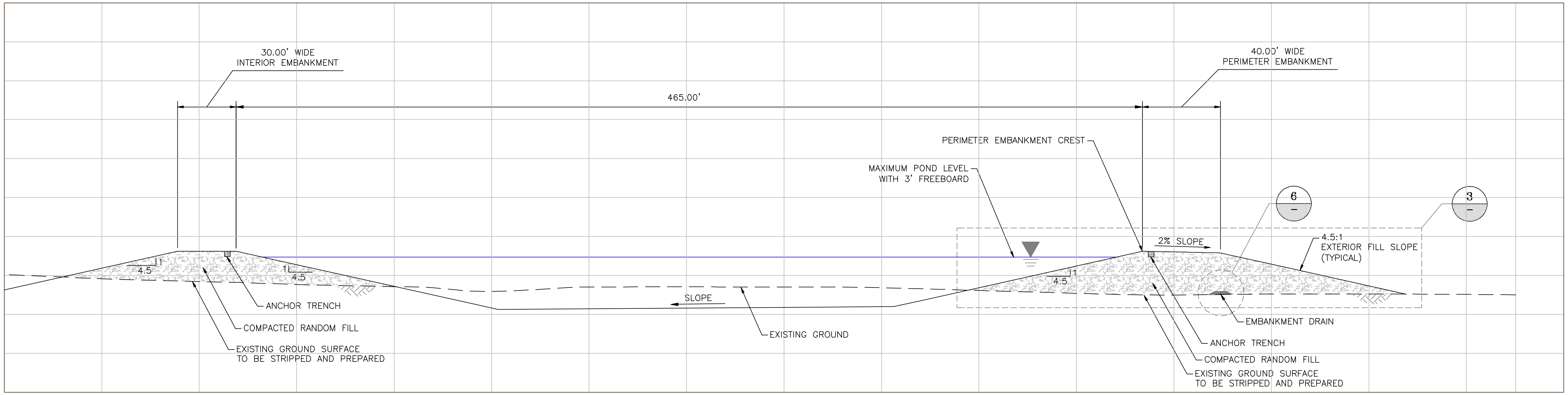
CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION DEWEY PLANT SITE FLOW DIAGRAM

Knight Piésold CONSULTING

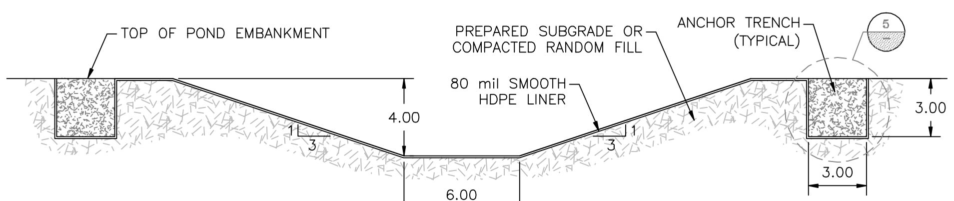
DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	102	279.02	3.4–2	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		



1 / 3.3-3 1 / 3.3-6 STORAGE POND DETAIL
TYPICAL OF SINGLE LINED PONDS

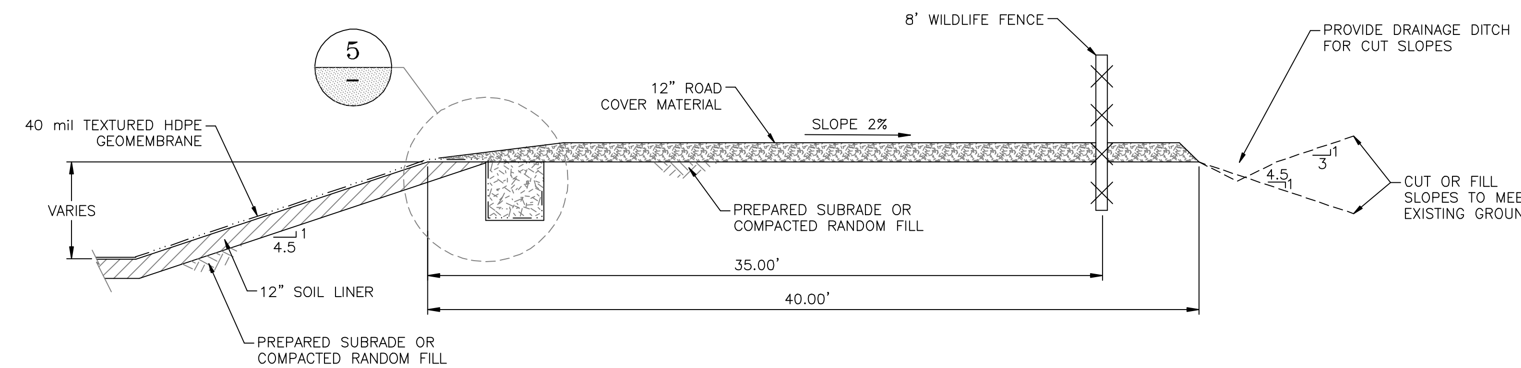
30 0 30 60 FEET
HORIZONTAL SCALE
1" = 30' AT FULL SIZE (ANSI D)
1" = 60' AT HALF SIZE (ANSI B)

30 0 30 60 FEET
VERTICAL SCALE
1" = 30' AT FULL SIZE (ANSI D)
1" = 60' AT HALF SIZE (ANSI B)



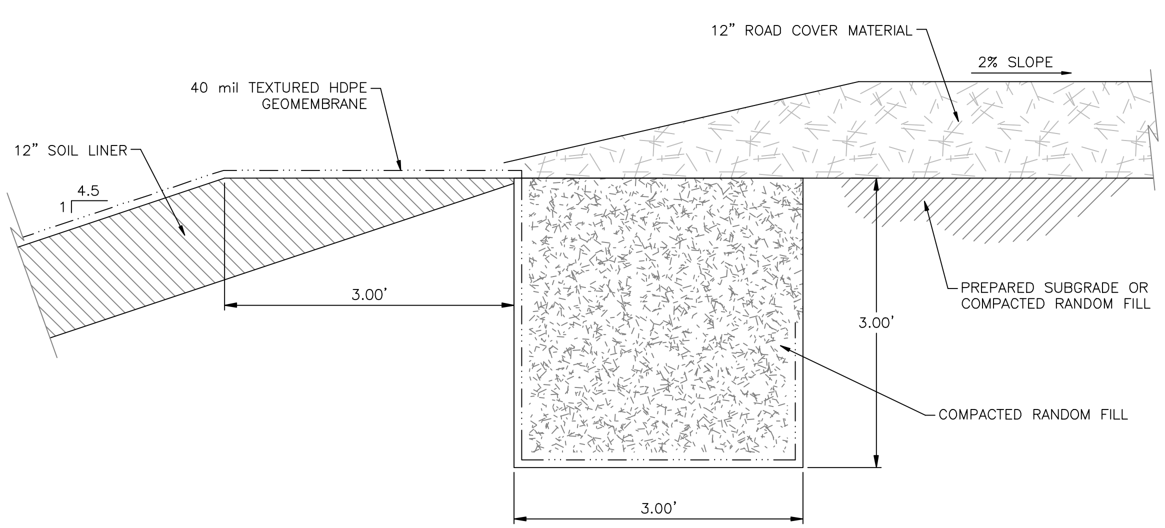
7 / 3.3-1 7 / 3.3-4 SPILLWAY DETAIL

5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



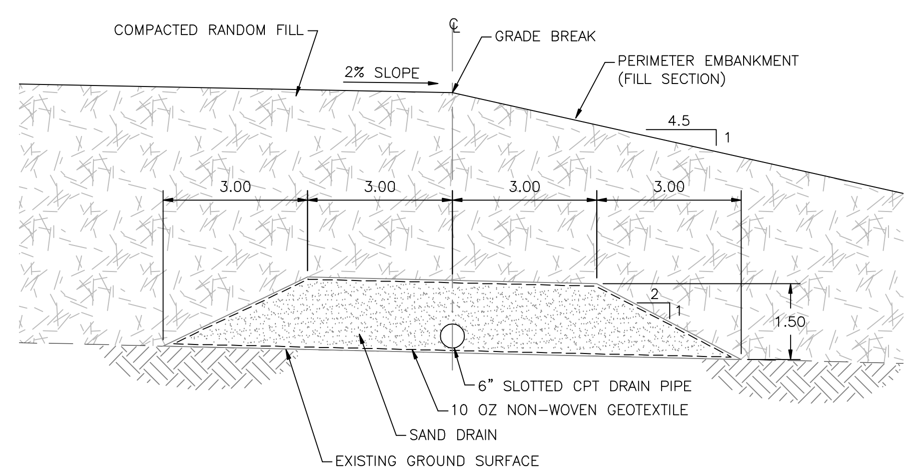
3 / – POND EMBANKMENT DETAIL
FOR SINGLE LINED PONDS

5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



5 / – LINER ANCHOR TRENCH DETAIL
FOR SINGLE LINED PONDS

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)



6 / – EMBANKMENT DRAIN DETAIL

2 0 2 4 FEET
1" = 2' AT FULL SIZE (ANSI D)
1" = 4' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).
2. EMBANKMENT DRAINS TO BE CONSTRUCTED BENEATH ALL FILL EMBANKMENTS.

CLIENT
POWERTECH (USA) Inc.

PROJECT
DEWEY–BURDOCK PROJECT

TITLE
LAND APPLICATION AND IRRIGATION
TYPICAL POND SECTIONS AND DETAILS
SHEET 1 OF 2

Knight Piésold
CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV–102	279–02	3.6–1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

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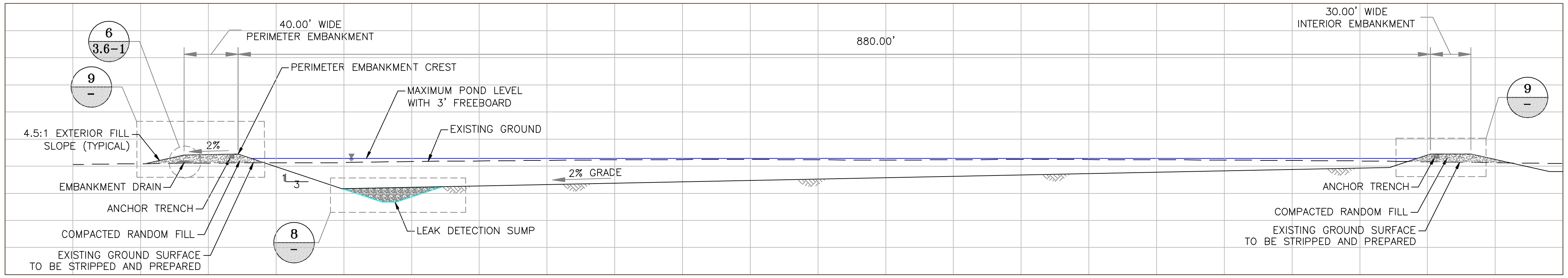
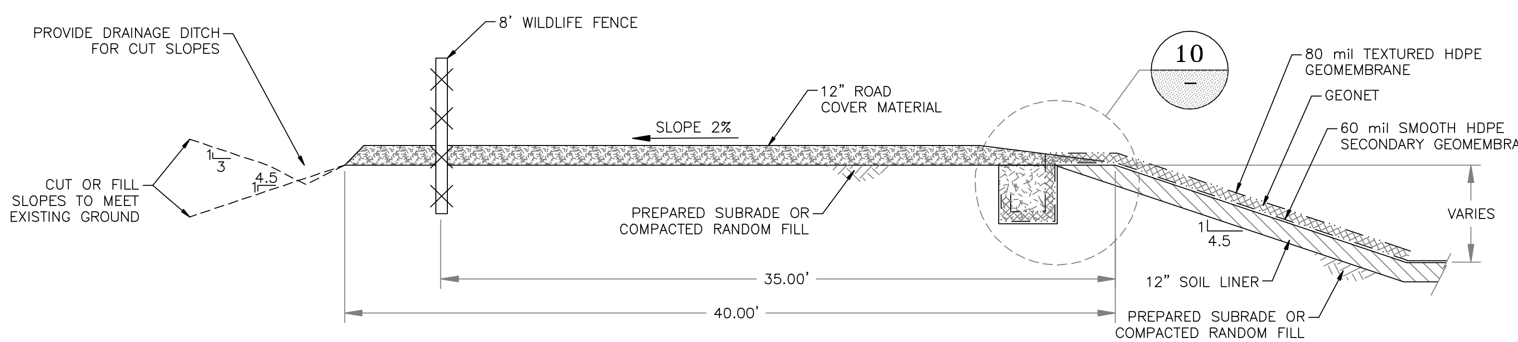


2 | 3.3-2 | 2 | 3.3-5

RADIUM SETTLING POND DETAIL
TYPICAL OF DOUBLE LINED PONDS

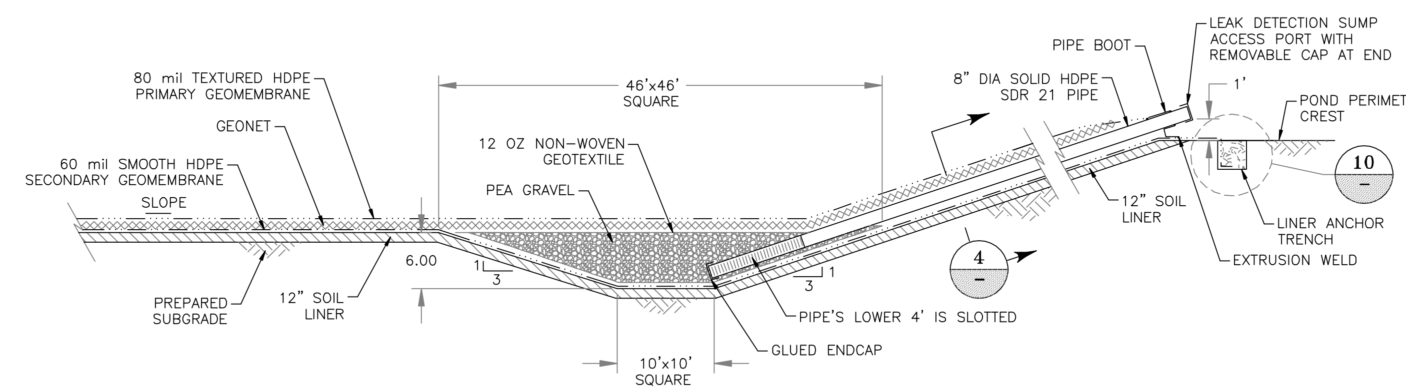
50 0 50 100 FEET
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)



9 | –

POND EMBANKMENT DETAIL
FOR DOUBLE LINED PONDS

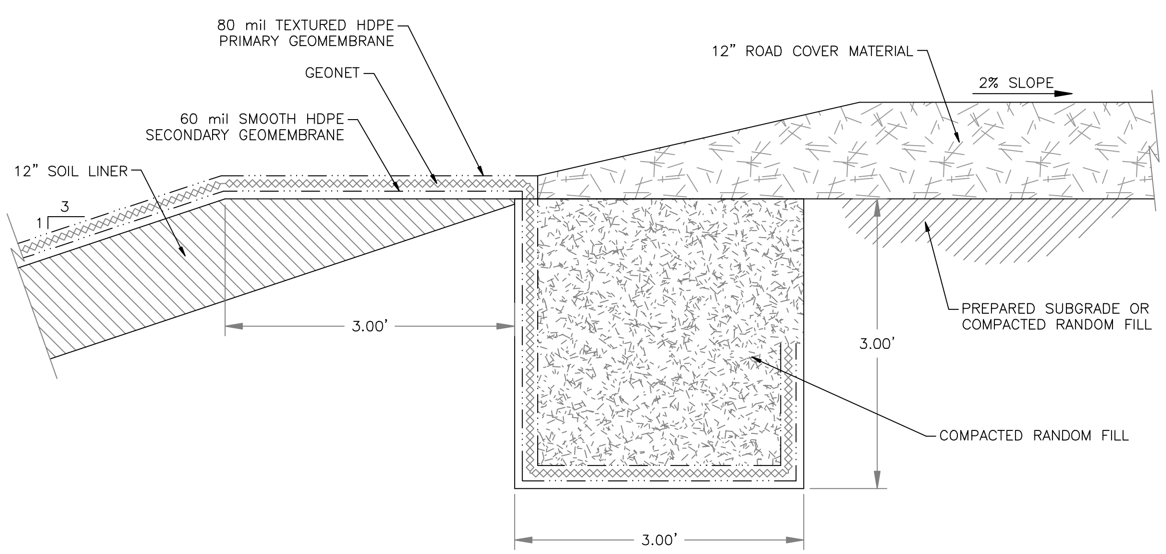
5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



8 | –

LEAK DETECTION SUMP AND ACCESS PORT DETAIL

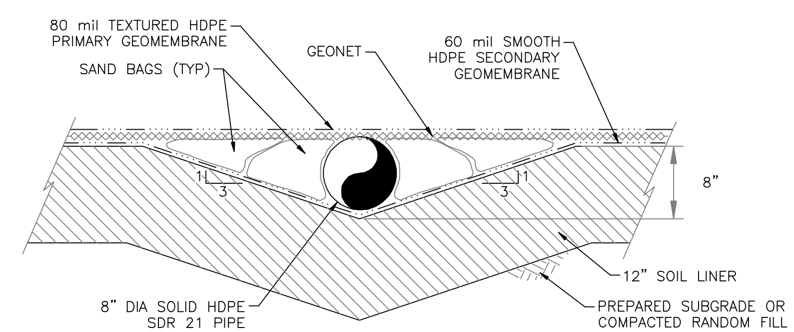
10 0 10 20 FEET
1" = 10' AT FULL SIZE (ANSI D)
1" = 20' AT HALF SIZE (ANSI B)



10 | –

ANCHOR TRENCH AND LINER DETAIL
FOR DOUBLE LINED PONDS

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)



4 | –

LEAK DETECTION SUMP ACCESS PORT DETAIL

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).
2. EMBANKMENT DRAINS TO BE CONSTRUCTED BENEATH ALL FILL EMBANKMENTS.

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION TYPICAL POND SECTIONS AND DETAILS SHEET 2 OF 2

Knight Piésold
CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV–102	279–02	3.6–2	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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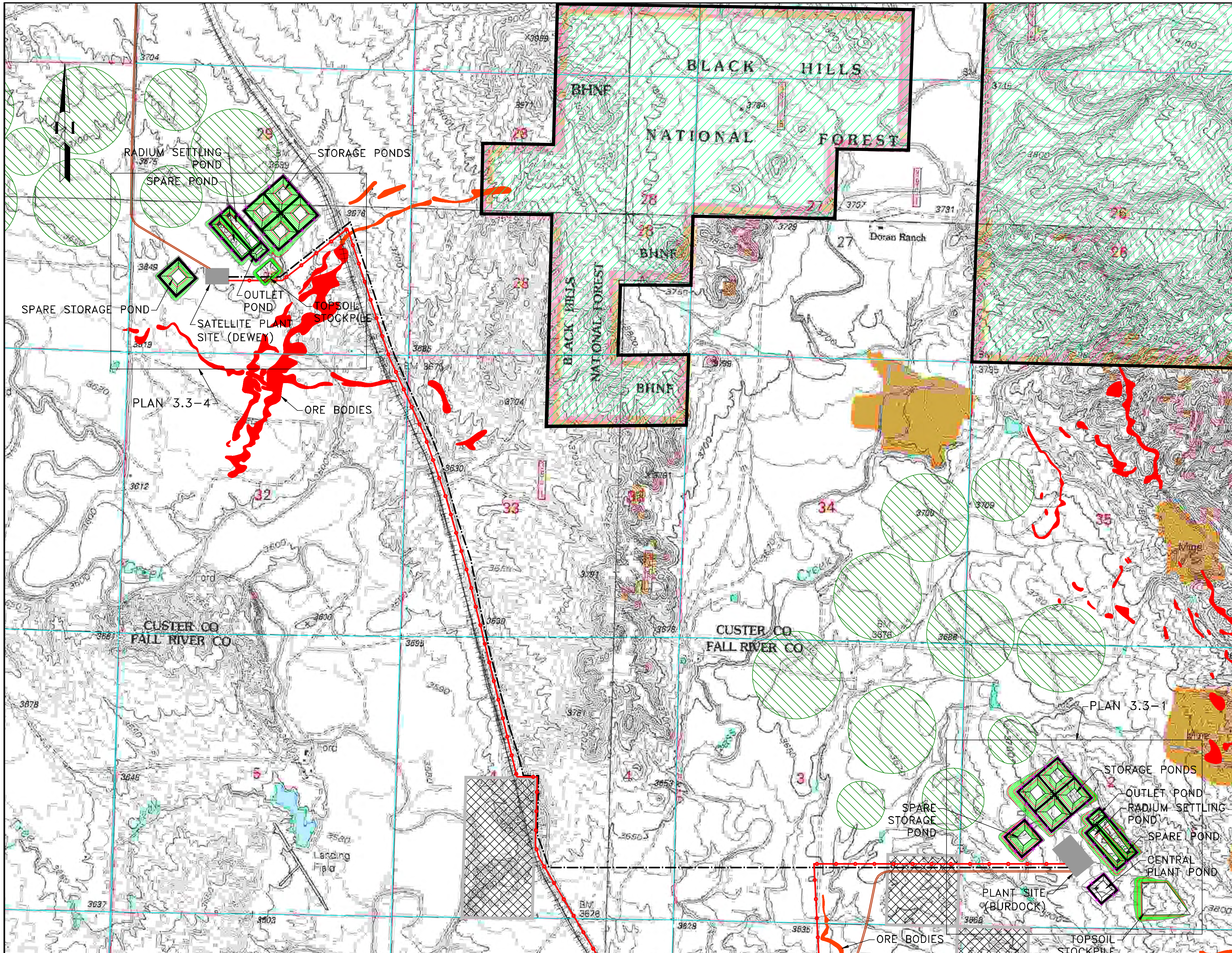

PLAN

1000 0 1000 2000 FEET

1" = 1000' AT FULL SIZE (ANSI D)
1" = 2000' AT HALF SIZE (ANSI B)

LEGEND:

- REGRADED CONTOURS
- EXISTING ROAD
- NEW ROADS
- RAILROAD
- POWER LINE
- PIPELINE
- EXISTING STREAM
- ORE BODIES
- LAND APPLICATION AREAS
- NATIONAL FOREST
- BLM AREAS

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	LAND APPLICATION AND IRRIGATION SITE PLAN

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	102	279.02	3.7-1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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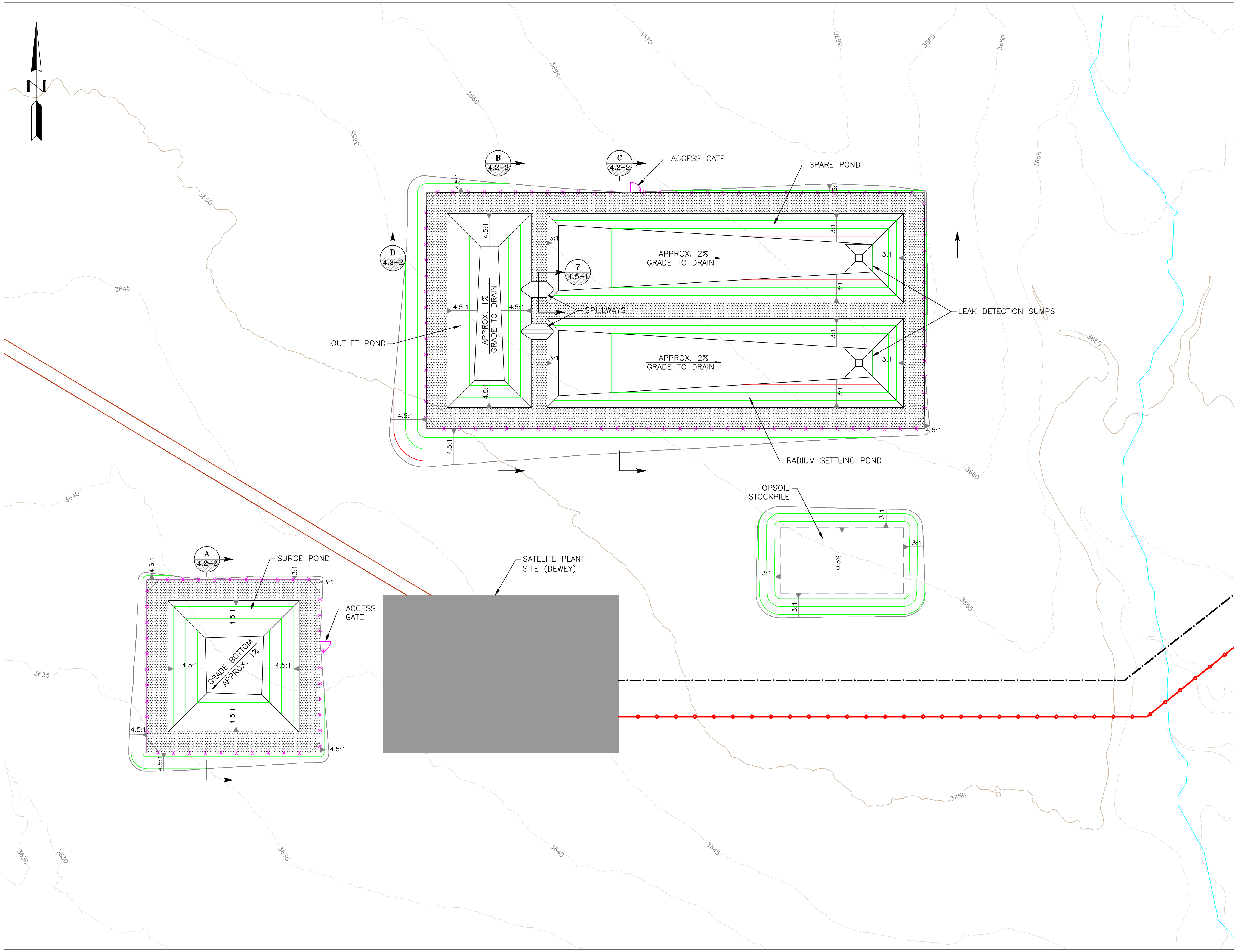

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN – DEWEY PLANT SITE

100 0 100 200 FEET
1" = 100' AT FULL SIZE (ANSI D)
1" = 200' AT HALF SIZE (ANSI B)

LEGEND:

- REGRADED CONTOURS
- EMBANKMENT ROAD
- PERIMETER FENCE
- POWER LINE
- PIPELINE
- ORE BODIES

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL DEWEY PLANT SITE PLAN

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RSP	DV-102	279-05	4.2-1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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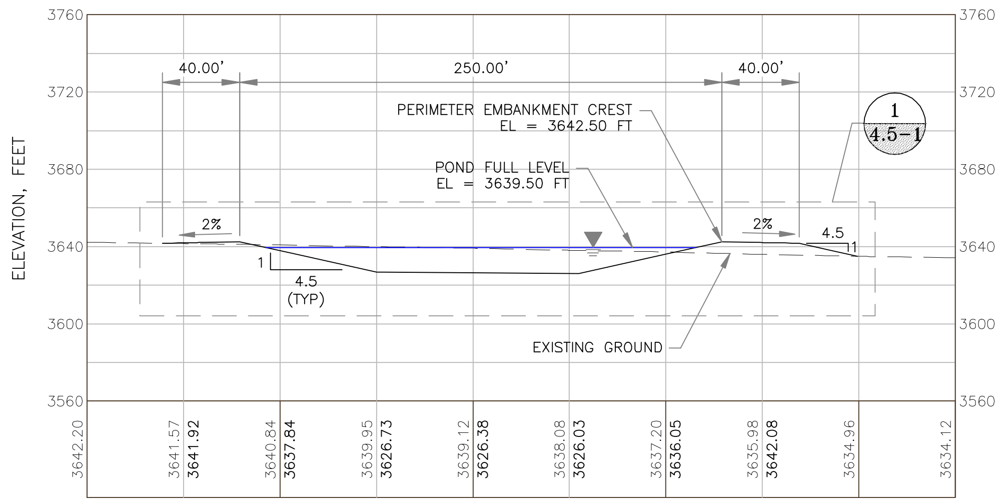
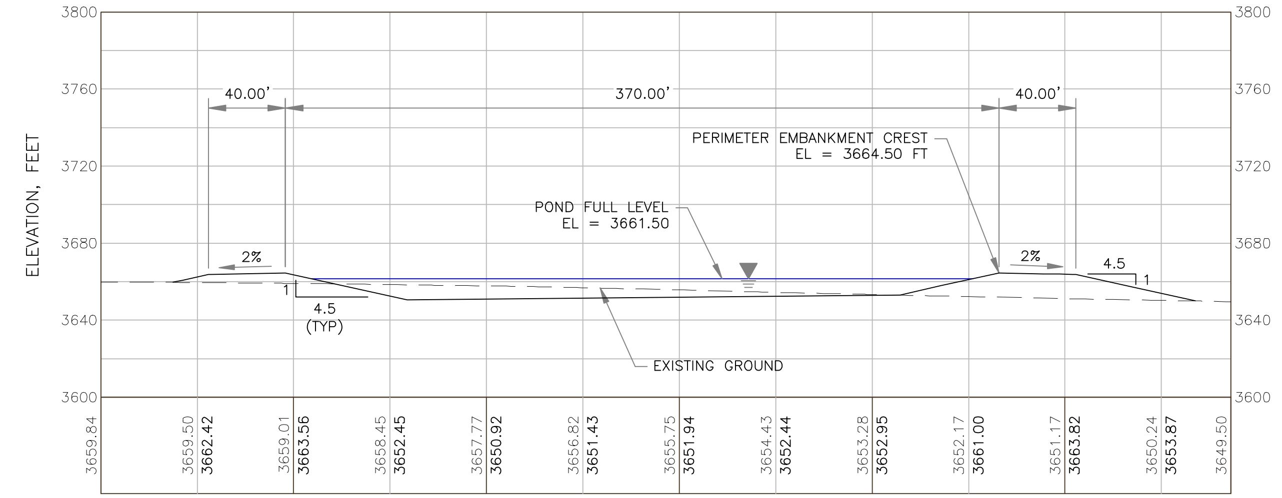
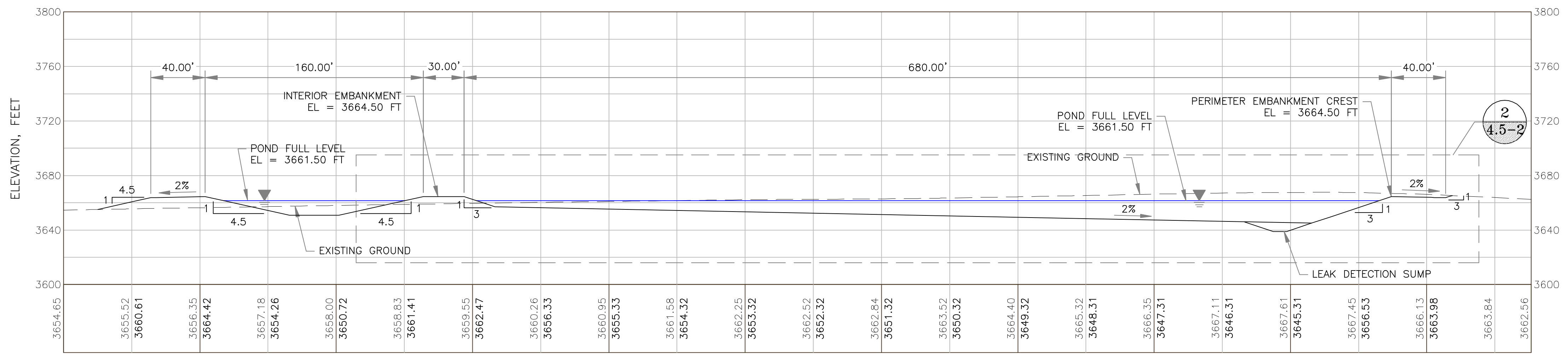


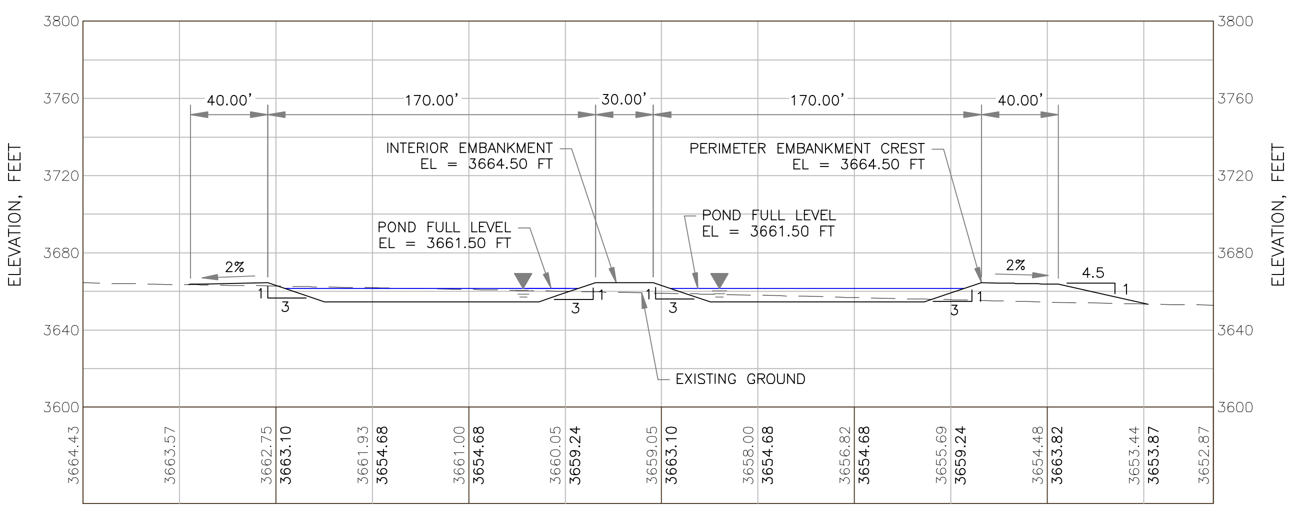
A
4.2-1
DEWEY SURGE POND SECTION



B
4.2-1
DEWEY OUTLET POND SECTION



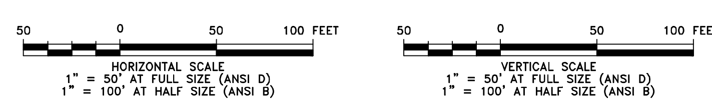
D
4.2-1
DEWEY OUTLET AND RADIUM SETTLING PONDS SECTION



C
4.2-1
DEWEY RADIUM SETTLING AND SPARE PONDS SECTION

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).



CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL DEWEY POND SECTIONS

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV–102	279.05	4.2–2	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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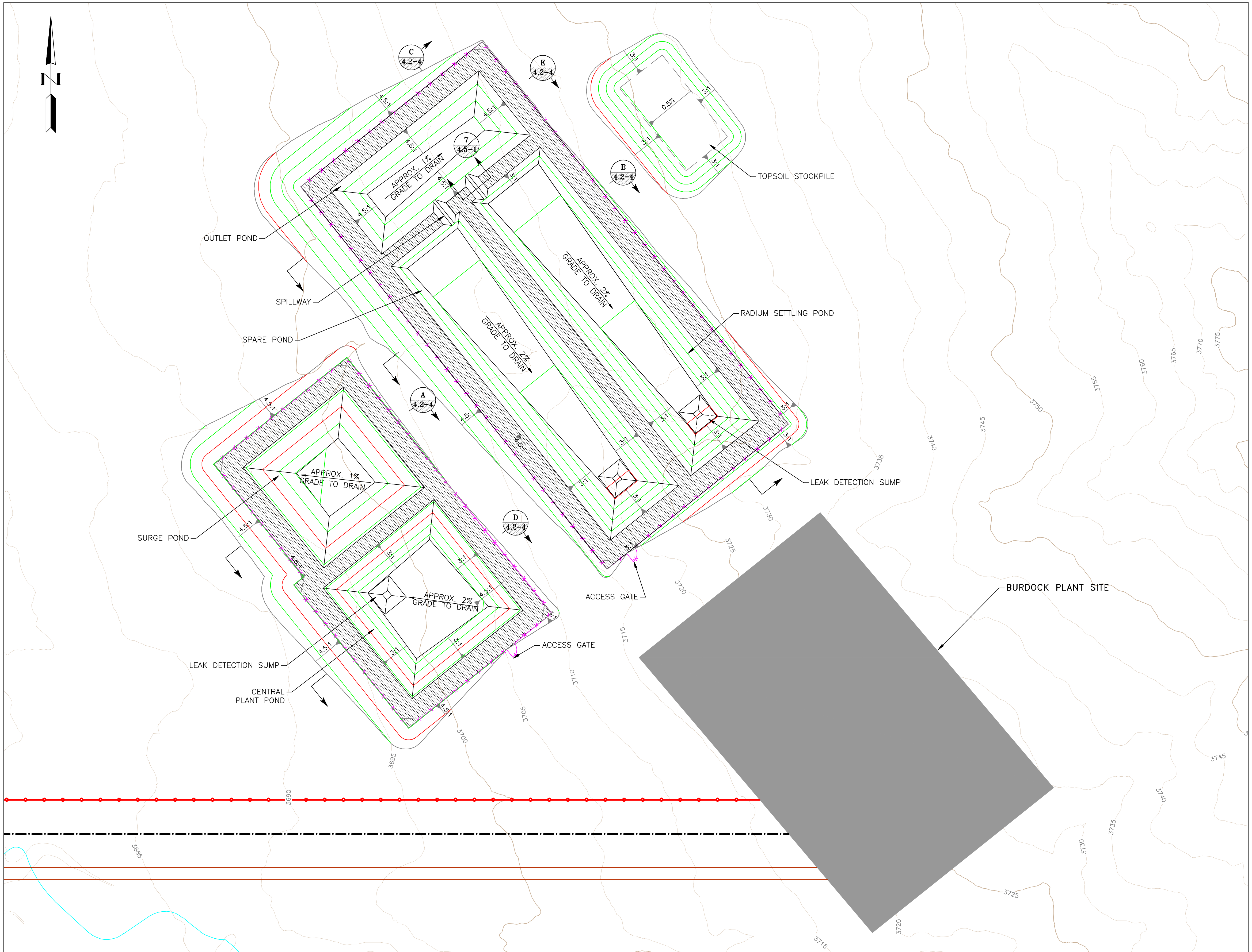

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN – BURDOCK PLANT SITE

100 0 100 200 FEET
1" = 100' AT FULL SIZE (ANSI D)
1" = 200 AT HALF SIZE (ANSI B)

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LEGEND:

- REGRADED CONTOURS
- EMBANKMENT ROAD
- PERIMETER FENCE
- PIPELINE
- POWER LINE
- ORE BODIES

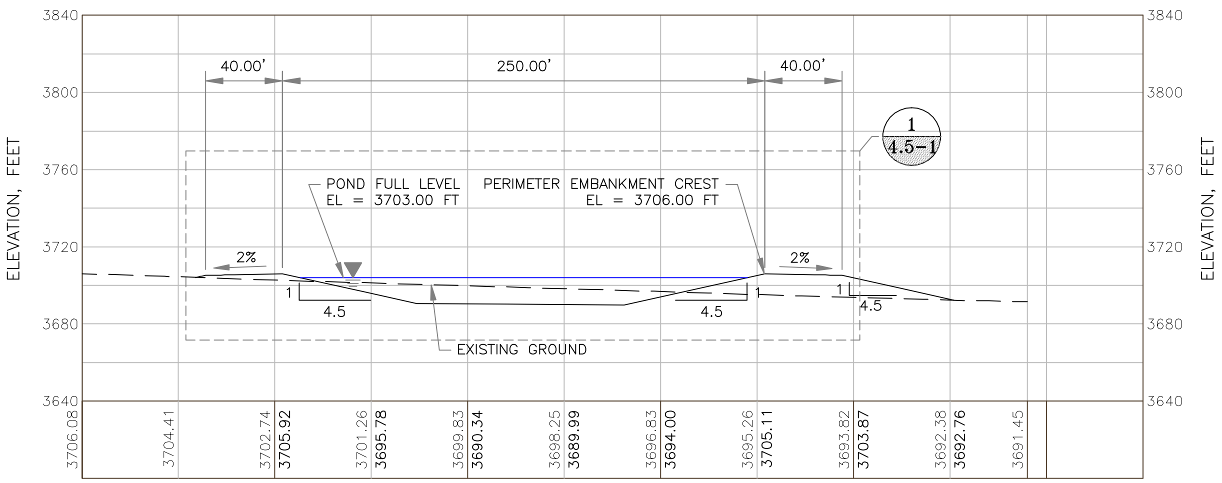
NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

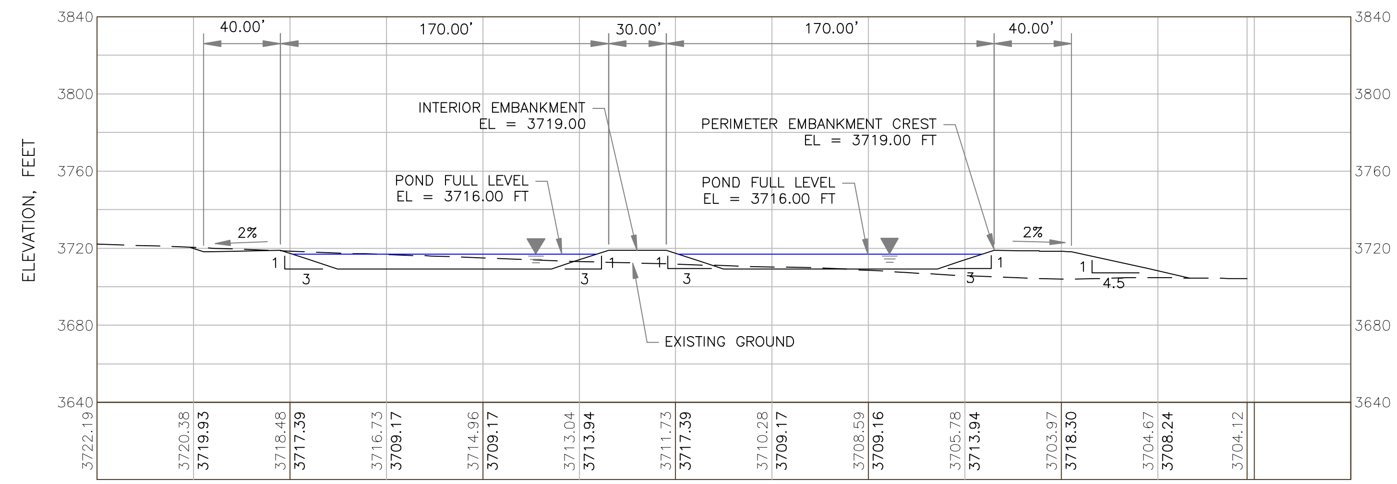
CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	DEEP WELL PROPOSAL BURDOCK PLANT SITE PLAN

Knight Piésold CONSULTING

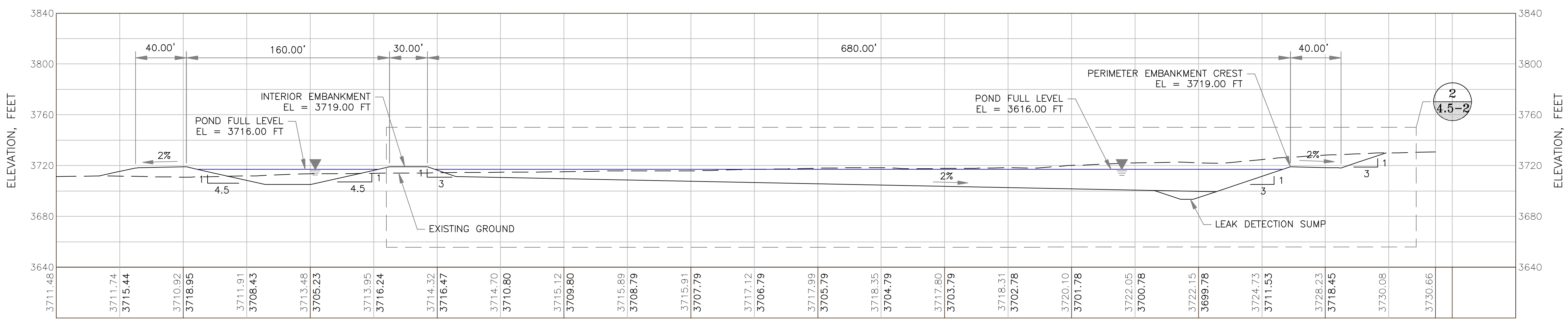
DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV-102	279-05	4.2-3	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		



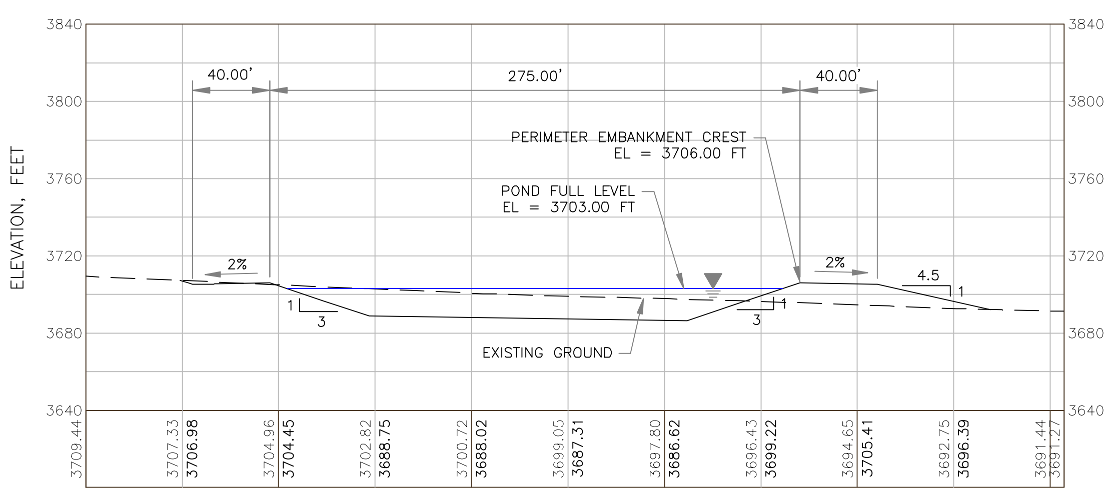
A 4.2-3 BURDOCK SURGE POND SECTION



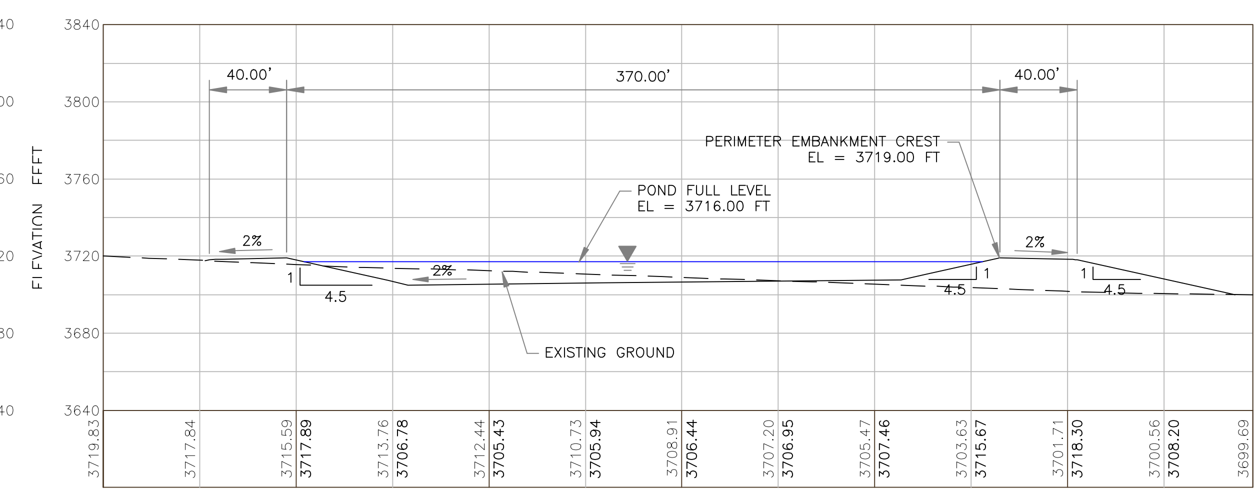
B 4.2-3 BURDOCK RADIUM SETTLING PONDS SECTION



C 4.2-3 BURDOCK RADIUM SETTLING AND OUTLET PONDS SECTION



D 4.2-3 CENTRAL PLANT POND SECTION



E 4.2-3 OUTLET POND SECTION

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

50 0 50 100 FEET
HORIZONTAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

50 0 50 100 FEET
VERTICAL SCALE
1" = 50' AT FULL SIZE (ANSI D)
1" = 100' AT HALF SIZE (ANSI B)

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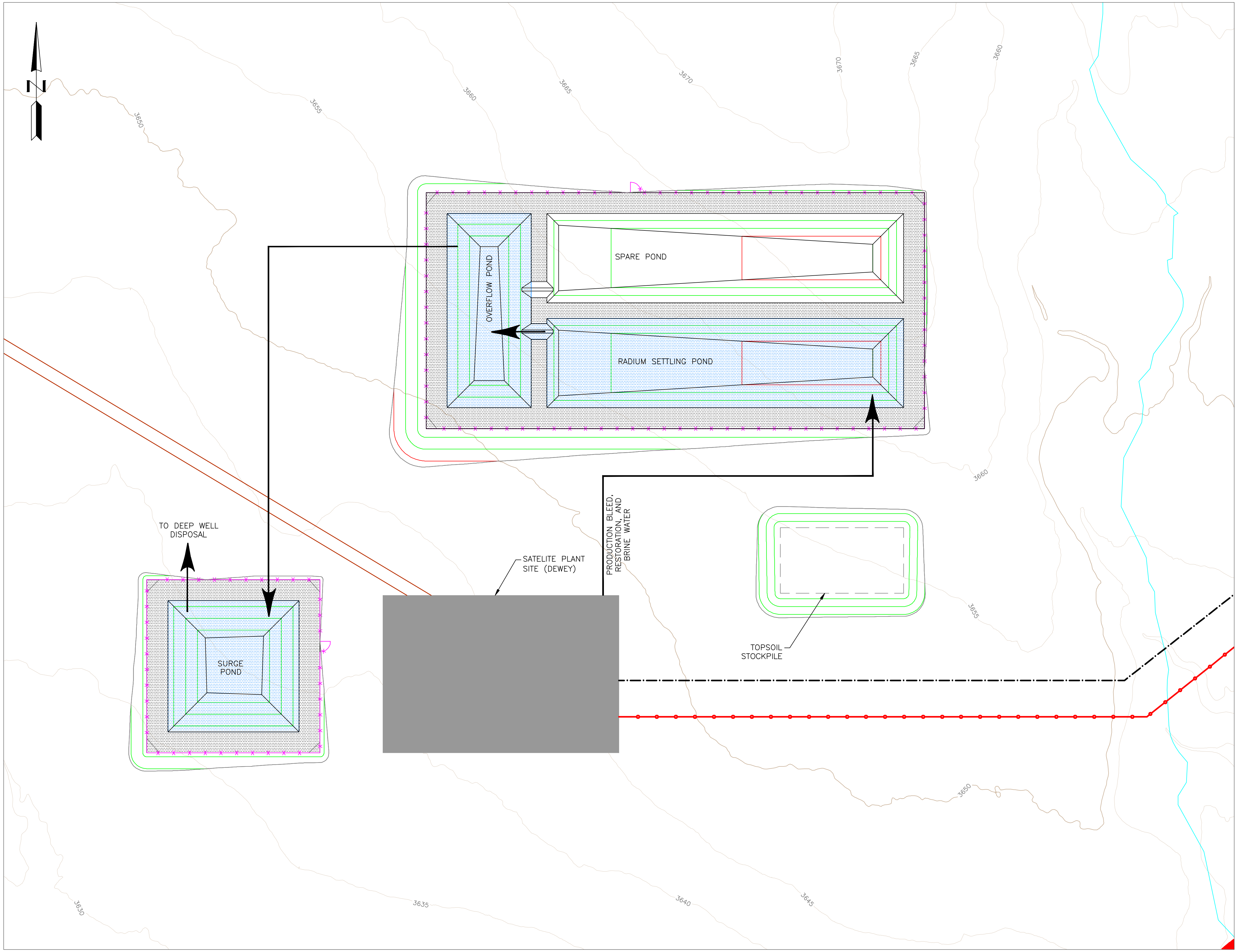
CLIENT
POWERTECH (USA) Inc.

PROJECT
DEWEY-BURDOCK PROJECT

TITLE
DEEP WELL DISPOSAL
BURDOCK POND SECTIONS

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV-102	279.05	4.2-4	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		



LEGEND:

- EXISTING CONTOURS
- REGRADED CONTOURS
- ROAD
- PERIMETER FENCE
- ORE BODIES
- PIPELINE
- POWER LINE
- DIRECTION OF WATER FLOW

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN - DEWEY PLANT SITE

100 0 100 200 FEET
1" = 100' AT FULL SIZE (ANSI D)
1" = 200' AT HALF SIZE (ANSI B)

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL DEWEY PLANT SITE FLOW DIAGRAM

Knight Piésold
CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RSP	DV-102	279-05	4.3-1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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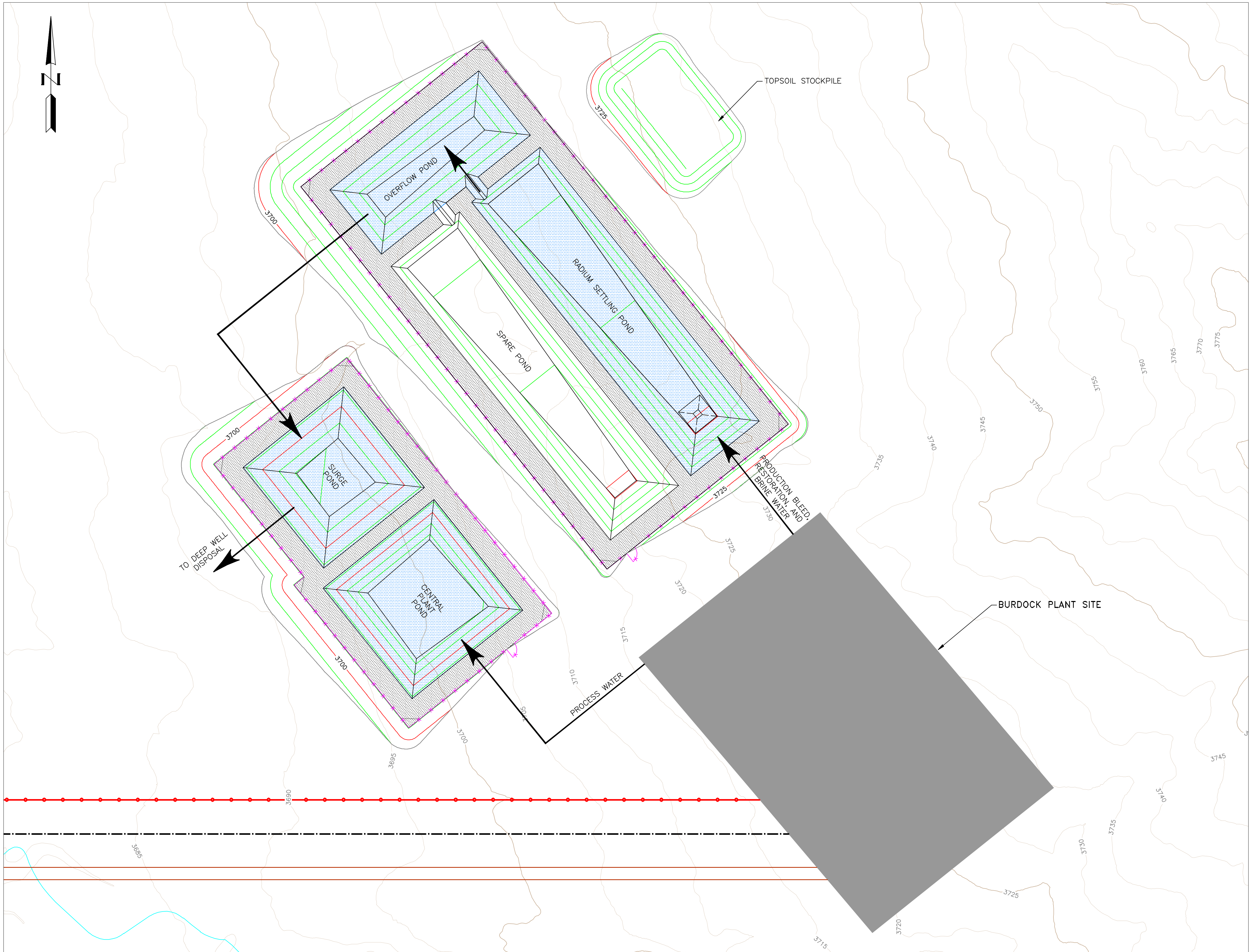

LEGEND:

- REGRADED CONTOURS
- EMBANKMENT ROAD
- PERIMETER FENCE
- PIPELINE
- POWER LINE
- ORE BODIES

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).

REFERENCE:
Existing ground surface generated from contours received from Powertech (USA) Inc. and dated 11 December 2008

PLAN – BURDOCK PLANT SITE

100 0 100 200 FEET

1" = 100' AT FULL SIZE (ANSI D)
1" = 200 AT HALF SIZE (ANSI B)

LAST SAVED BY: RBOWLING
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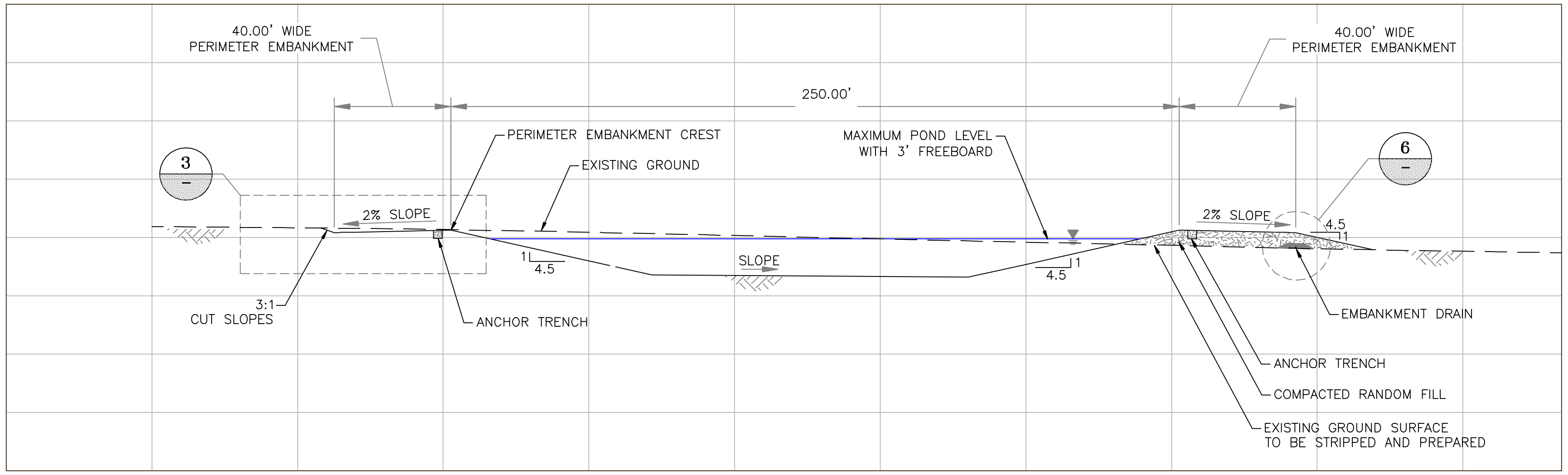
CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY–BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL BURDOCK PLANT SITE FLOW DIAGRAM

Knight Piésold CONSULTING

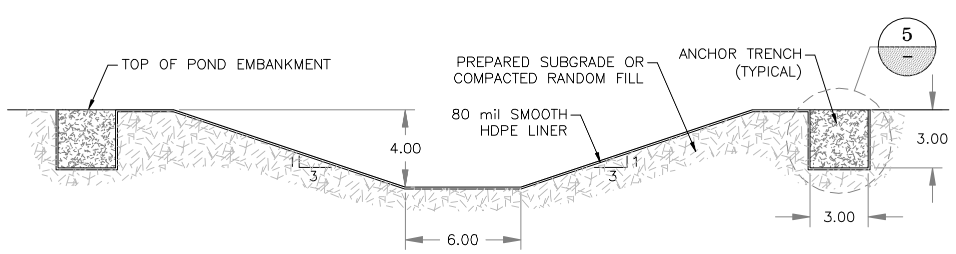
DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV–102	279–05	4.3–2	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		



1 / 4.2-2, 1 / 4.2-4 SURGE POND DETAIL
TYPICAL OF SINGLE LINED PONDS

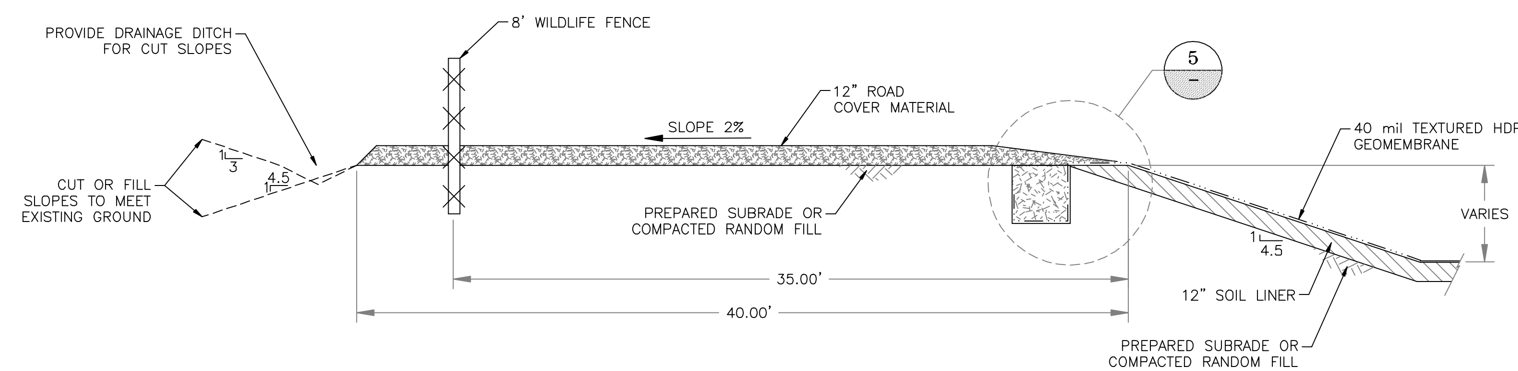
30 0 30 60 FEET
HORIZONTAL SCALE
1" = 30' AT FULL SIZE (ANSI D)
1" = 60' AT HALF SIZE (ANSI B)

30 0 30 60 FEET
VERTICAL SCALE
1" = 30' AT FULL SIZE (ANSI D)
1" = 60' AT HALF SIZE (ANSI B)



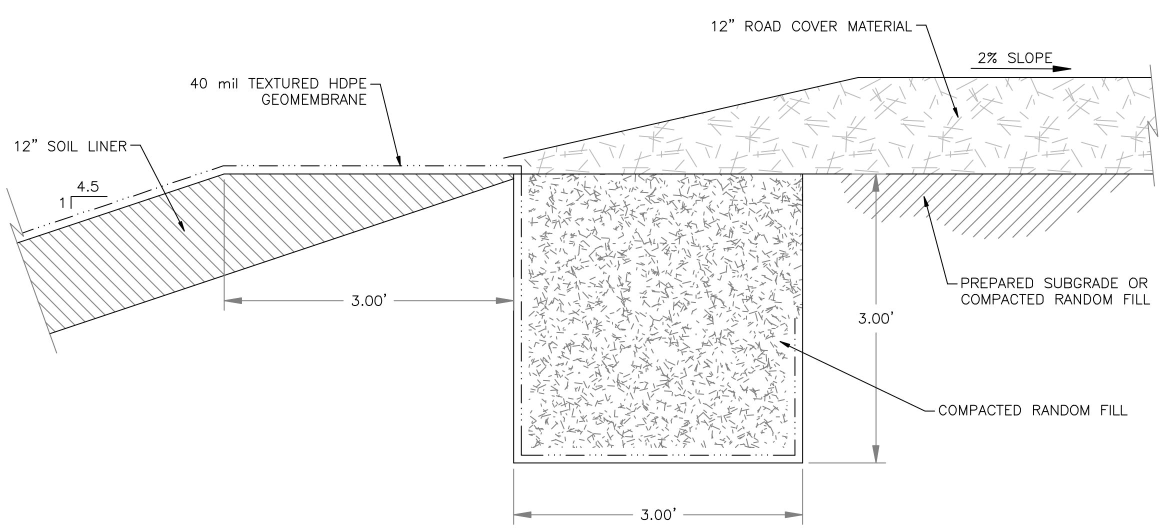
7 / 4.2-1, 7 / 4.2-3 SPILLWAY DETAIL

5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



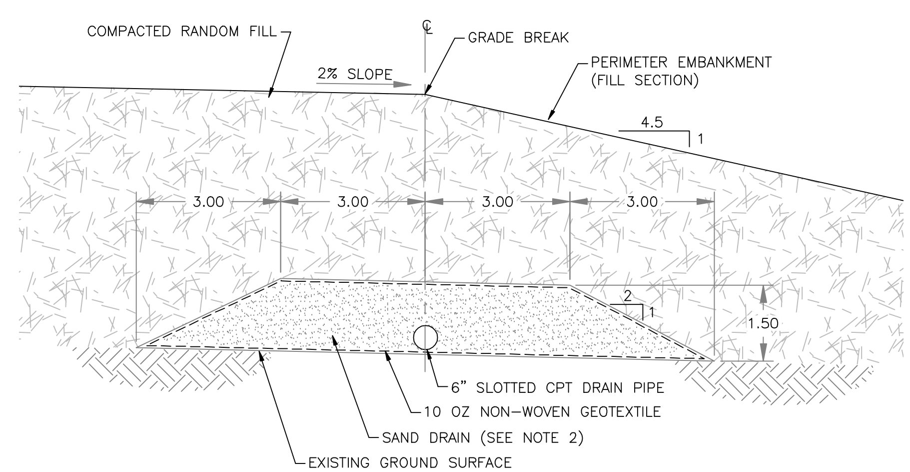
3 / – POND EMBANKMENT DETAIL
FOR SINGLE LINED PONDS

5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



5 / – LINER ANCHOR TRENCH DETAIL
FOR SINGLE LINED PONDS

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)



6 / – EMBANKMENT DRAIN DETAIL

2 0 2 4 FEET
1" = 2' AT FULL SIZE (ANSI D)
1" = 4' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI–D) AND 1.5" ON A HALF SIZE PLOT (ANSI–B).
2. TEXTURING OF PRIMARY GEOMEMBRANE IS AT SURFACE.
3. EMBANKMENT DRAINS TO BE CONSTRUCTED BENEATH ALL FILL EMBANKMENTS.

CLIENT	POWERTECH (USA) Inc.				
PROJECT	DEWEY–BURDOCK PROJECT				
TITLE	DEEP WELL DISPOSAL TYPICAL POND SECTIONS AND DETAILS SHEET 1 OF 2				
	Knight Piésold CONSULTING				
DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV–102	279–05	4.5–1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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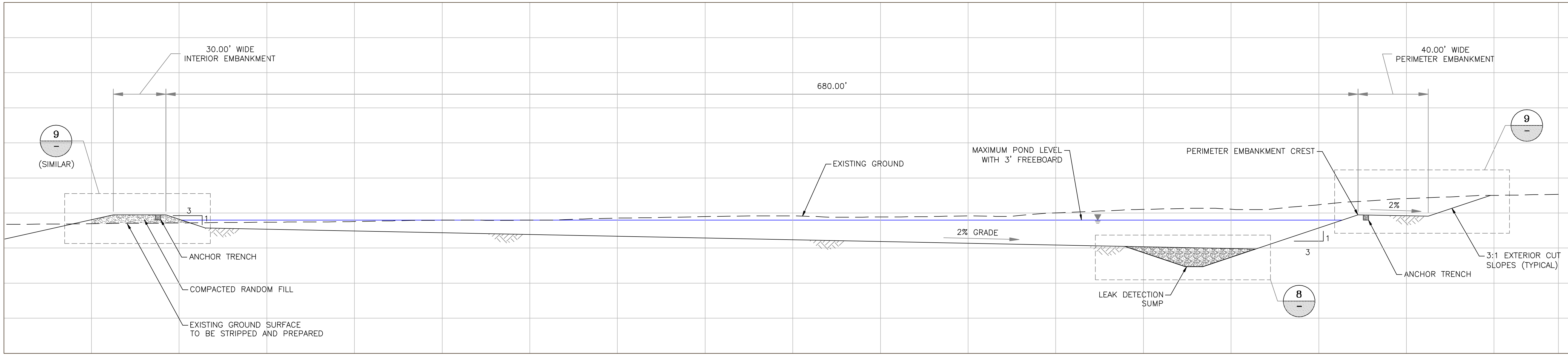
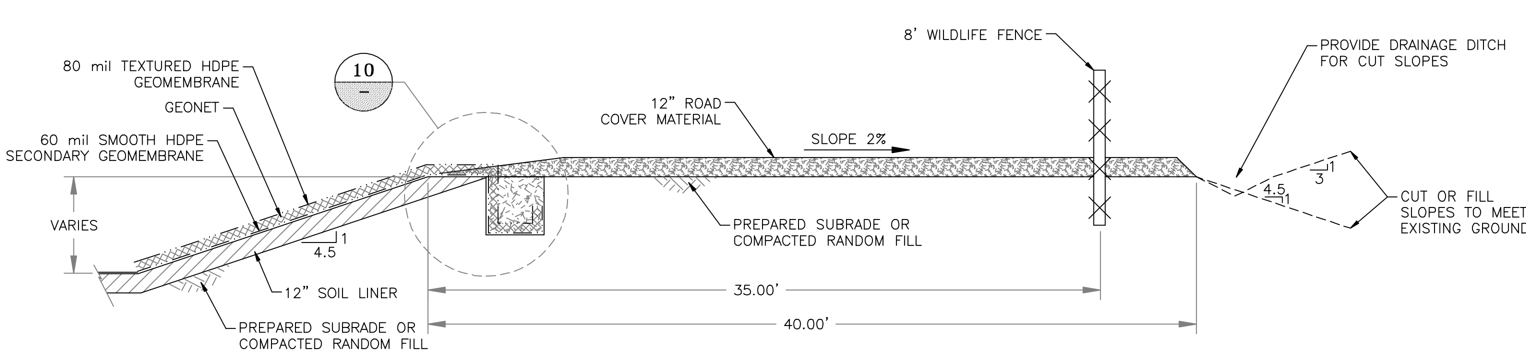


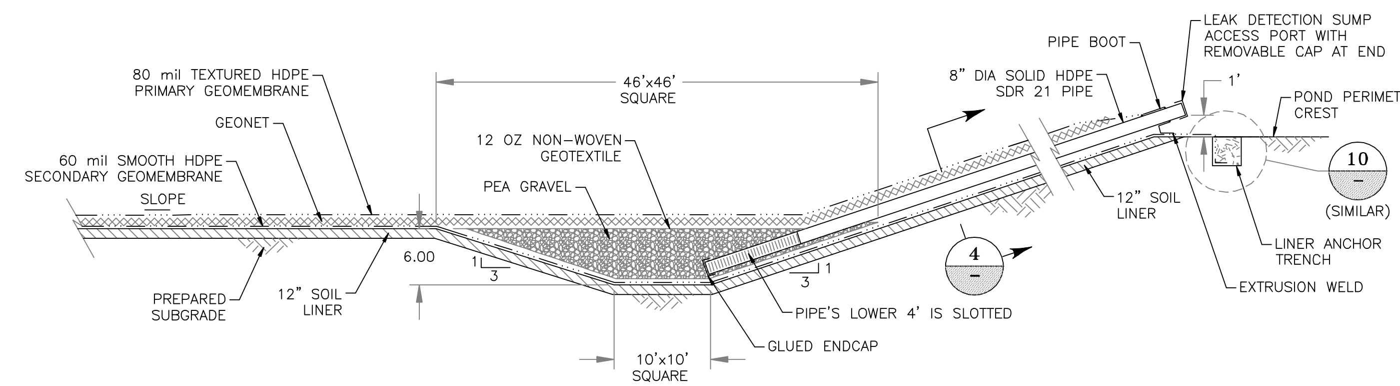
2 / 4.2-2 2 / 4.2-4 RADIUM SETTLING POND DETAIL
TYPICAL OF DOUBLE LINED PONDS

30 0 30 60 FEET
1" = 30' AT FULL SIZE (ANSI D)
1" = 60' AT HALF SIZE (ANSI B)



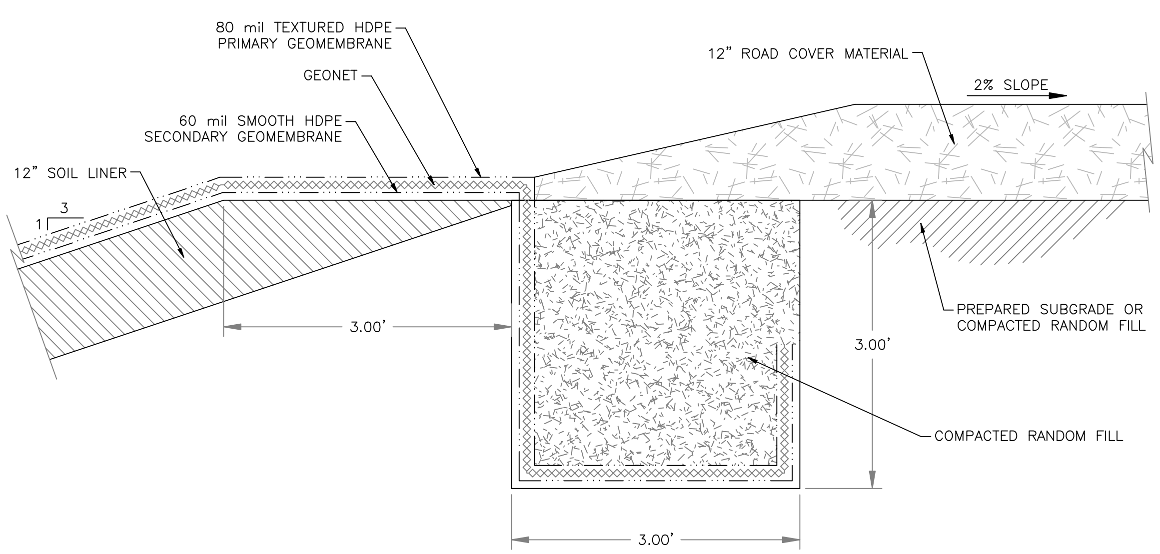
9 / – POND EMBANKMENT DETAIL
FOR DOUBLE LINED PONDS

5 0 5 10 FEET
1" = 5' AT FULL SIZE (ANSI D)
1" = 10' AT HALF SIZE (ANSI B)



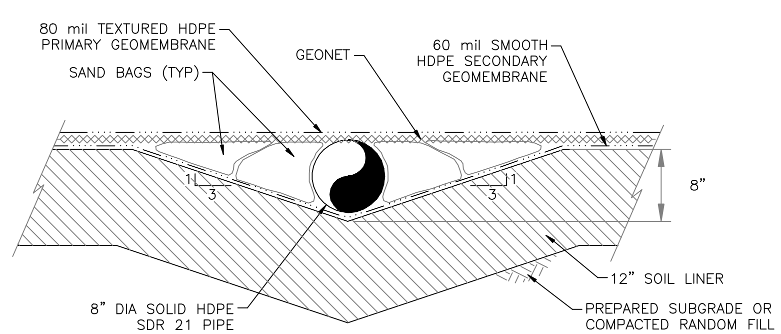
8 / 4.2-2 8 / – LEAK DETECTION SUMP AND ACCESS PORT DETAIL

10 0 10 20 FEET
1" = 10' AT FULL SIZE (ANSI D)
1" = 20' AT HALF SIZE (ANSI B)



10 / – ANCHOR TRENCH AND LINER DETAIL
FOR DOUBLE LINED PONDS

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)



4 / – LEAK DETECTION SUMP ACCESS PORT DETAIL

1 0 1 2 FEET
1" = 1' AT FULL SIZE (ANSI D)
1" = 2' AT HALF SIZE (ANSI B)

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).
2. EMBANKMENT DRAINS TO BE CONSTRUCTED BENEATH ALL FILL EMBANKMENTS.

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL TYPICAL POND SECTIONS AND DETAILS SHEET 2 OF 2

Knight Piésold CONSULTING

DESIGNED BY	ST	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	RJB	DV-102	279-05	4.5-2	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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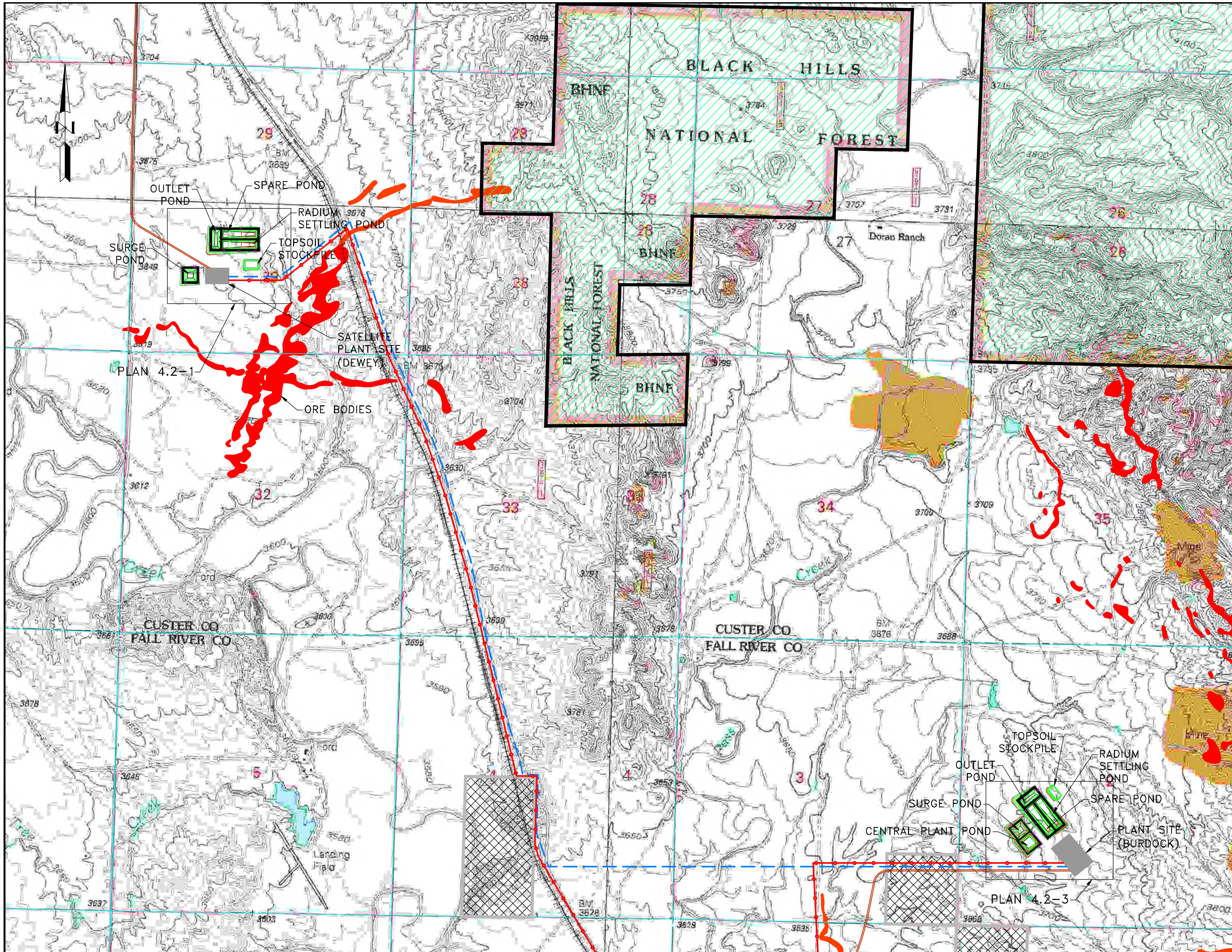

PLAN

1000 0 1000 2000 FEET

1" = 1000' AT FULL SIZE (ANSI D)
1" = 2000' AT HALF SIZE (ANSI B)

LEGEND:

REGRADED CONTOURS
EXISTING ROAD
NEW ROADS
RAILROAD
POWER LINE
PIPELINE
EXISTING STREAM
ORE BODIES
NATIONAL FOREST
BLM AREAS

NOTES:

1. SCALE BAR MEASURES 3" ON A FULL SIZE PLOT (ANSI-D) AND 1.5" ON A HALF SIZE PLOT (ANSI-B).

CLIENT	POWERTECH (USA) Inc.
PROJECT	DEWEY-BURDOCK PROJECT
TITLE	DEEP WELL DISPOSAL SITE PLAN

Knight Piésold CONSULTING

DESIGNED BY	ST/DJB	LOCATION	PROJECT NUMBER	FIGURE NUMBER	REVISION
DRAWN BY	DJB	DV-102	279-05	4.6-1	B
ACTIVITY CODE	N/A	XREF NUMBER	N/A		

LAST SAVED BY: RBOWLING
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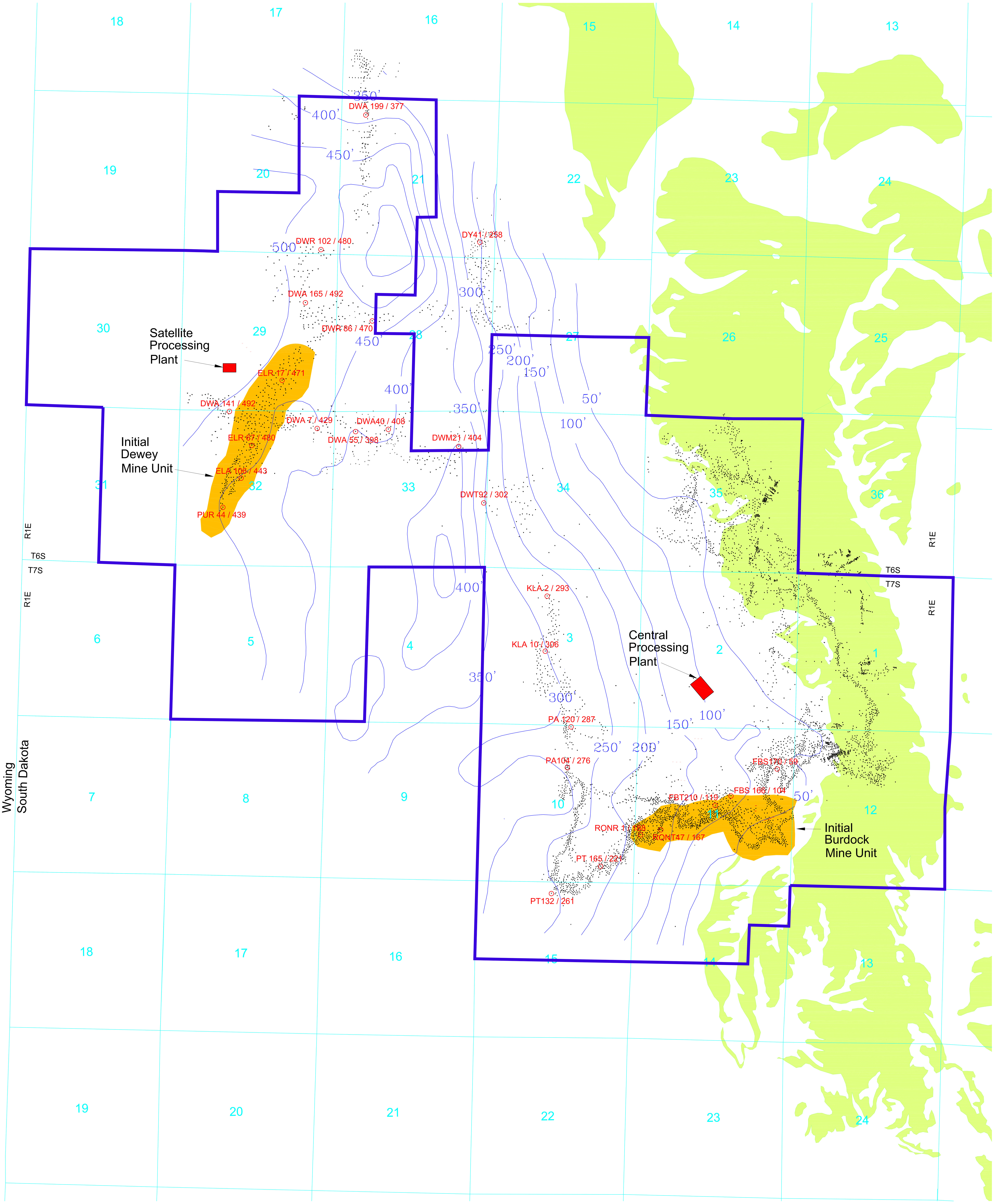
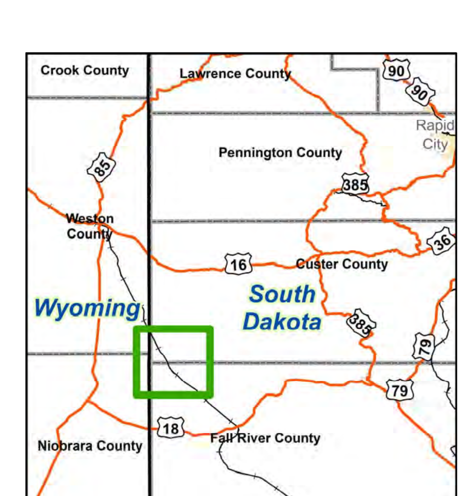
Plates



Legend

- Processing Plant Sites
- Fall River Outcrop
- Initial Mine Units
- Permit Boundary
- 100' Thickness
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PA104 / 276 Measured Thickness at Borehole (Hole / Thickness)



N

Feet: 0, 500, 1,000, 2,000, 3,000, 4,000
Meters: 0, 250, 500, 1,000

CONSULTANT

REF 315

CHECK SCALES

If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

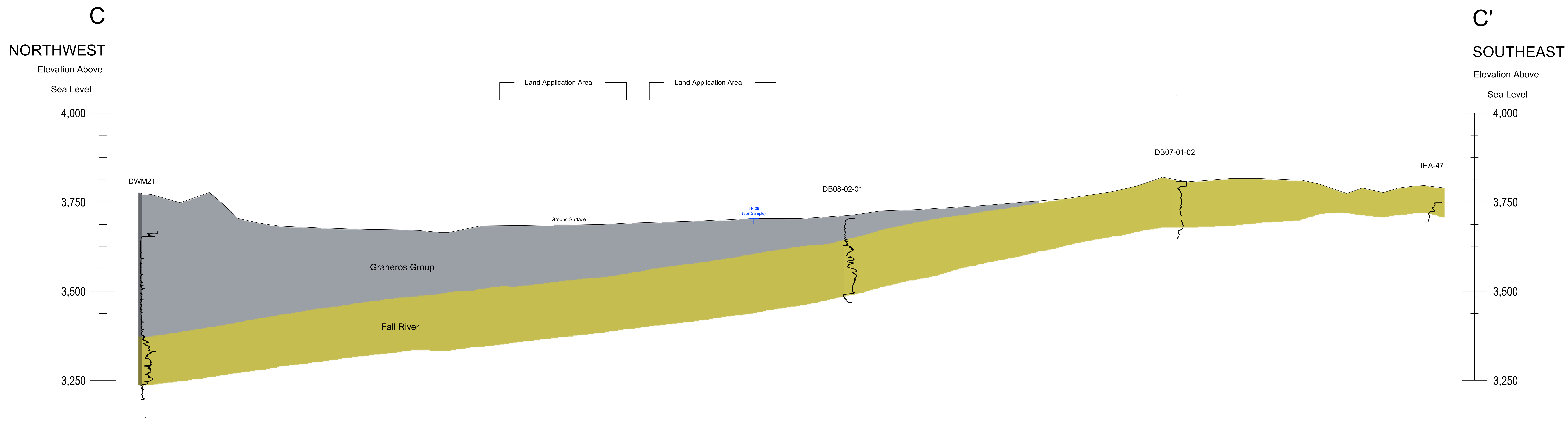
REVISIONS				
#	DRAWN	CHECKED	APPROVED	DATE

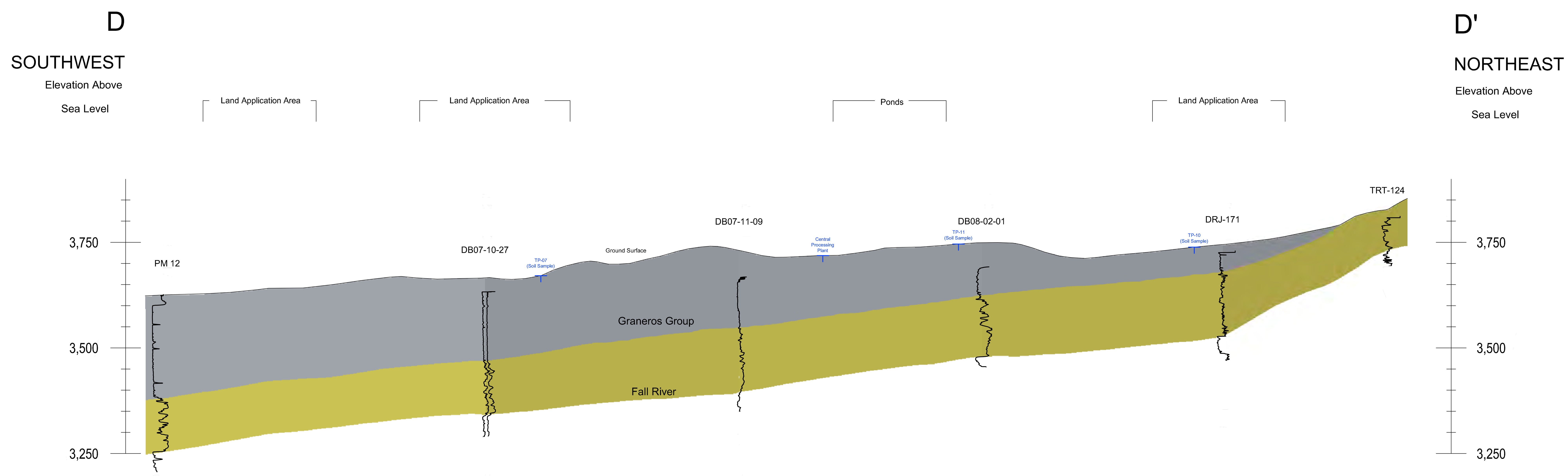
POWERTECH (USA) INC.

Supplemental Exhibit 315

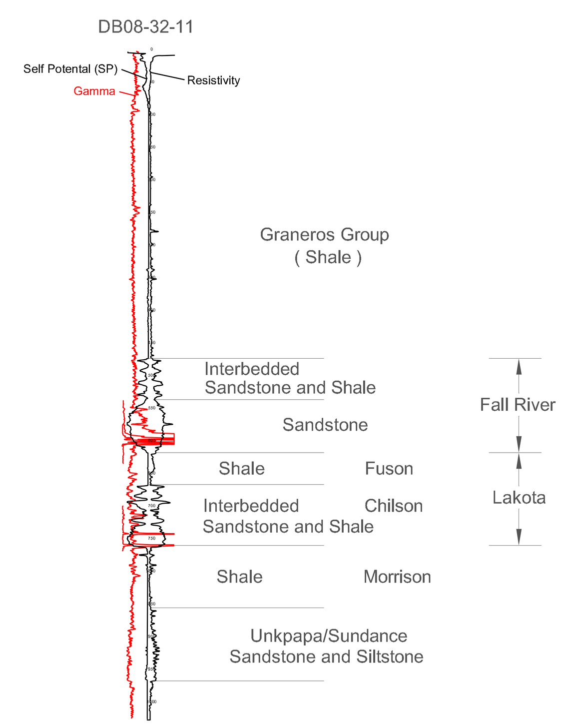
Isopach of the Upper Confining Graneros Unit (Mowry and Skull Creek Shales)

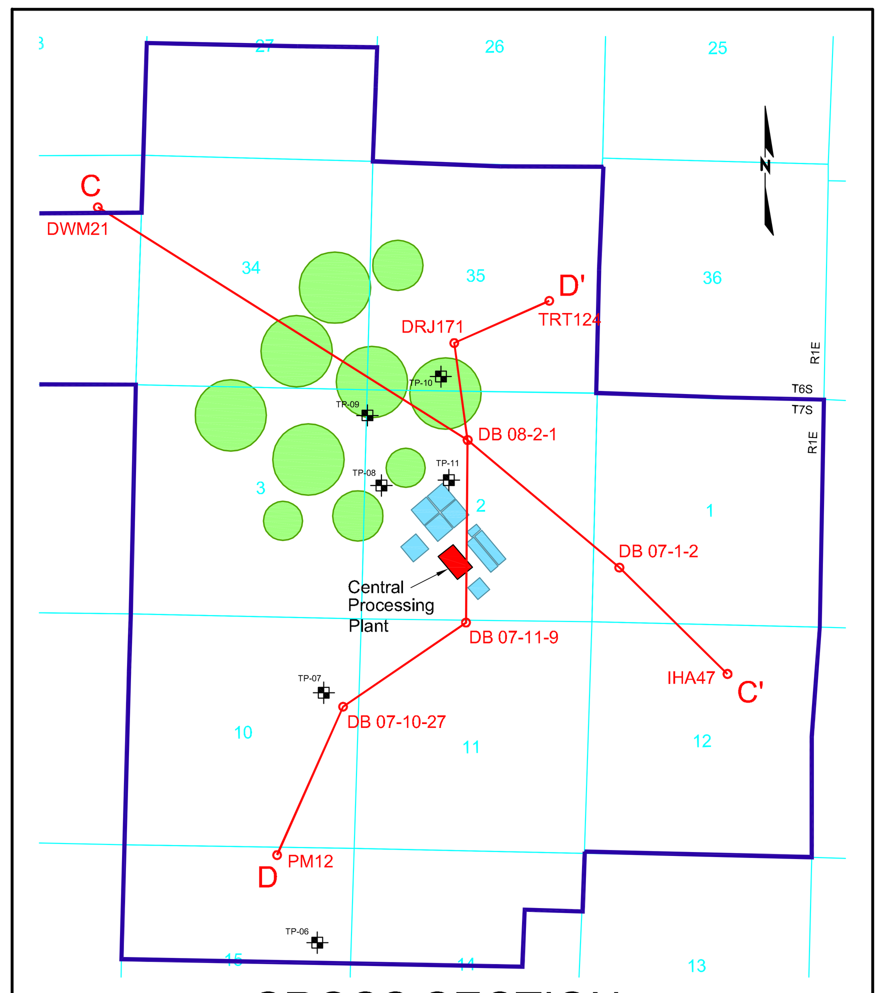
PLOT DATE 06-Aug-2009	DATE 28-Jun-2009	PROJECT Dewey-Burdock Project	
DRAWN Hetrick, Lichnovsky	CHECKED W. Mays	COORDS NAD 27, South Dakota State Plane South (feet)	
SCALE 1" = 1000'	FILENAME p:\dewey-burdock\nrc supplimental\finals\isopach upper confining unit mowry and skull.dwg		OF





DRILL HOLE LOG

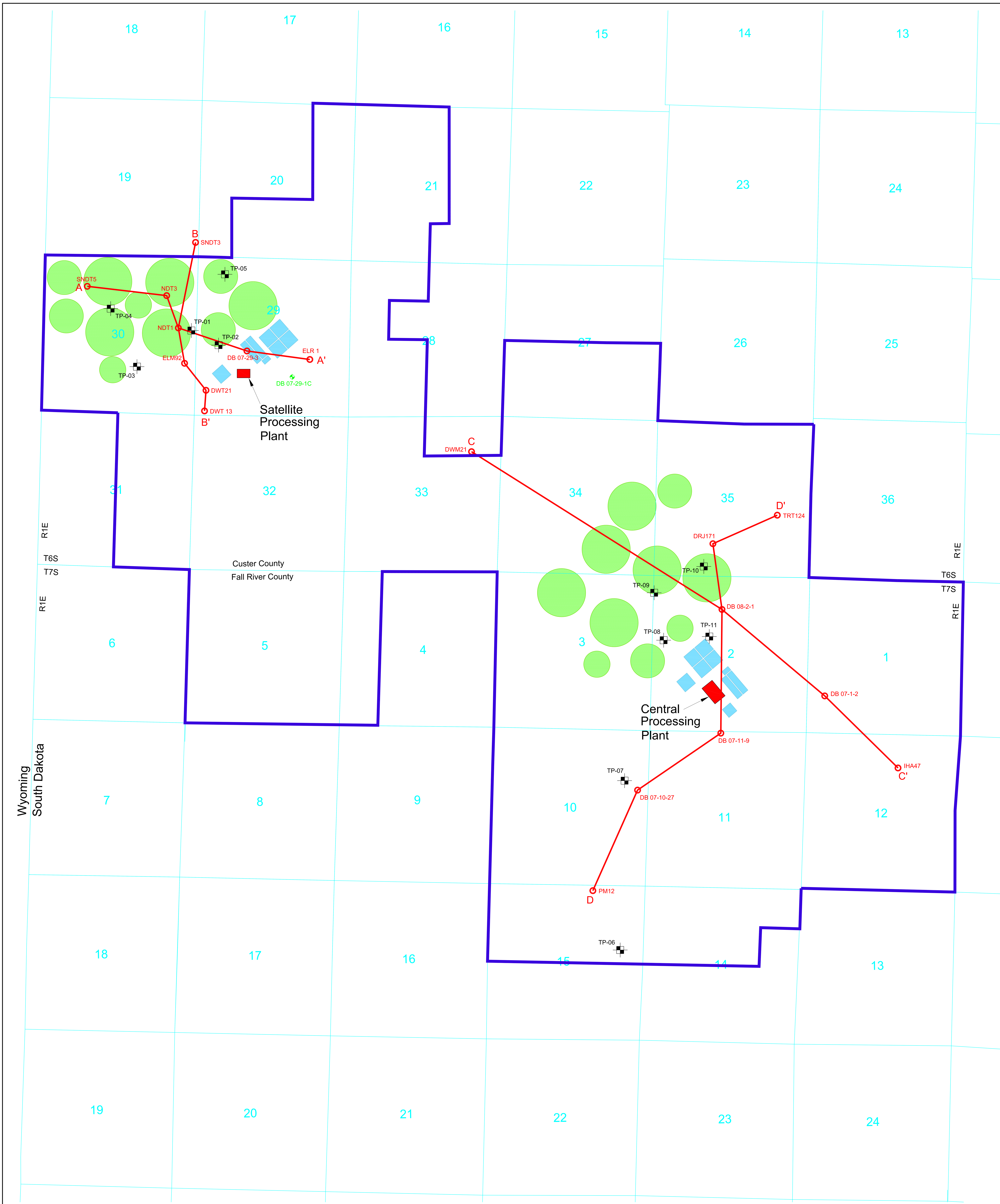


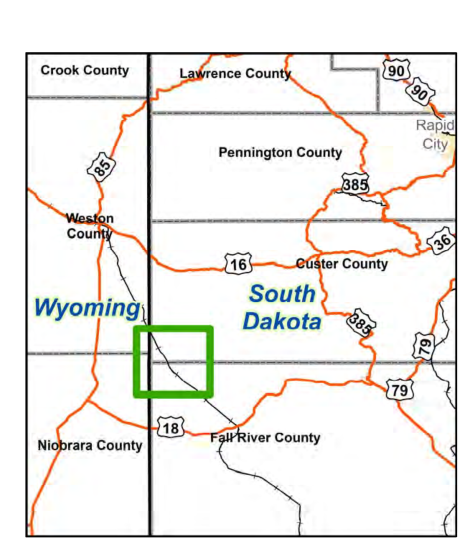


CROSS SECTION
INDEX

SCALE FEET
0 100 200
HORIZONTAL & VERTICAL SCALE

CONSULTANT	REVISIONS					**POWERTECH (USA) INC.**
	#	DRAWN	CHECKED	APPROVED	DATE	Supplemental Exhibit 335
REF 335						**Land Application Cross Sections Burdock**
CHECK SCALES — If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 06-Aug-2009		DATE 23-Jul-2009			PROJECT Dewey-Burdock Project
	DRAWN Cadd Services		CHECKED W. Mays			COORDS n/a
Arch E 36" x 48"	SCALE As Shown		FILENAME p:\dewey-burdock\nrc supplimental\finals\j-burdock-well-secs.dwg			OF





Legend

- Coring Location
- Test Pits
- Settling Ponds
- Permit Boundary
- Processing Plant Locations
- Permit Boundary
- Path of Cross Sections
- Borehole Number

Feet: 0 500 1,000 2,000 3,000 4,000

Meters: 0 250 500 1,000

N

CONSULTANT

REF 337

CHECK SCALES

If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

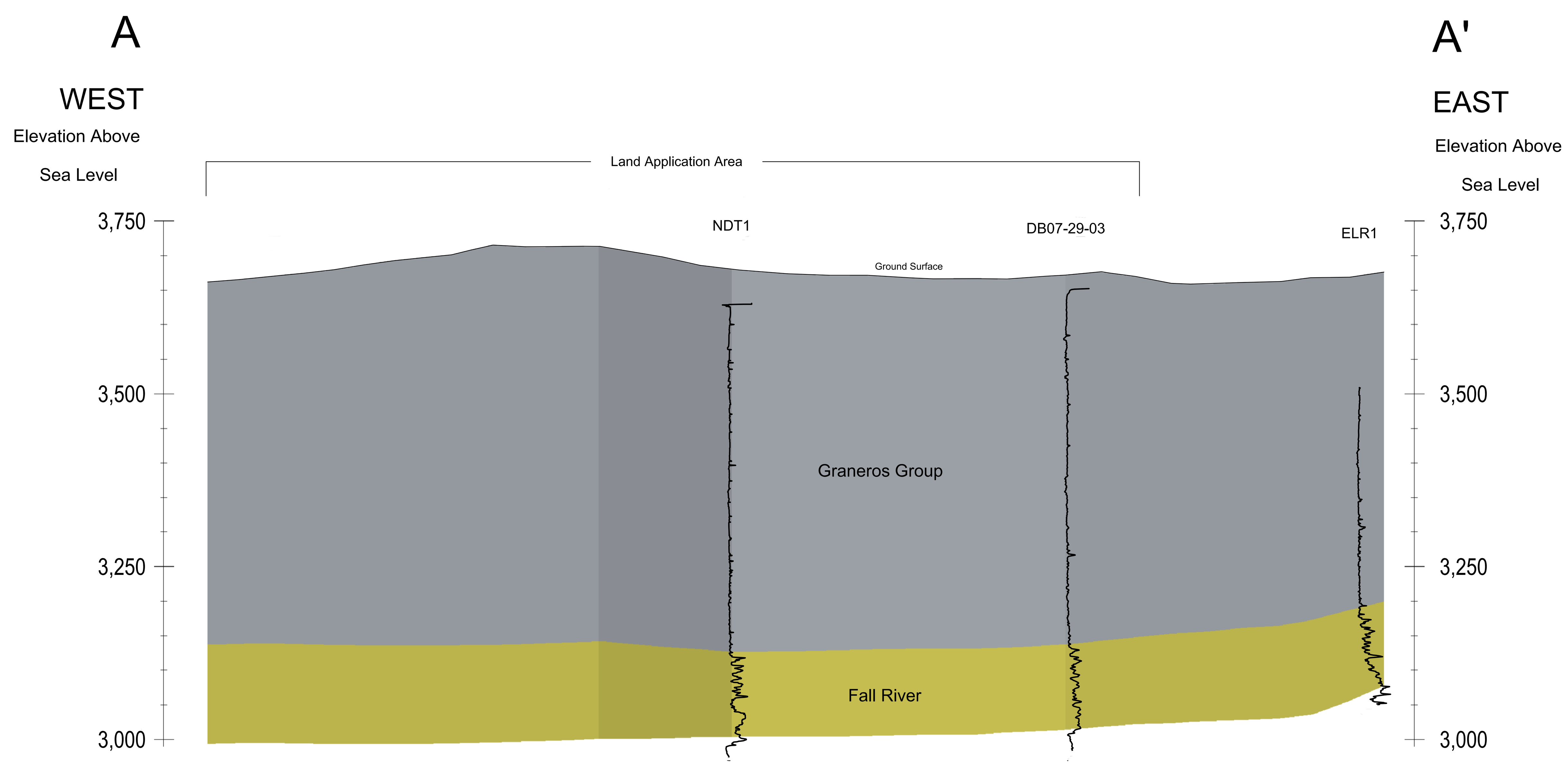
REVISIONS				
#	DRAWN	CHECKED	APPROVED	DATE

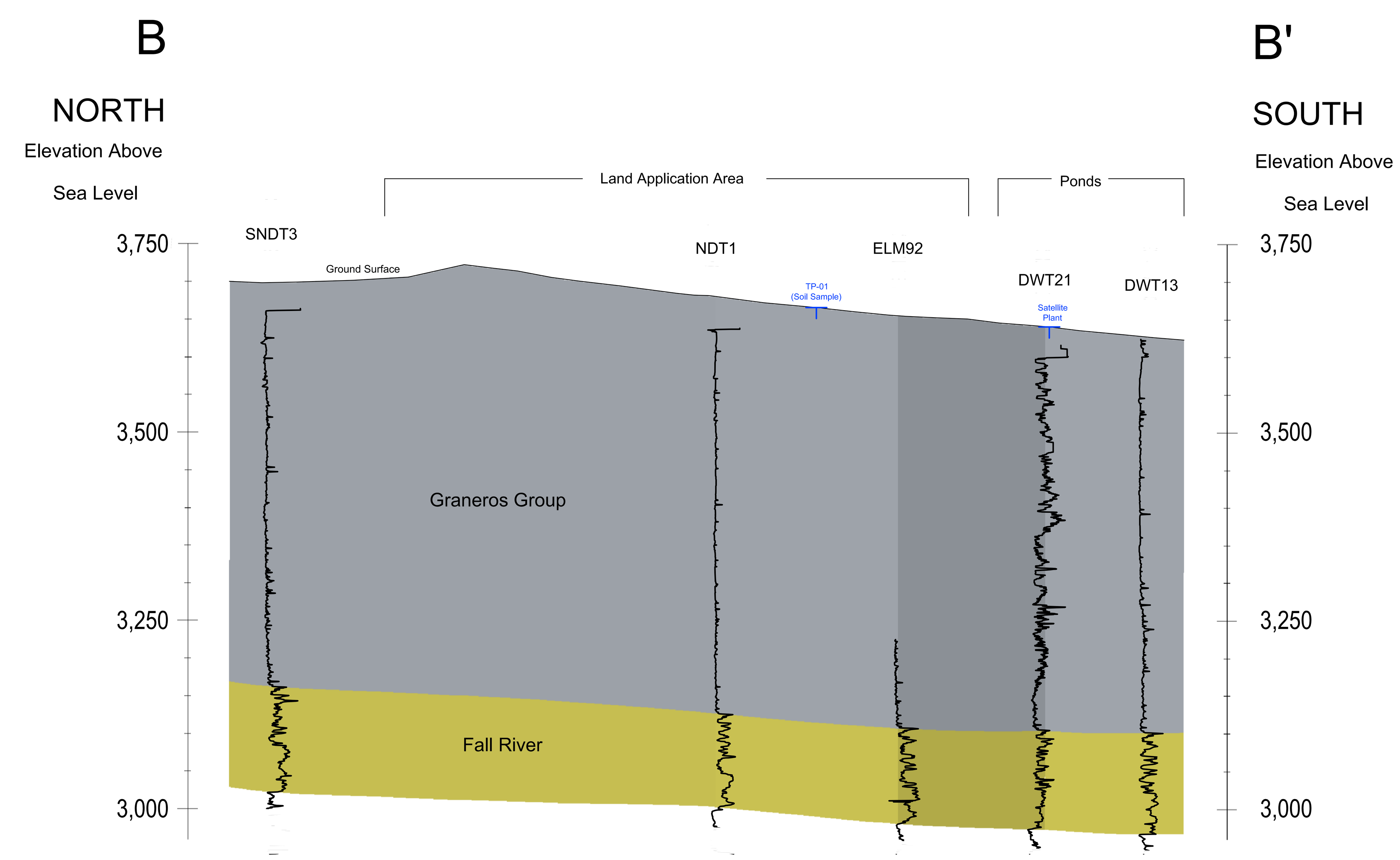
POWERTECH (USA) INC.

Supplemental Exhibit 337

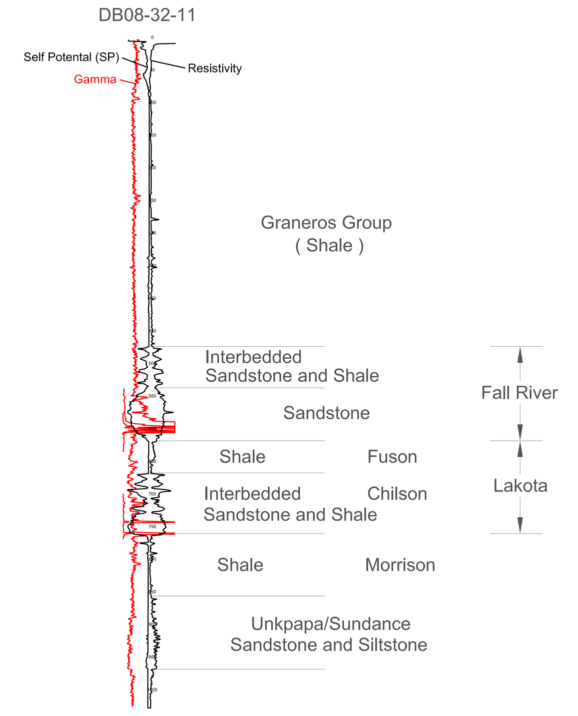
Facilities Cross Section Index

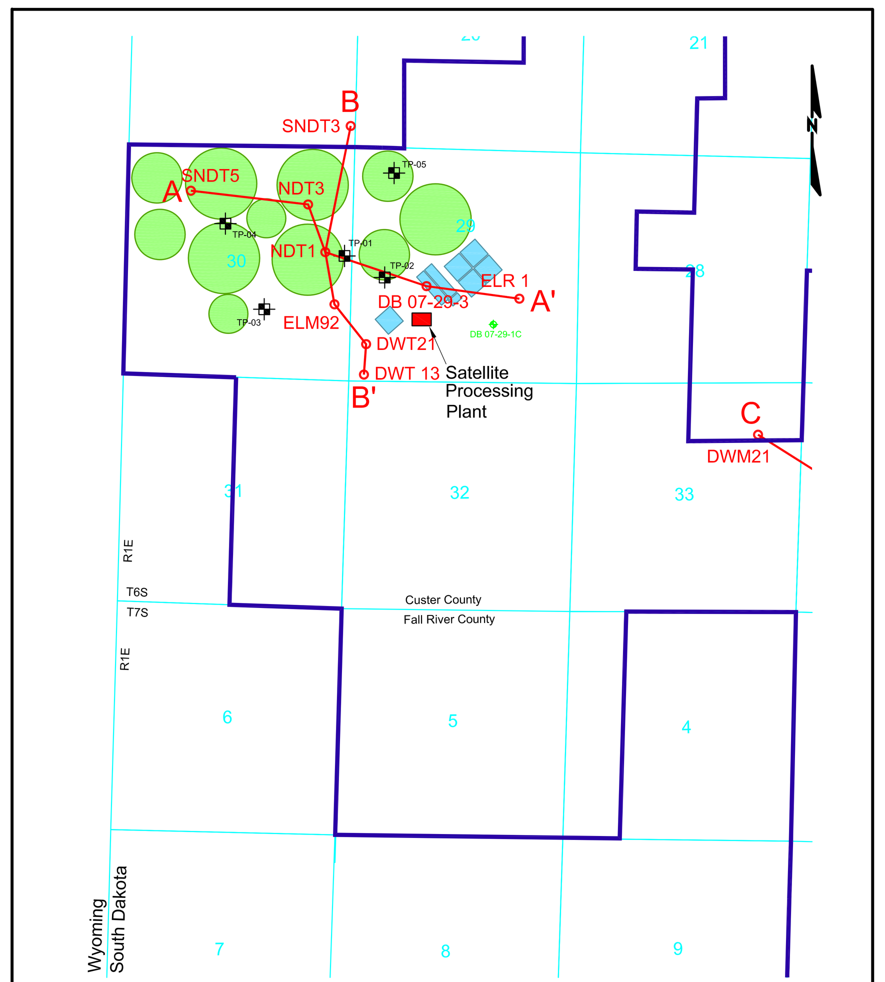
PLOT DATE 06-Aug-2009	DATE 04-Aug-2009	PROJECT Dewey-Burdock Project	
DRAWN S. Hetrick	CHECKED W. Mays	COORDS NAD 27, South Dakota State Plane South (feet)	
SCALE 1" = 1000'	FILENAME p:\dewey-burdock\nrc supplimental\finals\landappxsecindex.dwg		OF



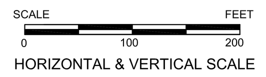


DRILL HOLE LOG





CROSS SECTION INDEX



CONSULTANT	REVISIONS				**POWERTECH (USA) INC.** Supplemental Exhibit 338
	#	DRAWN	CHECKED	APPROVED	DATE
REF 338					**Land Application Cross Sections Dewey**
CHECK SCALES — If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 06-Aug-2009	DATE 23-Jul-2009	PROJECT Dewey-Burdock Project		
	DRAWN Cadd Services (RJV)	CHECKED W. Mays	COORDS n/a		
Arch E 36" x 48"	SCALE As Shown	FILENAME p:\dewey-burdock\nrc supplimental\finals\j-dewey-well-secs.dwg			OF

Appendix A

Regulatory Requirements

A-1 USNRC Regulatory Requirements
A-2 South Dakota DENR Regulatory Requirements

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Appendix A-1

USNRC Regulatory Requirements

The USNRC regulatory requirements relating to surface impoundments are contained in NRC Regulations 10 CFR Part 40 Appendix A, Criterion 5A, Regulatory Guide 3.11 and NUREG-1569. These are summarized below:

- The liner must be designed, constructed and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, groundwater or surface water during its life.
- Closure must make allowance for the removal of or decontamination of any of all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate.
- For impoundments that will be closed with the liner material left in place, the liner must be constructed from materials that prevent wastes from migrating into them during the active life of the facility.
- Liners must be constructed from materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to:
    - Pressure gradients
    - Physical contact with the waste or leachate to which they are exposed
    - Climatic conditions
    - Stress of installation
    - Stress of daily operation
- Liners must be placed on a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner. This must prevent failure due to settlement, compression or uplift.
- Liners must be installed to cover all surrounding earth that would otherwise be likely to be in contact with the wastes or leachate.
- Dykes forming any surface impoundment must be designed, constructed and maintained with sufficient structural integrity to prevent massive failure of the dykes. In ensuring the structural integrity, it must not be assumed that the liner system will not function without leakage during the active life of the impoundment.
- A leak detection system must be installed below synthetic liners to ensure that major failures are detected if they occur.

- Where clay liners are used, or where relatively thin in situ clay soils are to be relied upon for seepage controls, tests must be conducted to confirm that no significant deterioration of permeability or stability properties will occur with continuous exposure of the clay to tailings solutions. Tests must be run for a sufficient period of time to reveal any effects if they are going to occur.

- The design, installation and operation of surface impoundments must have sufficient capacity that the entire contents of one impoundment can be transferred to another surface impoundment in case of a leak.

- Surface impoundments must be designed, constructed, maintained and operated to prevent overtopping from normal or abnormal operations, equipment malfunctions and human error.

- Stability analyses of slopes including seismic stability, settlement and seepage analyses.

- Basic design criteria for stability of the retention system and minimum factors of safety.

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Appendix A-2

South Dakota DENR Regulatory Requirements

The South Dakota DENR regulatory requirements relating to surface water ponds are contained in the South Dakota Legislature Administrative Rules 74:29:11:23 In Situ Leach Mining: Pond and Surface Impoundment Design and Construction Requirements. These are summarized below:

- General design and construction requirements include:
  - A geotechnical and stability analysis to determine the suitability of the site and materials for construction
  - A minimum of 3-feet of freeboard
  - Maximum side slopes of 3 horizontal to 1 vertical
  - A minimum bottom slope of 2 percent
  - Provisions for migratory bird and wildlife protection
  - A minimum capacity of normal operating levels plus storage for the 100-year, 24-hour storm event
- A double liner must be included for impoundments that are to contain fluids that have the potential to pollute surface or ground water. The liner system must conform to the following:
  - The liners shall be separated by a leak detection, collection and recovery system. At a minimum, this must consist of:
    1. A design that will rapidly remove fluids to minimize hydraulic head on the secondary liner.
    2. A drain layer of clean sand or gravel, or a geonet drainage product. The system shall be constructed of materials chemically resistant to the fluids contained in the pond or impoundment.
    3. The system shall have a minimum hydraulic conductivity of 0.01 cm/sec.
    4. The drain layer shall cover the entire pond or impoundment if possible. At a minimum, it must cover the pond or impoundment to the high water mark.

5. The system shall be capable of draining the fluids to a collection gallery for recovery. If the collection gallery is not free draining, it shall be continuously pumped to minimize hydraulic head on the secondary liner.

6. The permit application must include a leakage response plan detailing actions that will be taken in response to the detection of liner system leakage including notification, reporting, monitoring and repair.

- The bottom liner shall be composite liner, consisting of one of the following:

1. An upper geomembrane liner and a lower compacted soil liner, having the following requirements:

   a. The soil liner shall have a compacted maximum coefficient of permeability of $1x10^{-7}$ cm/sec.

   b. The soil liner shall have a one-foot thick compacted thickness placed in 6-inch scarified and compacted lifts, with no materials greater than three inches in diameter.

   c. The soil liner shall meet compaction specifications equivalent to 95 percent standard proctor density with a moisture content of 0 to 6 percent of optimum moisture.

   d. The geomembrane and soil liner shall be in direct contact, with minimal void spaces, to minimize lateral flow of liquids at the geomembrane/soil liner interface.

2. A geosynthetic clay liner, having the following requirements:

   a. For bentonite clay encapsulated by geotextile layers, the geosynthetic clay liner shall be overlain by a geosynthetic liner. The geosynthetic liner shall have a minimum 60-mil thickness.

   b. For bentonite clay bonded to a geomembrane liner, the geomembrane liner shall have a minimum 60-mil thickness. During installation, the geomembrane shall be the upper layer of the composite liner.

c. Installation of the geosynthetic clay liners must be consistent with the manufacturer's specifications and recommendations.

- Liners systems must be constructed of materials that have the strength, thickness and chemical properties needed to prevent failure due to:

1. Pressure gradients
2. Physical contact with the waste or fluids to which they are exposed
3. Climatic conditions
4. Stress of installation
5. Stress of daily operation

- Liner design and construction requirements include at a minimum:

1. The primary (uppermost) liner shall have an 80 mil thickness, and the secondary (bottom) geomembrane shall have a 60 mil thickness.
2. The liners shall be compatible with the fluids to be contained.
3. Liners shall have a life expectancy longer than the life of the facility.
4. Installation of the liners must be consistent with the manufacturer's specifications and recommendations.

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Appendix B

Site Investigation – Test Pit Logs

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TEST PIT LOG

TEST PIT 01

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307 SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 09:45	Ground Elevation	:
Date & Time Finished	: 7/11/2008 12:00	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0		ML		SILT, soft, topsoil, rootlets, dry, gray (10YR 7/1).			
1		ML		SILT with trace amount of CLAY and very fine SAND, firm, dry, light brown gray (10YR 6/2).	—	LD, MC	Sample No. TP01-1
3					—	LD, MC	Sample No. TP01-3
5		ML		SANDY SILT, stiff, damp, greenish brown (10YR 5/2).			
7					—	LD, MC	Sample No. TP01-7
9				SILTY CLAYSTONE, weathered bedrock, weak, moist, gray.	—	SD	
10							

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TEST PIT LOG

TEST PIT 01

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307 SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 09:45	Ground Elevation	:
Date & Time Finished	: 7/11/2008 12:00	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10							
11							
12				End of testpit at 12 ft.			
13							
14							
15							
16							
17							
18							
19							
20							

10-30-2008 G:\102\00279.02\A\Data Info\Site Investigation\Dewey Burdock Test Pit Logs\TEST PIT 01.bor

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TEST PIT LOG

TEST PIT 02

(Page 1 of 2)

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X 15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 13 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 11:00	Ground Elevation	:
Date & Time Finished	: 7/11/2008 13:20	Logged By	: JWB

Sample Condition: ⊠ Disturbed; ▨ Undisturbed; ■ Lost; ▩ Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0				CLAYEY SILT, stiff, rootlets throughout, dry, light grayish brown (10YR 6/2).			
1		ML			—	LD, MC	Sample No. TP02-1
2				SILT, firm, dry, grayish brown (10YR 5/2).			
3							
4		ML			—	LD, MC	Sample No. TP02-4
5							
6				SANDY SILT with trace amount of CLAY, firm, sand zone very fine grained, damp, variegated very pale brown (10YR 7/4) to black (10YR 2/1).			
7					—	LD, MC	Sample No. TP02-7
8		ML					
9							
10							

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TEST PIT LOG

TEST PIT 02

(Page 2 of 2)

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 13 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 11:00	Ground Elevation	:
Date & Time Finished	: 7/11/2008 13:20	Logged By	: JWB

Sample Condition: Disturbed, Undisturbed, Lost, Remolded

Sampler Type: SD Small Disturbed, LD Large Disturbed, MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10–11		ML					
11–13				SHALE, weathered bedrock, fissle, black (7.5YR 2.5/1).	— (at 12)	LD, MC	Sample No. TP02-12
13				End of testpit at 13 ft			

Depth scale: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

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TEST PIT LOG

TEST PIT 03

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X 15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 12 ft

Project No. : DV102-00279/02
Project : DEWEY BURDOCK
Client : POWERTECH URANIUM
Date & Time Started : 7/11/2008 12:20
Date & Time Finished : 7/11/2008

Location :
Northing :
Easting :
Ground Elevation :
Logged By : JWB

Sample Condition
☒ Disturbed
▨ Undisturbed
■ Lost
▩ Remolded

Sampler Type
SD Small Disturbed
LD Large Disturbed
MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0		ML		SILT, firm, rootlets throughout, dry, grayish brown (10YR 5/2).			
1					—	LD, MC	Sample No. TP03-1
2		CL	▨	SILTY CLAY, stiff, dry, dark grayish brown (10YR 6/2).			
3				PALEOSOL (SILT), firm, calcite rootlets, dry, light reddish brown (2.5YR 6/4).			
4							
5							
6							
7					—	LD, MC	Sample No. TP03-7
8							
9							
10							

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Knight Piésold
CONSULTING

TEST PIT LOG

TEST PIT 03

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 12:20	Ground Elevation	:
Date & Time Finished	: 7/11/2008	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10–12		GW		SANDY GRAVEL, loose to medium dense, fine to coarse, significant cobbles (> 3 in), well graded, dry, multiple colors.	—	LD	Sample No. TP03-11 No MC-Loose Gravel and difficult to drive through Cobbles
12				End of testpit at 12 ft			

Depth scale: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

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TEST PIT LOG

TEST PIT 04

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 13:50	Ground Elevation	:
Date & Time Finished	: 7/11/2008 16:30	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–2		ML		SILT, firm, rootlets throughout, light gray (10YR 7/1)			
1					—	LD, MC	Sample No. TP04-1
2–10		SM		SILTY SAND, very dense, quartz, feldspar, caliche throughout, very fine grained, well sorted, dry, gray (10YR 5/1).			
7					—	LD, MC	Sample No. TP04-7

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

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TEST PIT LOG

TEST PIT 04

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 13:50	Ground Elevation	:
Date & Time Finished	: 7/11/2008 16:30	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10							
11		SM					
12				End of testpit at 12 ft			
13							
14							
15							
16							
17							
18							
19							
20							

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TEST PIT LOG

TEST PIT 05

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 11 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 16:45	Ground Elevation	:
Date & Time Finished	: 7/11/2008 18:00	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–4		ML		SILT, stiff, dry, dark gray (10YR 5/1)	1	LD, MC	Sample No. TP05-1
4–6		SP		SILTY SAND, loose, very fine grained, dry, dark gray (10YR 5/1).	4	LD, MC	Sample No. TP05-4
6–8.5		SM		TRANSITIONAL into SANDY SILT, soft, iron oxide staining in places, dry, gray (10YR 5/1).	8	LD, MC	Sample No. TP05-8
8.5–10				SHALE, weathered bedrock, weathering (Fe Oxides), very weak, red brown. SHALE, unweathered, weak, black (7.5YR 2.5/1).			

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TEST PIT LOG

TEST PIT 05

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 11 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/11/2008 16:45	Ground Elevation	:
Date & Time Finished	: 7/11/2008 18:00	Logged By	: JWB

Sample Condition: Disturbed, Undisturbed, Lost, Remolded

Sampler Type: SD Small Disturbed, LD Large Disturbed, MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10							
11				End of testpit at 11ft			
12							
13							
14							
15							
16							
17							
18							
19							
20							

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TEST PIT LOG

TEST PIT 06

(Page 1 of 2)

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 11 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 08:45	Ground Elevation	:
Date & Time Finished	: 7/12/2008 10:30	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–2		ML		SILT, stiff, dry, rootlets throughout, dry, dark gray brown (10YR 4/2).			
1					—	LD, MC	Sample No. TP06-1
2–10		SM		SILTY SAND, medium dense, very fine grained, poorly graded, dry, light brown (10YR 7/1).			
7					—	LD, MC	Sample No. TP06-7

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TEST PIT LOG

TEST PIT 06

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 11 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 08:45	Ground Elevation	:
Date & Time Finished	: 7/12/2008 10:30	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10		SM			—	LD	Sample No. TP06-10
11				End of testpit at 11 ft.			
12							
13							
14							
15							
16							
17							
18							
19							
20							

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TEST PIT LOG

TEST PIT 07

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X 15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 11 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 10:45	Ground Elevation	:
Date & Time Finished	: 7/12/2008 12:30	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–2		ML		SILT, medium stiff, dry to damp.			
1					—	LD, MC	Sample No. TP07-1
2–7		ML		CLAYEY SILT, hard, damp, gray (10YR 5/1).			
5					—	LD, MC	Sample No. TP07-5
7–10		CL		SILTY CLAY, hard, damp, caliche throughout, dark gray (10YR 4/1).			
10					—	LD, MC	Sample No. TP07-10

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TEST PIT LOG

TEST PIT 07

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X 15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 11 ft

Project No. : DV102-00279/02
Project : DEWEY BURDOCK
Client : POWERTECH URANIUM
Date & Time Started : 7/12/2008 10:45
Date & Time Finished : 7/12/2008 12:30

Location :
Northing :
Easting :
Ground Elevation :
Logged By : JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10–11		CL					Very hard/clayey
11				End of testpit 11 ft			

Depth scale: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

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TEST PIT LOG

TEST PIT 08

(Page 1 of 1)

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X 15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 10 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 12:45	Ground Elevation	:
Date & Time Finished	: 7/12/2008 14:07	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–3		ML		SILT, stiff, rootlets throughout, dry, gray (10YR 5/1)			
2					—	LD, MC	Sample No. TP08-2
3–7		SP		SAND with trace amount of SILT, medium dense, fine grained, well sorted/poorly graded, quartz, feldspar, light reddish brown (2.5YR 6/4).			
6					—	LD, MC	Sample No. TP08-6
7–10				SHALE, very weak, fissle, bentonite blebs, black (7.5YR 2.5/1).			
10				End of testpit at 10ft	—	SD	Sample No. TP07-10

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TEST PIT LOG

TEST PIT 09

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X 15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 10 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 14:15	Ground Elevation	:
Date & Time Finished	: 7/12/2008 16:00	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0–2		ML		SANDY SILT, very stiff, rootlets throughout, dry, dark gray (10YR 4/1).	— (1 ft)	LD, MC	Sample No. TP09-1
2–5		SP		SAND with trace amount of SILT medium dense, well sorted/poorly graded, fine grained, quartz/feldspar, light reddish brown (5YR 6/3).	— (4 ft)	LD, MC	Sample No. TP09-4
5–10				CLAYSTONE, weathered, very weak, moist, bentonite stringers throughout, dark gray (10YR 5/1).	— (7 ft)	LD, MC	Sample No. TP09-7
10				End of testpit at 10 ft.			

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TEST PIT LOG

TEST PIT 10

Excavation Contractor : BILL HOLLENBECK CONST.
Operator : BILL HOLLENBECK
Type of Excavator : 307SSR
Size of Test Pit : 20 ft X15 ft
Surface Conditions : DRY, GRASSY
Depth to GWT : NA
Total Depth of Test Pit : 12 ft

Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 16:10	Ground Elevation	:
Date & Time Finished	: 7/12/2008 17:15	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0				SILT, soft, damp, brown (10YR 5/3)			
1		ML			—	LD, MC	Sample No. TP010-1
2				CLAYEY SILT, very stiff, bentonite stringers throughout, damp, grayish brown (10YR 5/2).			
3							
4							
5							
6		ML					
7					—	LD, MC	Sample No. TP010-7
8							
9							
10							

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Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 16:10	Ground Elevation	:
Date & Time Finished	: 7/12/2008 17:15	Logged By	: JWB

Excavation Contractor	: BILL HOLLENBECK CONST.
Operator	: BILL HOLLENBECK
Type of Excavator	: 307SSR
Size of Test Pit	: 20 ft X15 ft
Surface Conditions	: DRY, GRASSY
Depth to GWT	: NA
Total Depth of Test Pit	: 12 ft

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
10–12		ML					
12				End of testpit at 12 ft.			

Depth scale: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

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TEST PIT LOG

TEST PIT 11

(Page 1 of 1)

Excavation Contractor	: BILL HOLLENBECK CONST.		
Operator	: BILL HOLLENBECK		
Type of Excavator	: 307SSR		
Size of Test Pit	: 20 ft X 15 ft		
Surface Conditions	: DRY, GRASSY		
Depth to GWT	: NA		
Total Depth of Test Pit	: 6 ft		
Project No.	: DV102-00279/02	Location	:
Project	: DEWEY BURDOCK	Northing	:
Client	: POWERTECH URANIUM	Easting	:
Date & Time Started	: 7/12/2008 17:30	Ground Elevation	:
Date & Time Finished	: 7/12/2008 18:00	Logged By	: JWB

Sample Condition: Disturbed; Undisturbed; Lost; Remolded

Sampler Type: SD Small Disturbed; LD Large Disturbed; MC Modified Cal Liner

Depth (ft)	Water Level	USCS	GRAPHIC	FIELD DESCRIPTION	Samples	Sample Type	REMARKS
0				SHALE, highly weathered from 2'-4' ft depth, weak to strong, fissle to thin beded, oxidized zone, black (7.5YR 2/4) to reddish yellow (7.5YR 6/8).			
2					—	LD, MC	Sample No. TP011-2
6							Refusal at 6 ft
6				End of testpit at 6 ft			

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

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Appendix C

Site Investigation – Geotechnical Laboratory Test Results

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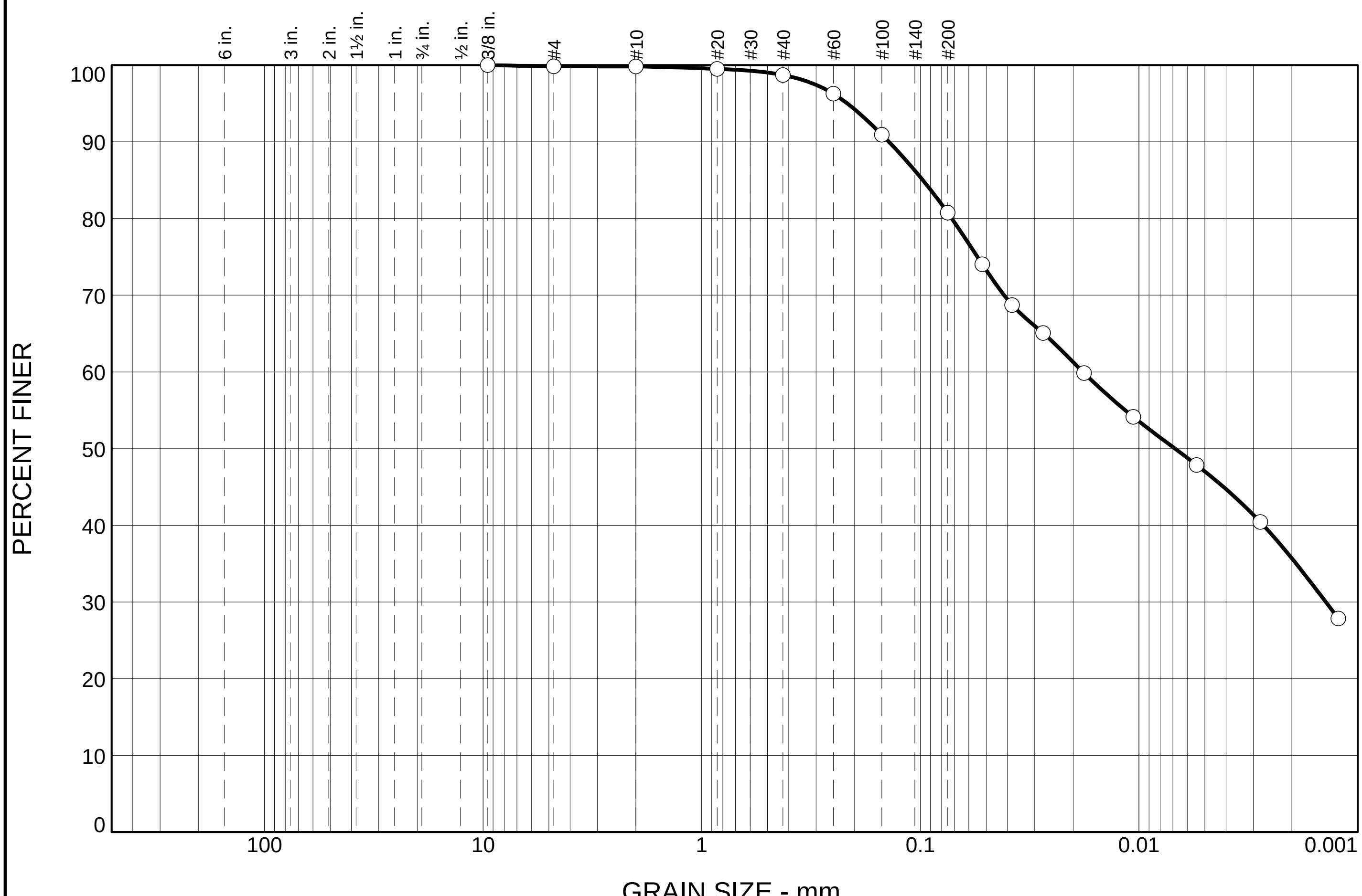
Appendix C-1

Particle Size Distributions

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	1.1	17.9	45.1	35.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	99.8		
#20	99.5		
#40	98.7		
#60	96.3		
#100	90.9		
#200	80.8		
0.0521 mm.	74.0		
0.0380 mm.	68.7		
0.0275 mm.	65.1		
0.0178 mm.	59.9		
0.0106 mm.	54.1		
0.0055 mm.	47.9		
0.0028 mm.	40.4		
0.0012 mm.	27.8		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 15 LL= 43 PI= 28

Coefficients

D_{90}= 0.1394 D_{85}= 0.0973 D_{60}= 0.0181
D_{50}= 0.0068 D_{30}= 0.0014 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(22)

Remarks

As received moisture 8.7%

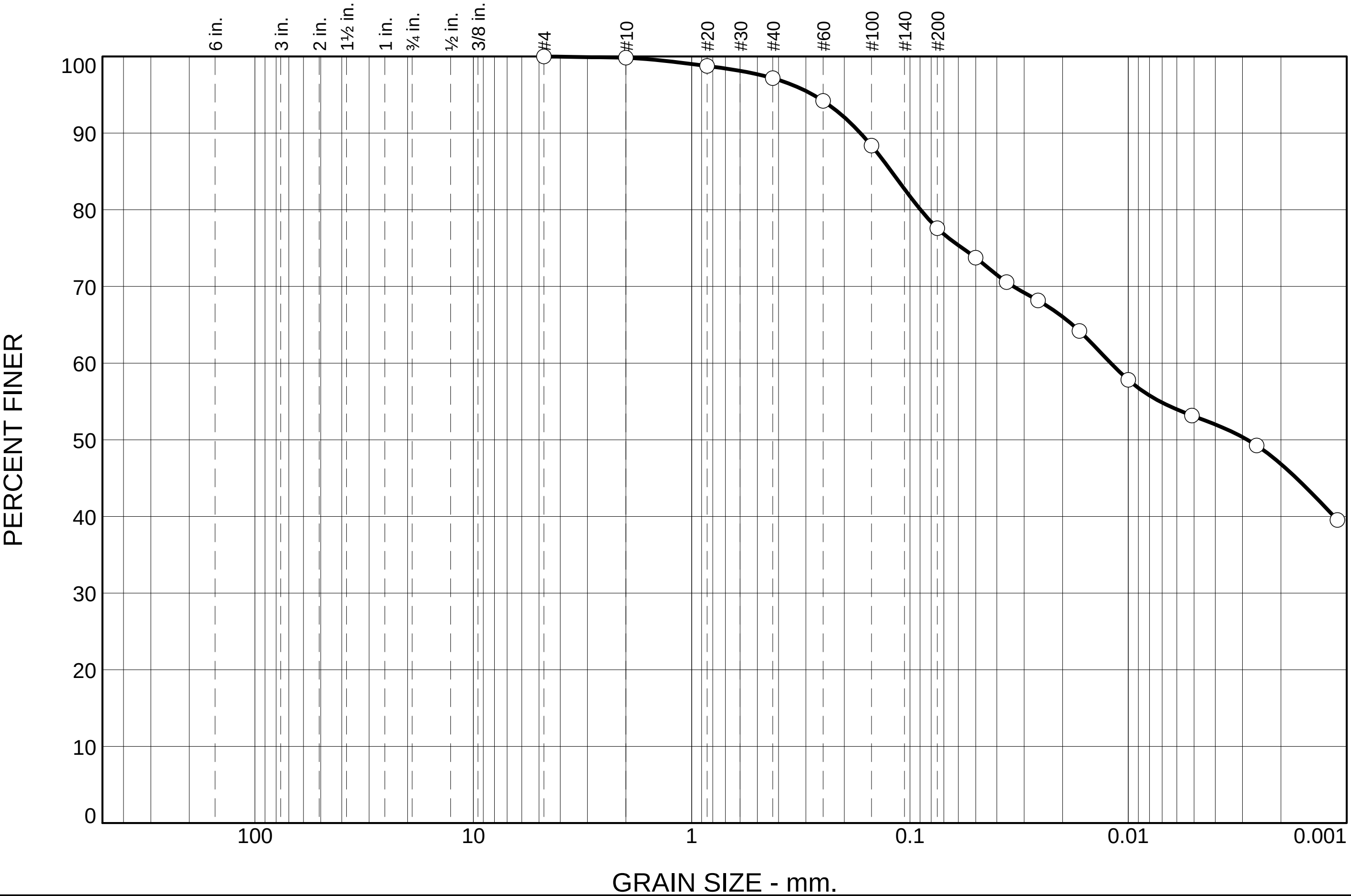
Location: TP01
Depth: 1'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.7	19.6	30.8	46.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	98.8		
#40	97.2		
#60	94.2		
#100	88.4		
#200	77.6		
0.0501 mm.	73.8		
0.0361 mm.	70.6		
0.0259 mm.	68.2		
0.0168 mm.	64.2		
0.0100 mm.	57.8		
0.0051 mm.	53.2		
0.0026 mm.	49.3		
0.0011 mm.	39.5		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 12 LL= 45 PI= 33

Coefficients

D_{90}= 0.1684 D_{85}= 0.1215 D_{60}= 0.0120
D_{50}= 0.0028 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(24)

Remarks

As received moisture 18.8%

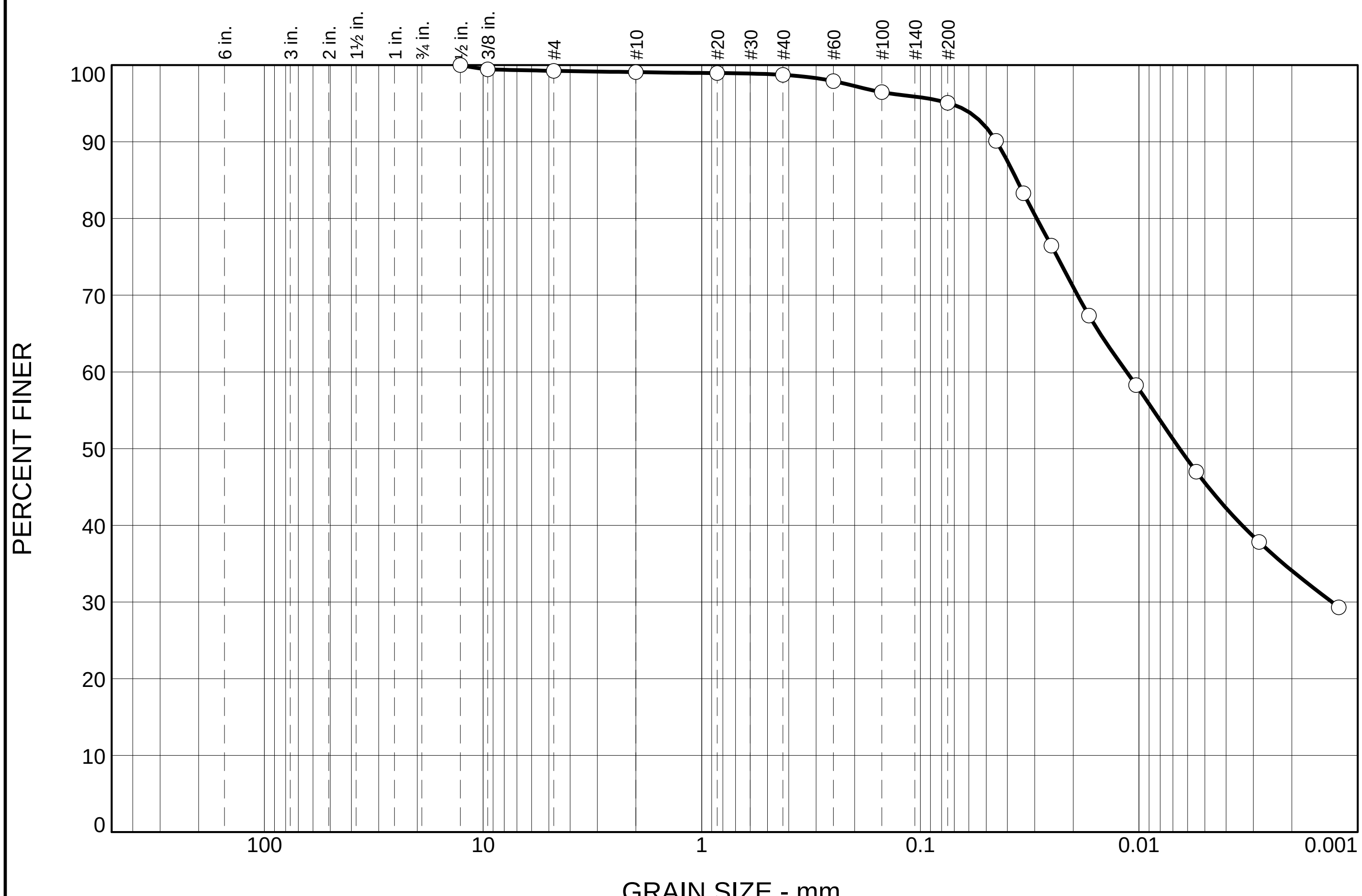
Location: TP01
Depth: 3'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.2	0.4	3.6	61.0	34.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
0.375	99.4		
#4	99.3		
#10	99.1		
#20	99.0		
#40	98.7		
#60	97.9		
#100	96.5		
#200	95.1		
0.0450 mm.	90.1		
0.0338 mm.	83.3		
0.0252 mm.	76.5		
0.0169 mm.	67.3		
0.0103 mm.	58.3		
0.0055 mm.	47.0		
0.0028 mm.	37.8		
0.0012 mm.	29.3		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 17 LL= 42 PI= 25

Coefficients

D_{90}= 0.0448 D_{85}= 0.0362 D_{60}= 0.0114
D_{50}= 0.0065 D_{30}= 0.0013 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(25)

Remarks

As received moisture 17.0%

Location: TP01
Depth: 7'

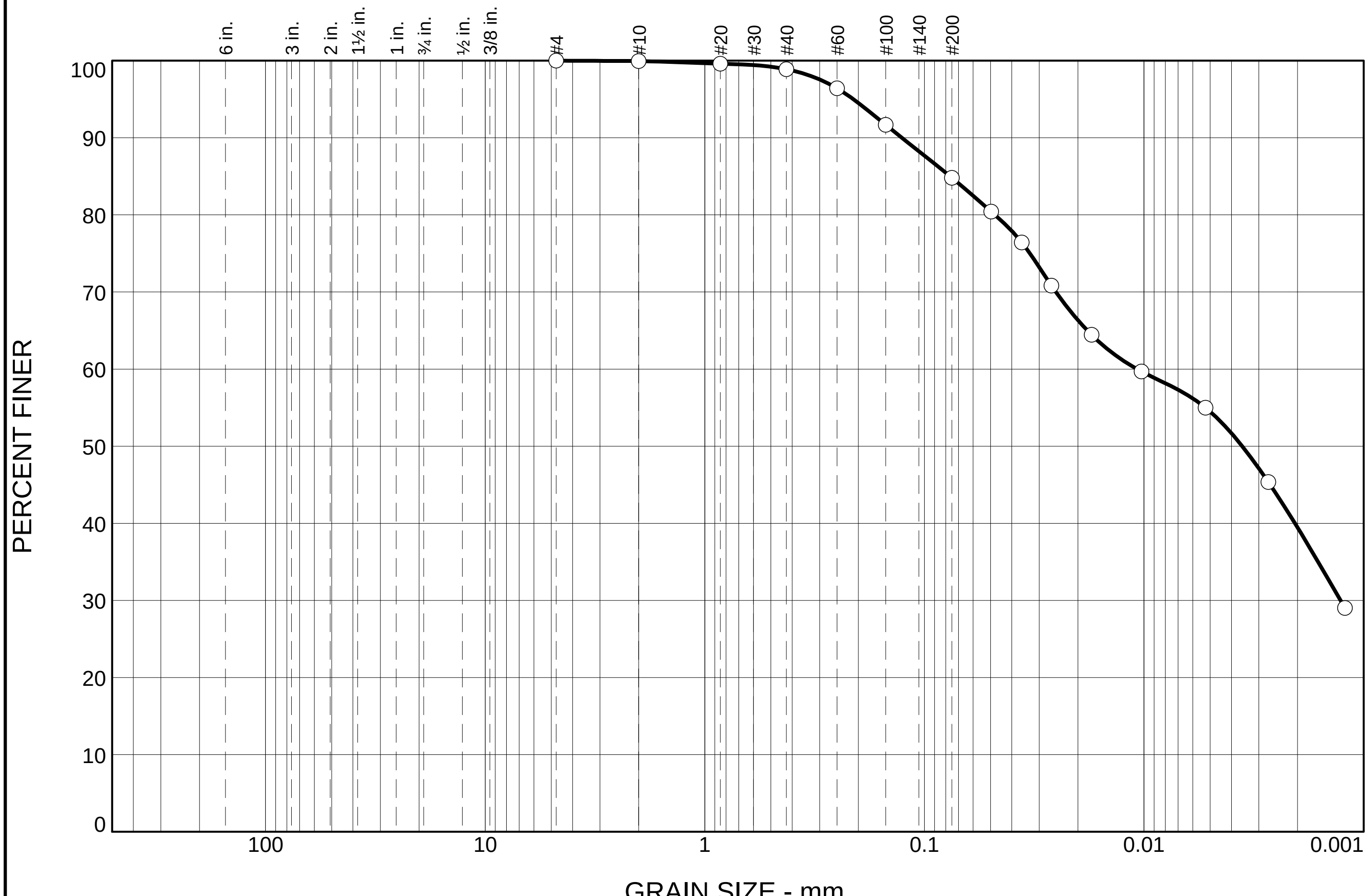
Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech

Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.1	14.1	45.3	39.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.6		
#40	98.9		
#60	96.4		
#100	91.7		
#200	84.8		
0.0496 mm.	80.4		
0.0360 mm.	76.4		
0.0264 mm.	70.8		
0.0173 mm.	64.4		
0.0103 mm.	59.7		
0.0053 mm.	55.0		
0.0027 mm.	45.3		
0.0012 mm.	29.0		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 17 LL= 48 PI= 31

Coefficients

D_{90}= 0.1266 D_{85}= 0.0764 D_{60}= 0.0107
D_{50}= 0.0036 D_{30}= 0.0013 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(27)

Remarks

As received moisture 10.2%

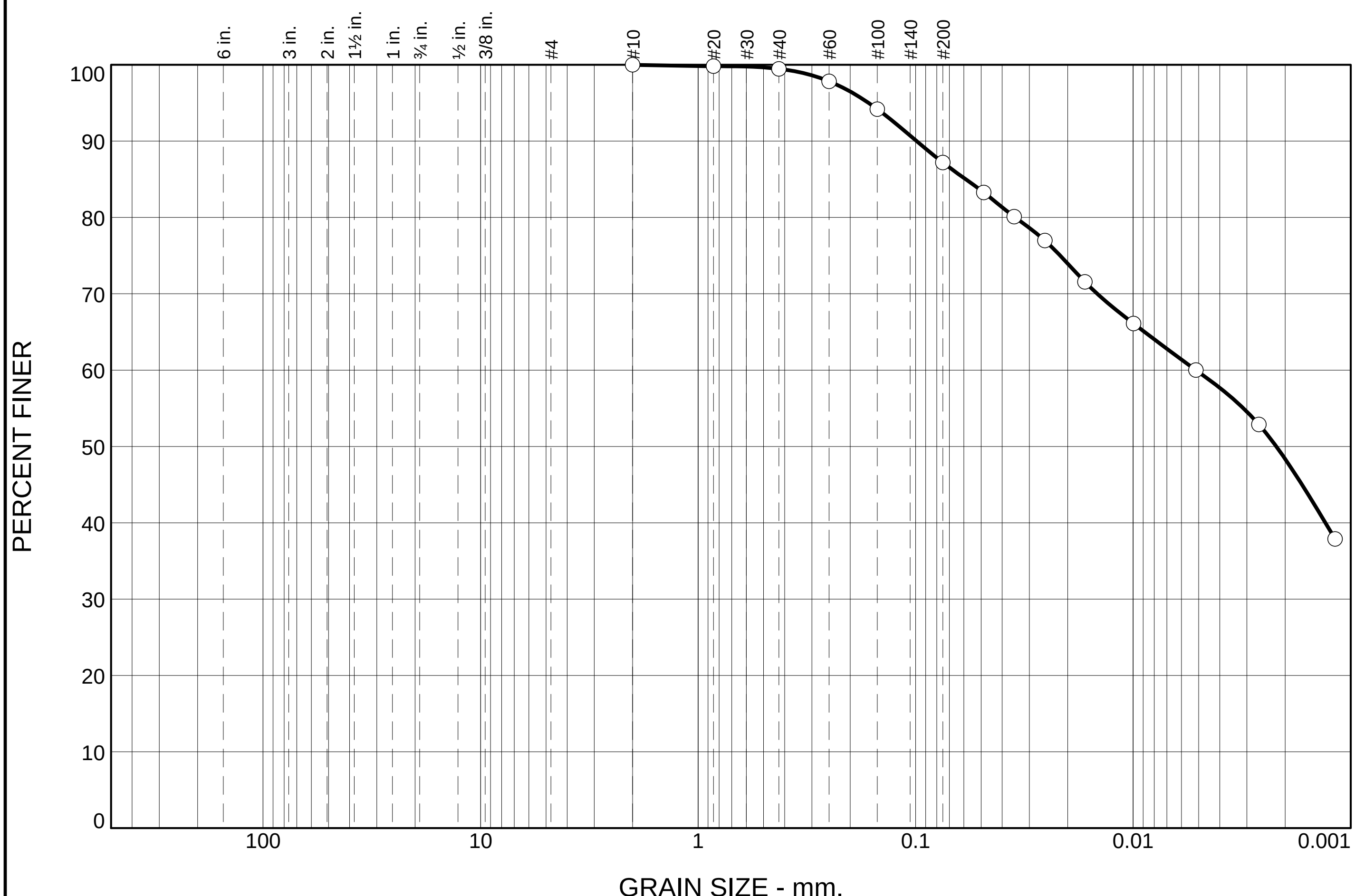
Location: TP02
Depth: 1'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	12.3	38.9	48.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.5		
#60	97.8		
#100	94.2		
#200	87.2		
0.0486 mm.	83.3		
0.0352 mm.	80.1		
0.0255 mm.	77.0		
0.0167 mm.	71.6		
0.0100 mm.	66.1		
0.0051 mm.	60.0		
0.0026 mm.	52.9		
0.0012 mm.	37.9		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 15 LL= 49 PI= 34

Coefficients

D_{90}= 0.0989 D_{85}= 0.0588 D_{60}= 0.0051
D_{50}= 0.0022 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(30)

Remarks

As received moisture 14.5%

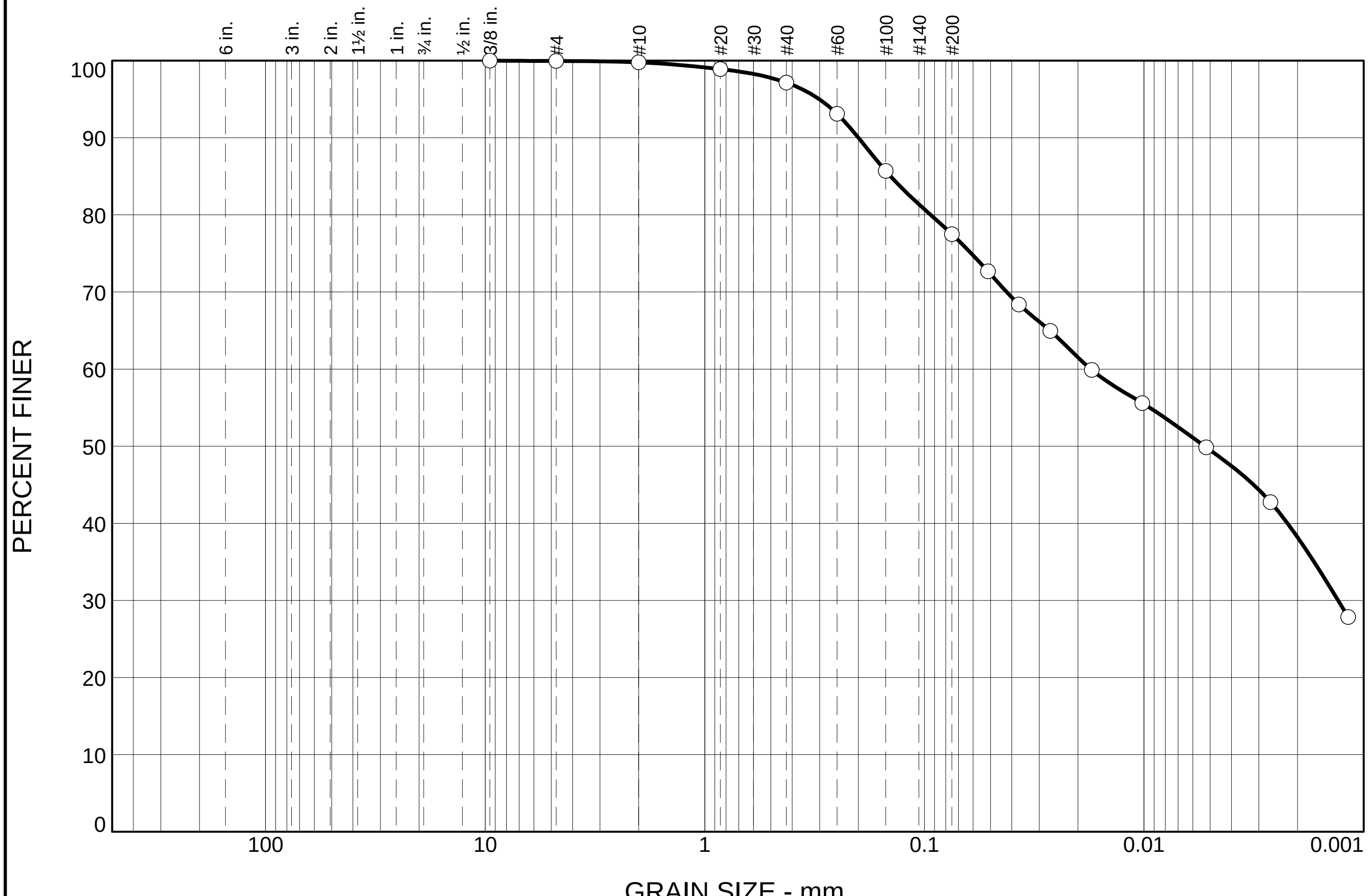
Location: TP02
Depth: 4'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	2.6	19.7	39.3	38.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	100.0		
#10	99.8		
#20	98.9		
#40	97.2		
#60	93.1		
#100	85.7		
#200	77.5		
0.0514 mm.	72.7		
0.0371 mm.	68.4		
0.0267 mm.	65.0		
0.0173 mm.	59.9		
0.0102 mm.	55.6		
0.0052 mm.	49.9		
0.0027 mm.	42.7		
0.0012 mm.	27.8		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 11 LL= 43 PI= 32

Coefficients

D_{90}= 0.1996 D_{85}= 0.1426 D_{60}= 0.0175
D_{50}= 0.0053 D_{30}= 0.0013 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(23)

Remarks

As received moisture 27.0%

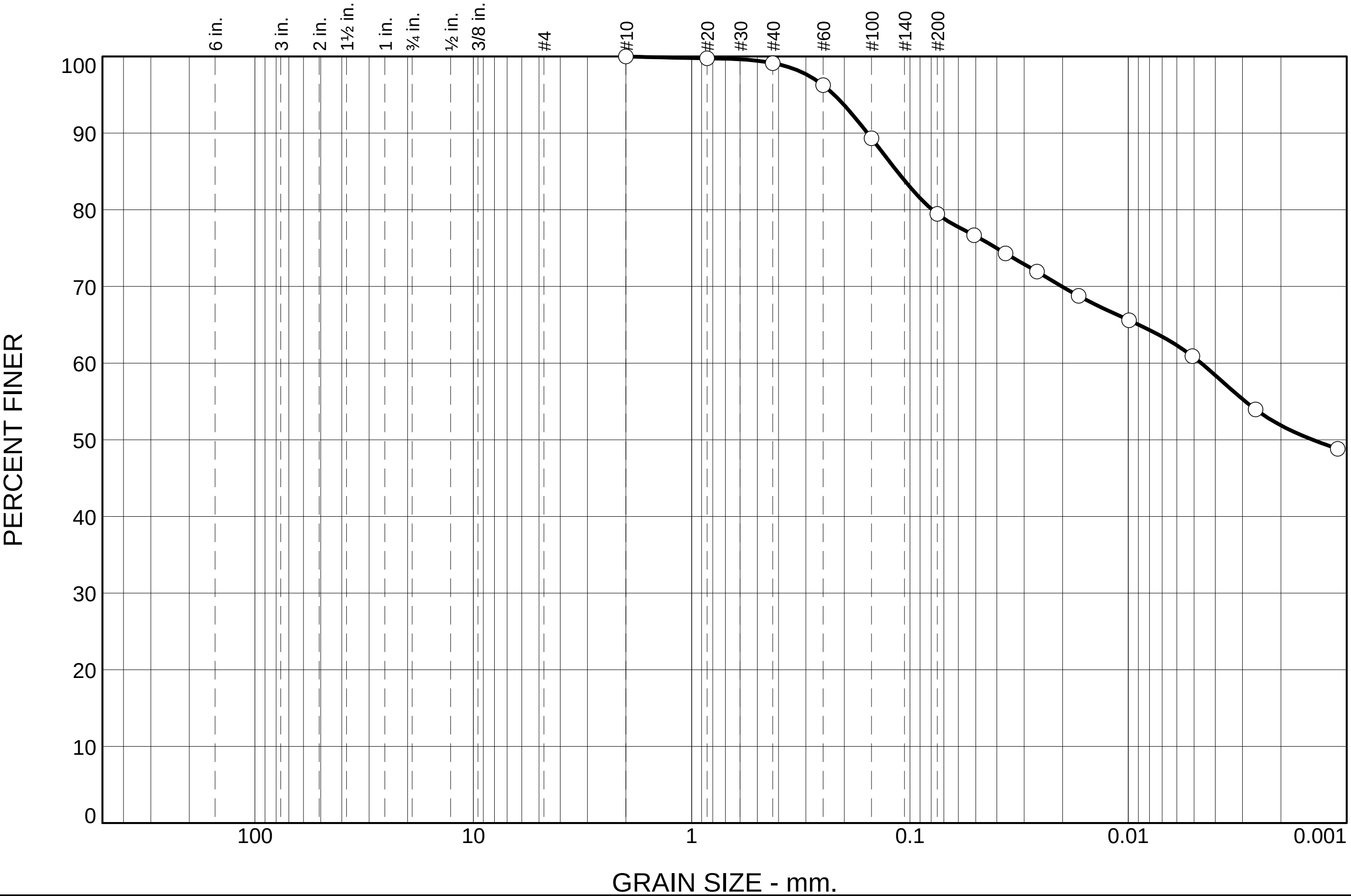
Location: TP02
Depth: 7'

Date: 7/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	19.6	27.6	51.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.1		
#60	96.3		
#100	89.3		
#200	79.5		
0.0508 mm.	76.7		
0.0365 mm.	74.3		
0.0262 mm.	71.9		
0.0169 mm.	68.8		
0.0099 mm.	65.6		
0.0051 mm.	60.9		
0.0026 mm.	54.0		
0.0011 mm.	48.8		

* (no specification provided)

Soil Description

fat clay with sand

Atterberg Limits

PL= 15 LL= 50 PI= 35

Coefficients

D_{90}= 0.1564 D_{85}= 0.1144 D_{60}= 0.0046
D_{50}= 0.0014 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(28)

Remarks

As received moisture 17.3%

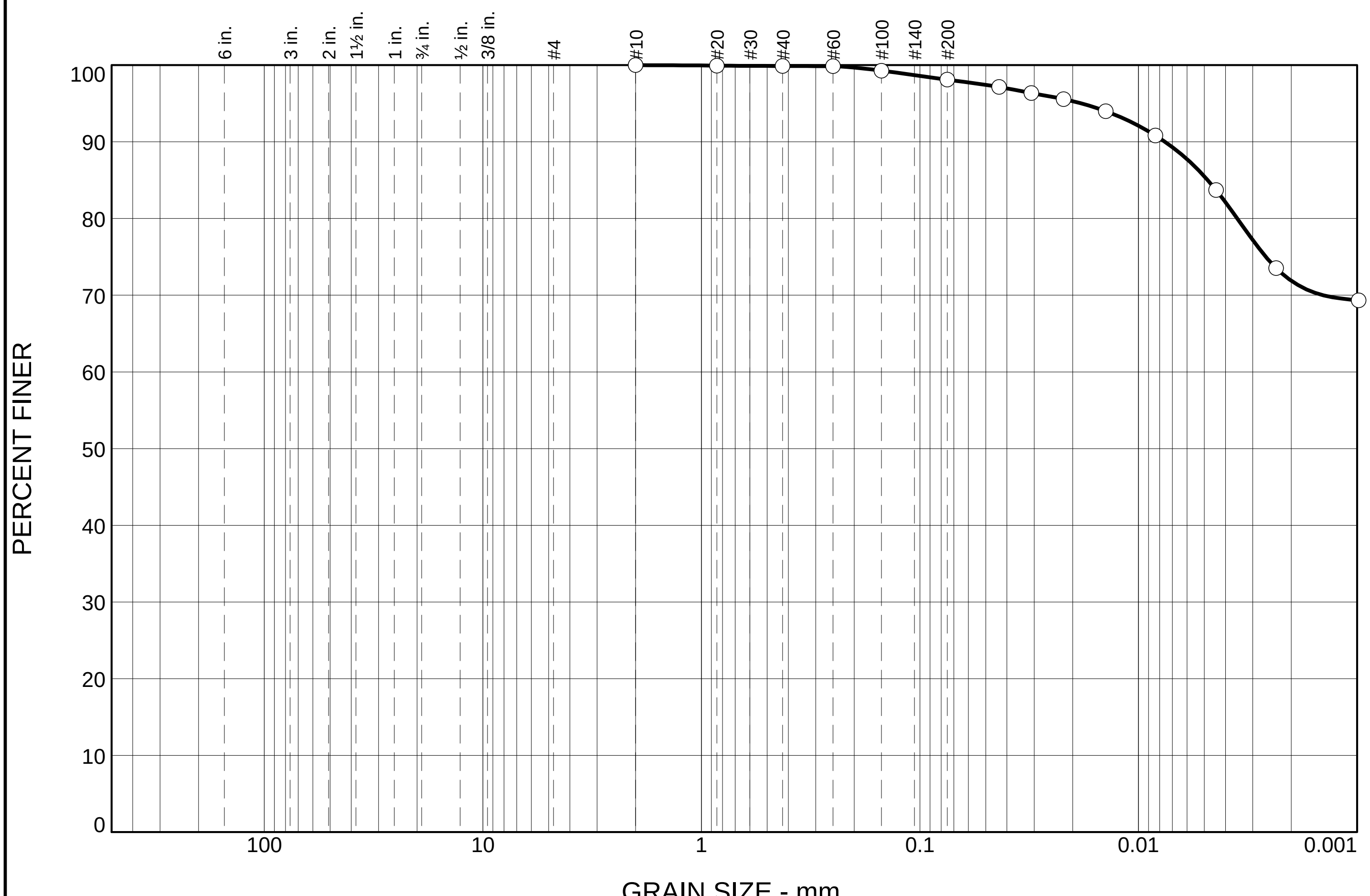
Location: TP03
Depth: 1'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	1.8	26.2	71.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.9		
#60	99.9		
#100	99.3		
#200	98.1		
0.0434 mm.	97.1		
0.0309 mm.	96.4		
0.0220 mm.	95.6		
0.0141 mm.	94.0		
0.0084 mm.	90.8		
0.0044 mm.	83.7		
0.0023 mm.	73.5		
0.0010 mm.	69.3		

* (no specification provided)

Soil Description

fat clay

Atterberg Limits

PL= 17 LL= 69 PI= 52

Coefficients

D_{90}= 0.0076 D_{85}= 0.0048 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(57)

Remarks

As received moisture 14.5%

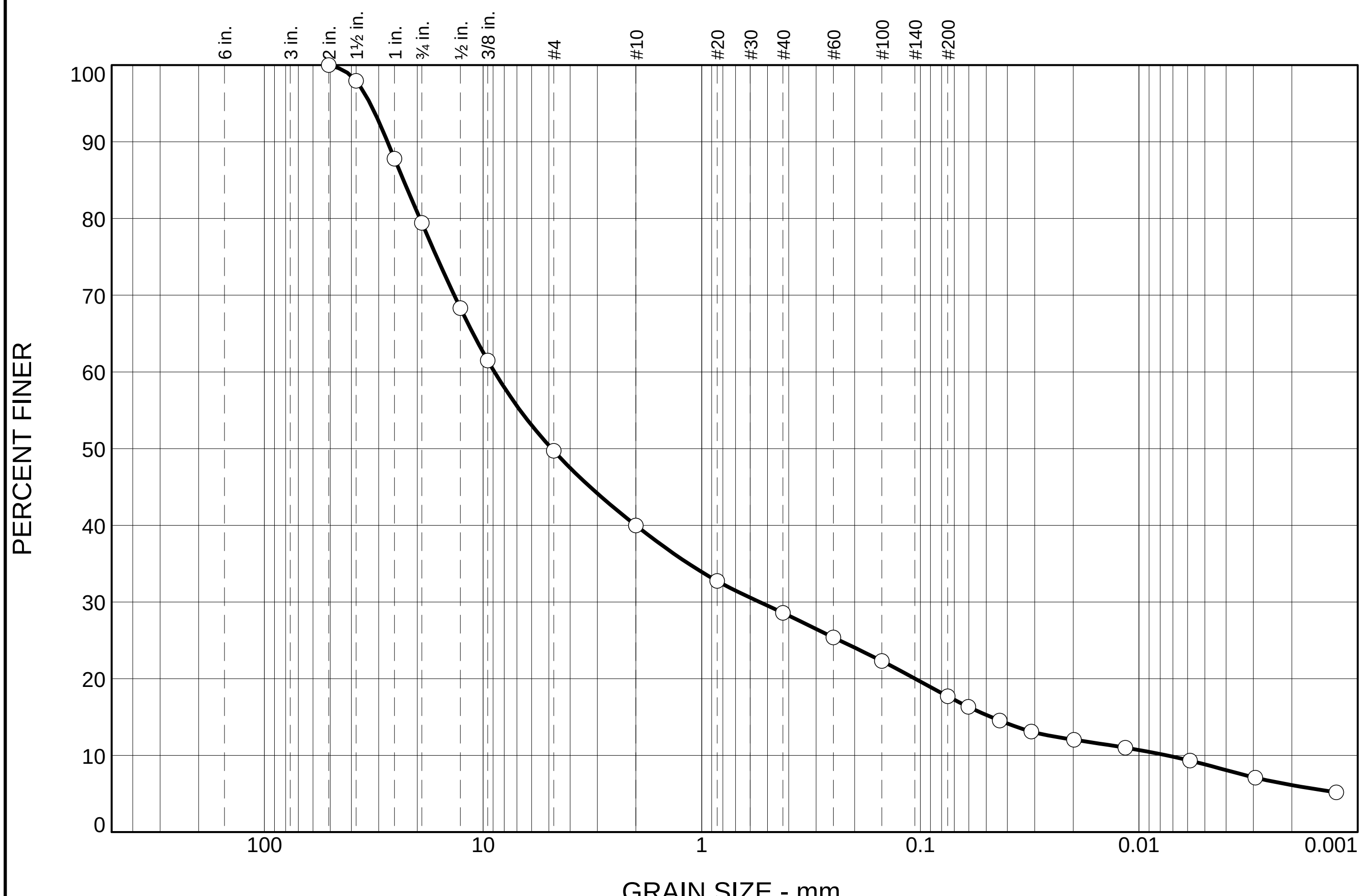
Location: TP03
Depth: 7'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.6	29.7	9.7	11.4	10.9	11.6	6.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	98.0		
1	87.8		
.75	79.4		
.5	68.3		
0.375	61.5		
#4	49.7		
#10	40.0		
#20	32.7		
#40	28.6		
#60	25.4		
#100	22.3		
#200	17.7		
0.0604 mm.	16.3		
0.0434 mm.	14.5		
0.0311 mm.	13.1		
0.0198 mm.	12.0		
0.0116 mm.	11.0		
0.0058 mm.	9.3		
0.0029 mm.	7.1		
0.0013 mm.	5.2		

* (no specification provided)

Soil Description

clayey gravel with sand

Atterberg Limits

PL= 12 LL= 24 PI= 12

Coefficients

D_{90}= 27.3612 D_{85}= 23.1076 D_{60}= 8.8720
D_{50}= 4.8517 D_{30}= 0.5444 D_{15}= 0.0475
D_{10}= 0.0075 C_u= 1187.75 C_c= 4.47

Classification

USCS= GC AASHTO= A-2-6(0)

Remarks

Natural moisture content was not obtained.

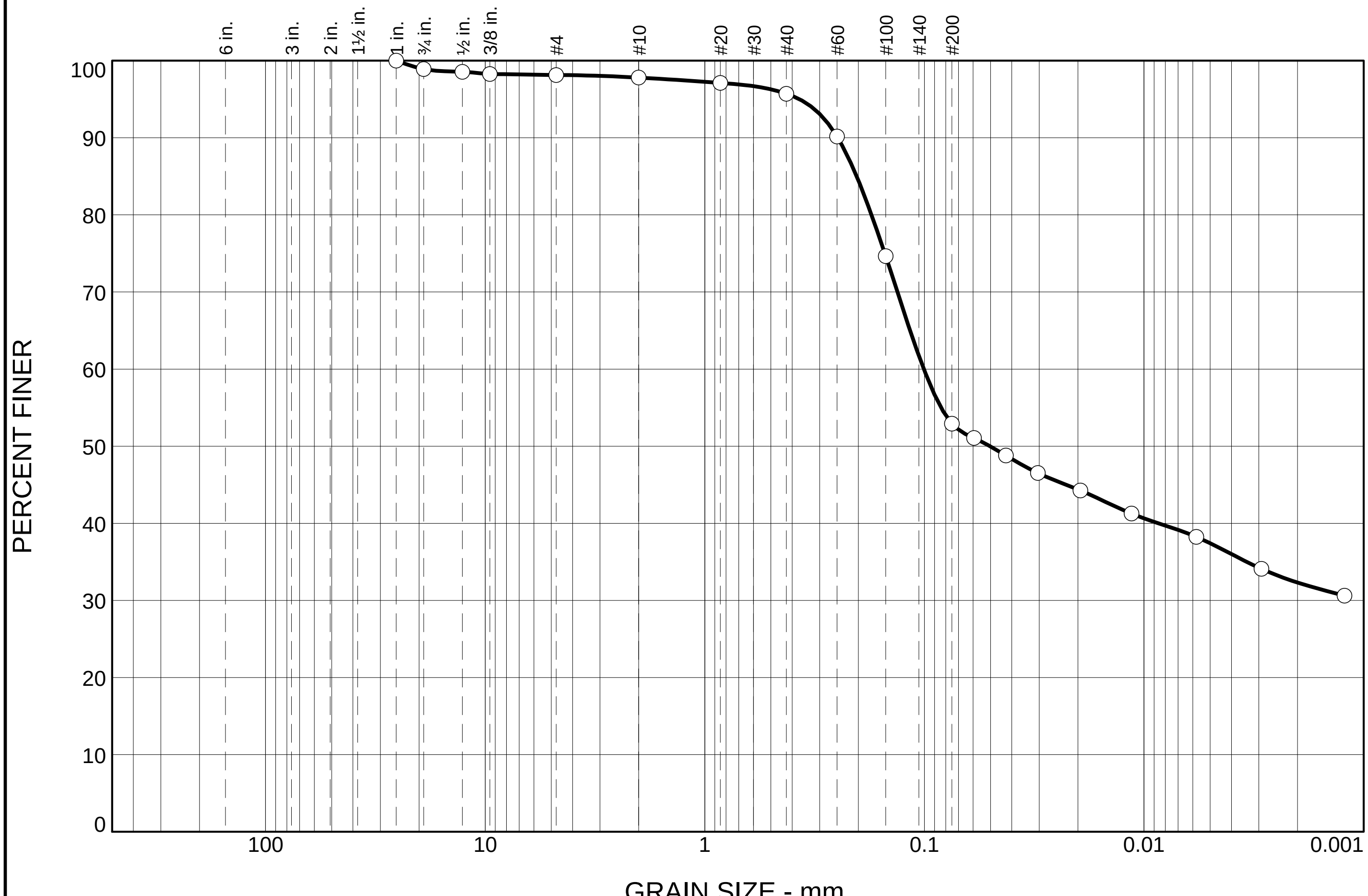
Location: TP03
Depth: 11'

Date: 7/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.1	0.8	0.3	2.1	42.8	20.6	32.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	98.9		
.5	98.6		
0.375	98.3		
#4	98.1		
#10	97.8		
#20	97.1		
#40	95.7		
#60	90.2		
#100	74.7		
#200	52.9		
0.0595 mm.	51.1		
0.0426 mm.	48.8		
0.0304 mm.	46.5		
0.0195 mm.	44.3		
0.0114 mm.	41.3		
0.0058 mm.	38.2		
0.0029 mm.	34.1		
0.0012 mm.	30.6		

* (no specification provided)

Soil Description

sandy lean clay

Atterberg Limits

PL= 13 LL= 35 PI= 22

Coefficients

D_{90}= 0.2480 D_{85}= 0.2035 D_{60}= 0.1006
D_{50}= 0.0503 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

As received moisture 5.7%

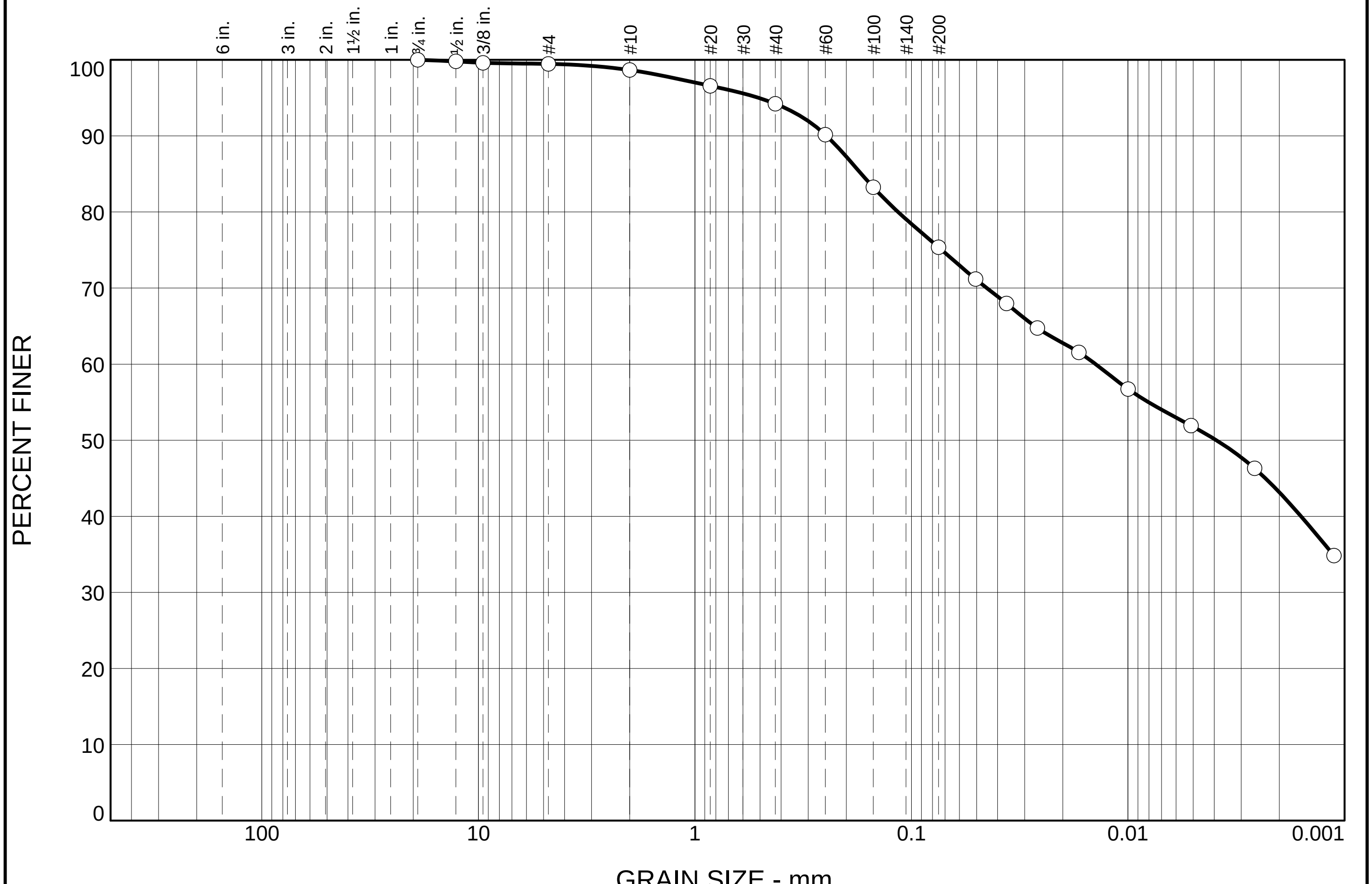
Location: TP04
Depth: 1'

Date: 8/20/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.8	4.5	18.8	32.2	43.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	99.8		
0.375	99.6		
#4	99.5		
#10	98.7		
#20	96.6		
#40	94.2		
#60	90.2		
#100	83.2		
#200	75.4		
0.0505 mm.	71.2		
0.0364 mm.	68.0		
0.0262 mm.	64.8		
0.0169 mm.	61.5		
0.0100 mm.	56.7		
0.0051 mm.	51.9		
0.0026 mm.	46.3		
0.0011 mm.	34.8		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 13 LL= 41 PI= 28

Coefficients

D_{90}= 0.2465 D_{85}= 0.1702 D_{60}= 0.0141
D_{50}= 0.0039 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(19)

Remarks

As received moisture 10.2%

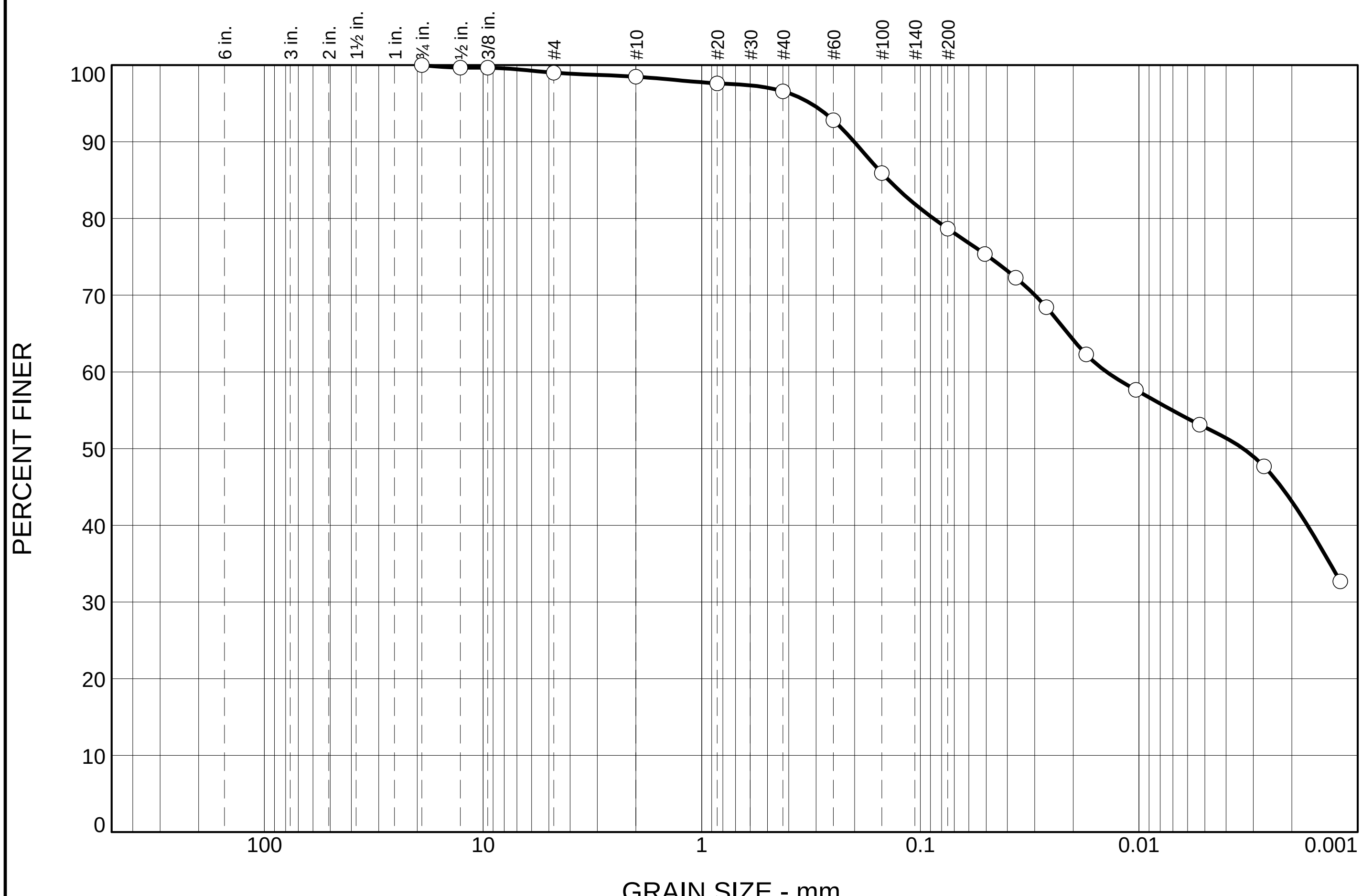
Location: TP04
Depth: 7'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	0.5	1.9	17.9	35.6	43.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	99.7		
0.375	99.7		
#4	99.0		
#10	98.5		
#20	97.6		
#40	96.6		
#60	92.8		
#100	85.9		
#200	78.7		
0.0507 mm.	75.4		
0.0366 mm.	72.3		
0.0265 mm.	68.4		
0.0174 mm.	62.3		
0.0103 mm.	57.7		
0.0053 mm.	53.1		
0.0027 mm.	47.7		
0.0012 mm.	32.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 10 LL= 40 PI= 30

Coefficients

D_{90}= 0.2008 D_{85}= 0.1396 D_{60}= 0.0141
D_{50}= 0.0033 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(22)

Remarks

As received moisture 8.6%

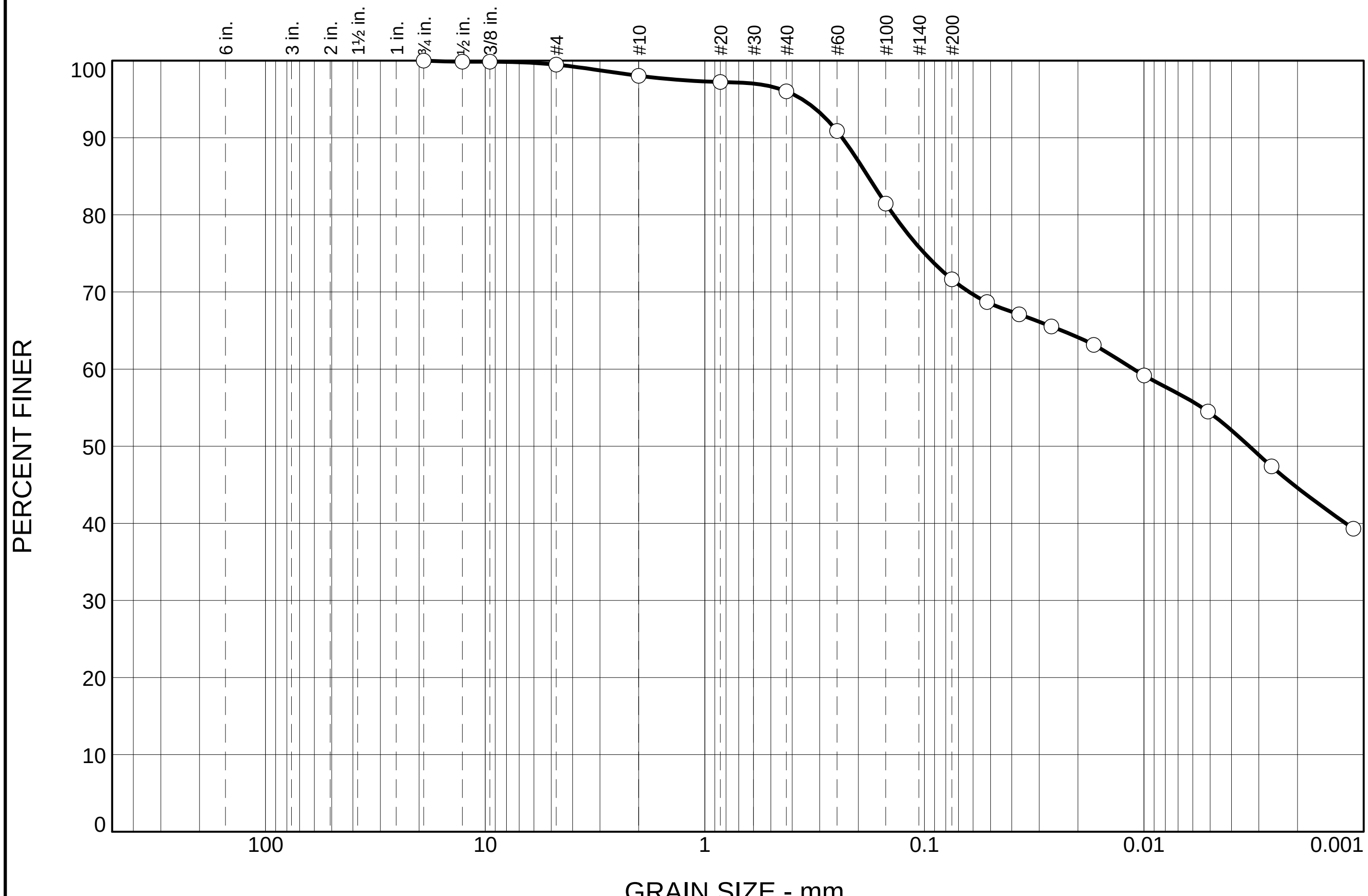
Location: TP05
Depth: 1'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	1.5	2.0	24.3	27.1	44.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	99.9		
0.375	99.9		
#4	99.5		
#10	98.0		
#20	97.2		
#40	96.0		
#60	90.9		
#100	81.5		
#200	71.7		
0.0519 mm.	68.7		
0.0370 mm.	67.1		
0.0264 mm.	65.5		
0.0169 mm.	63.1		
0.0100 mm.	59.2		
0.0051 mm.	54.5		
0.0026 mm.	47.4		
0.0011 mm.	39.3		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 12 LL= 42 PI= 30

Coefficients

D_{90}= 0.2367 D_{85}= 0.1805 D_{60}= 0.0112
D_{50}= 0.0033 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(19)

Remarks

As received moisture 11.7%

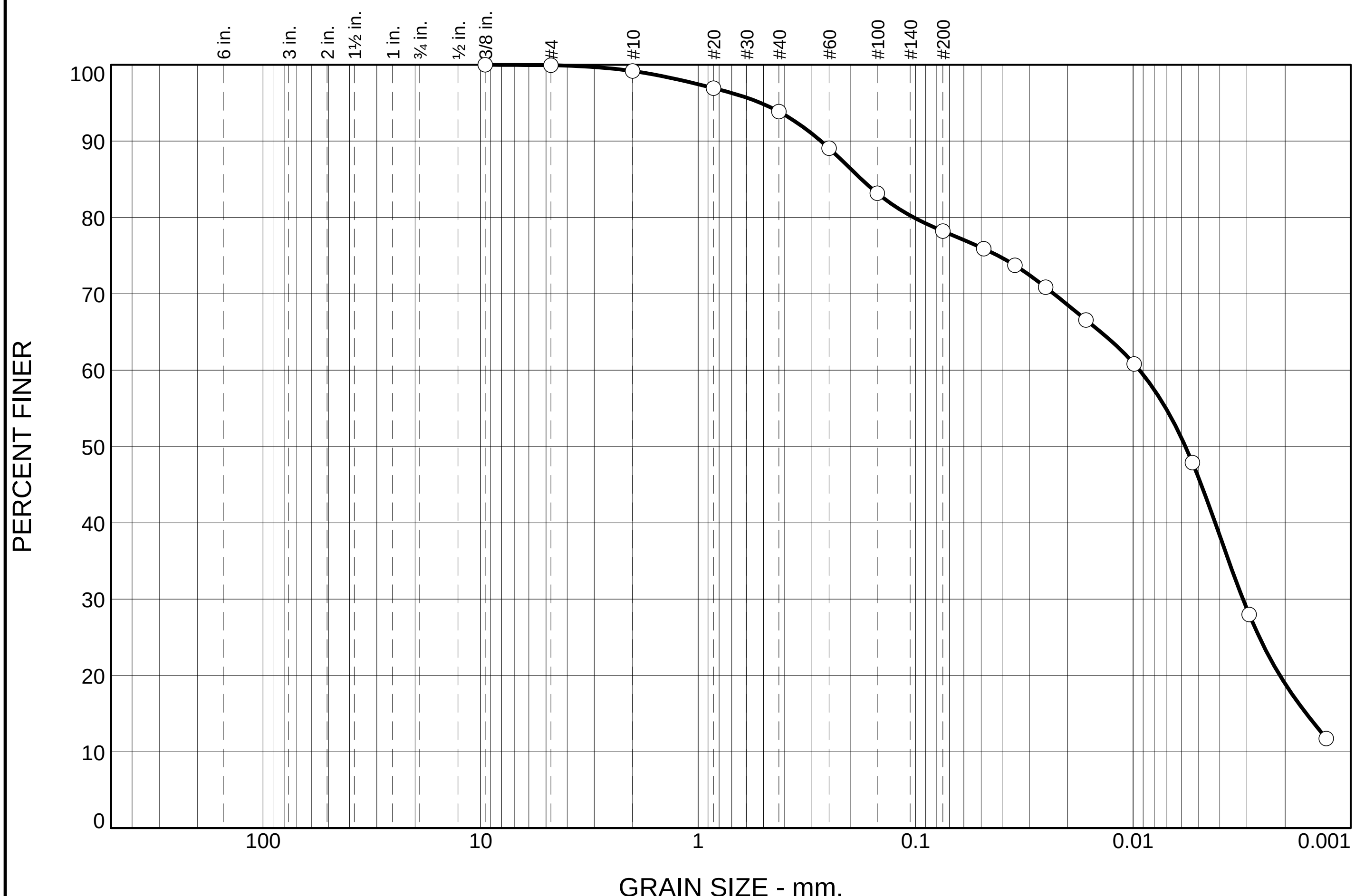
Location: TP05
Depth: 4'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.7	5.3	15.7	59.3	18.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	99.2		
#20	96.9		
#40	93.9		
#60	89.1		
#100	83.2		
#200	78.2		
0.0486 mm.	75.9		
0.0350 mm.	73.7		
0.0253 mm.	70.9		
0.0165 mm.	66.6		
0.0099 mm.	60.8		
0.0053 mm.	47.9		
0.0029 mm.	28.0		
0.0013 mm.	11.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 16 LL= 46 PI= 30

Coefficients

D_{90}= 0.2723 D_{85}= 0.1773 D_{60}= 0.0094
D_{50}= 0.0058 D_{30}= 0.0031 D_{15}= 0.0016
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(22)

Remarks

As received moisture 13.7%

Location: TP05
Depth: 7'

Date: 8/20/08

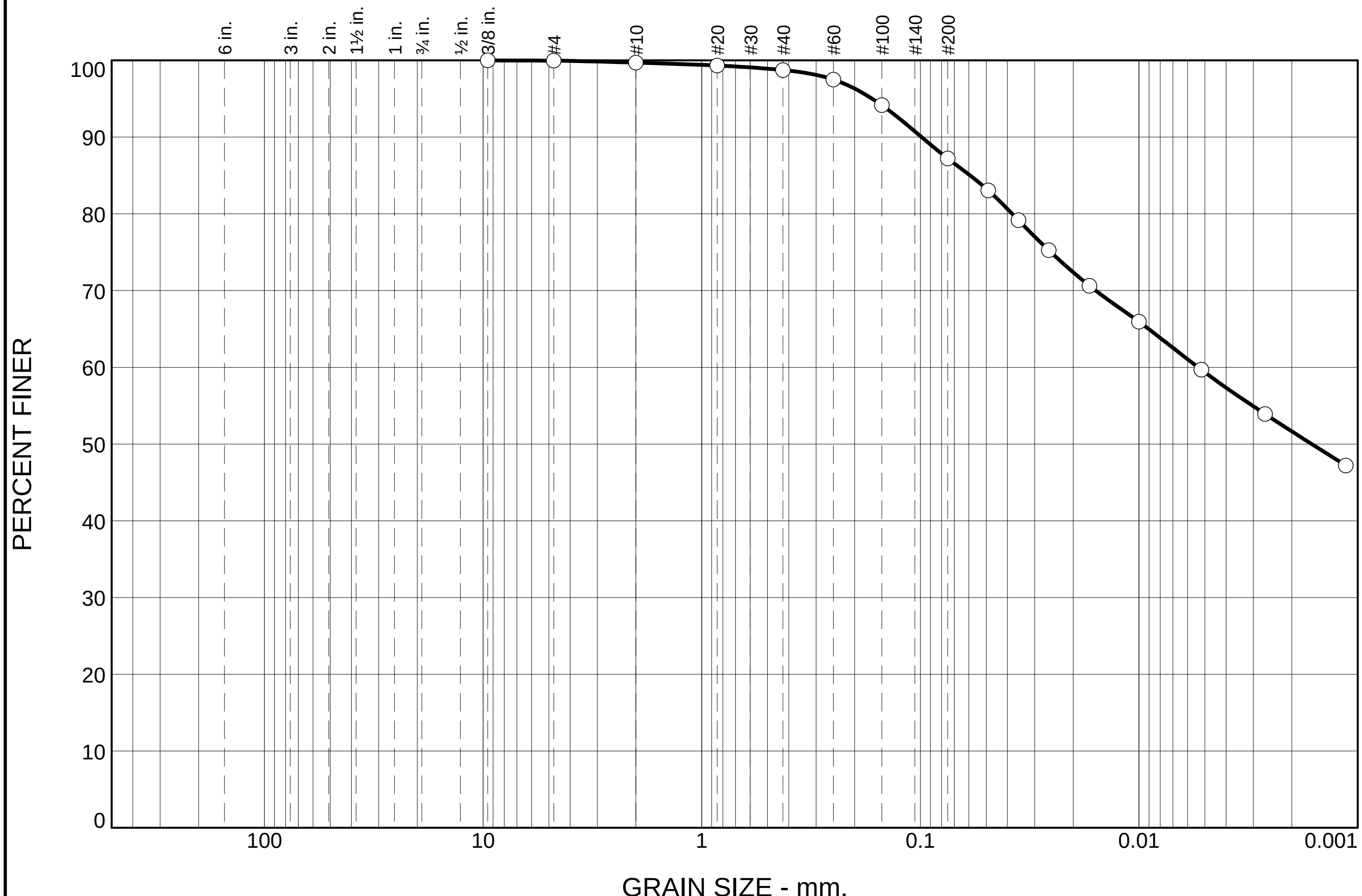
Knight Piésold CONSULTING

Client:

Project: Powertech

Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	1.0	11.5	35.5	51.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	100.0		
#10	99.7		
#20	99.3		
#40	98.7		
#60	97.5		
#100	94.2		
#200	87.2		
0.0489 mm.	83.1		
0.0356 mm.	79.2		
0.0259 mm.	75.3		
0.0168 mm.	70.6		
0.0100 mm.	65.9		
0.0052 mm.	59.7		
0.0027 mm.	53.9		
0.0011 mm.	47.2		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 15 LL= 47 PI= 32

Coefficients

D_{90}= 0.0986 D_{85}= 0.0592 D_{60}= 0.0054
D_{50}= 0.0016 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(28)

Remarks

As received moisture 10.3%

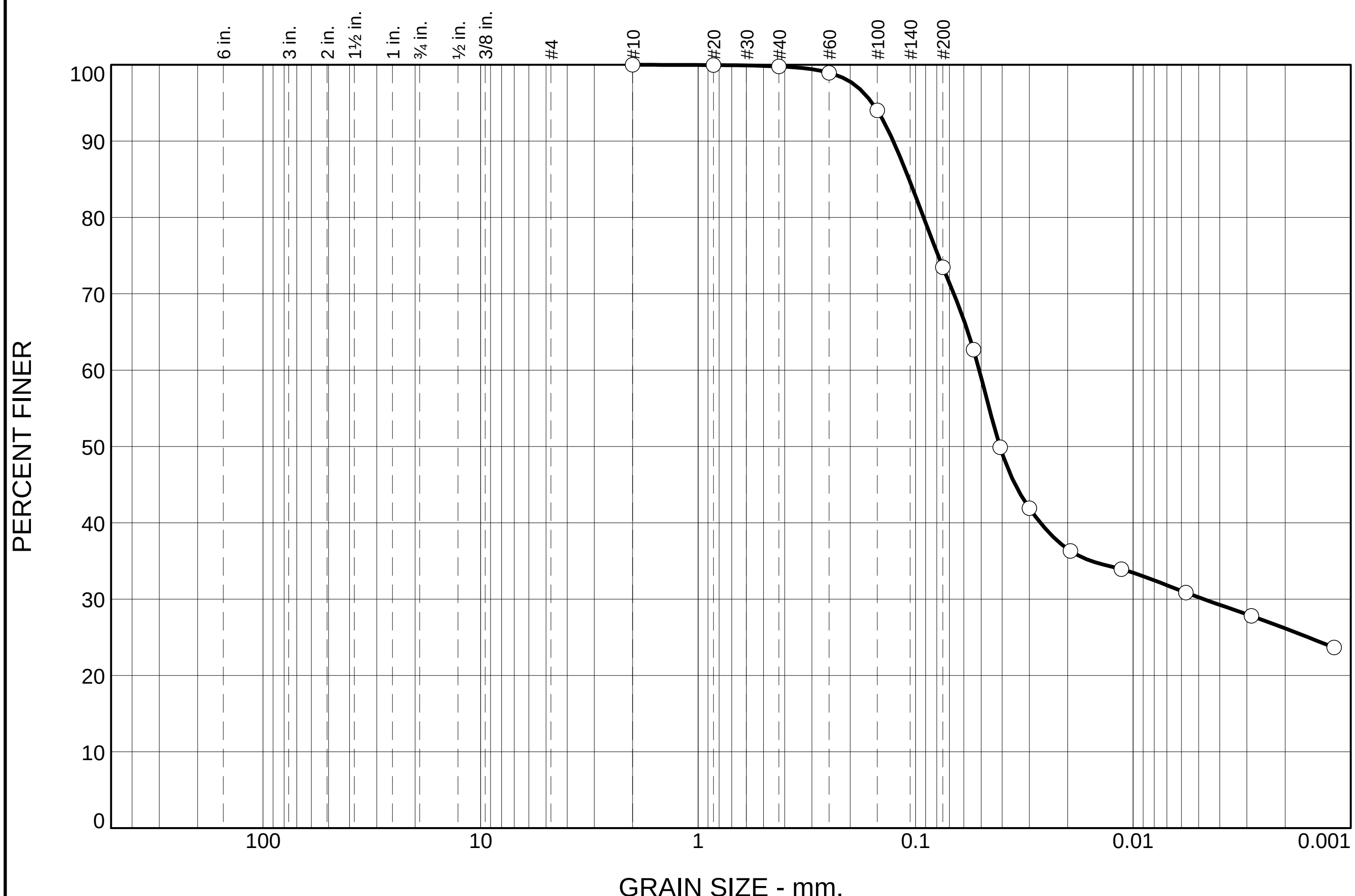
Location: TP06
Depth: 1'

Date: 8/20/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	26.3	47.3	26.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.8		
#60	98.9		
#100	94.0		
#200	73.5		
0.0541 mm.	62.7		
0.0409 mm.	49.9		
0.0300 mm.	41.9		
0.0194 mm.	36.3		
0.0113 mm.	33.9		
0.0057 mm.	30.9		
0.0029 mm.	27.8		
0.0012 mm.	23.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 13 LL= 30 PI= 17

Coefficients

D_{90}= 0.1267 D_{85}= 0.1071 D_{60}= 0.0510
D_{50}= 0.0410 D_{30}= 0.0047 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

As received moisture 6.0%. Natural dry density 110.1 pcf. Liner sample was damaged while attempting to extrude. No permeability values are reported.

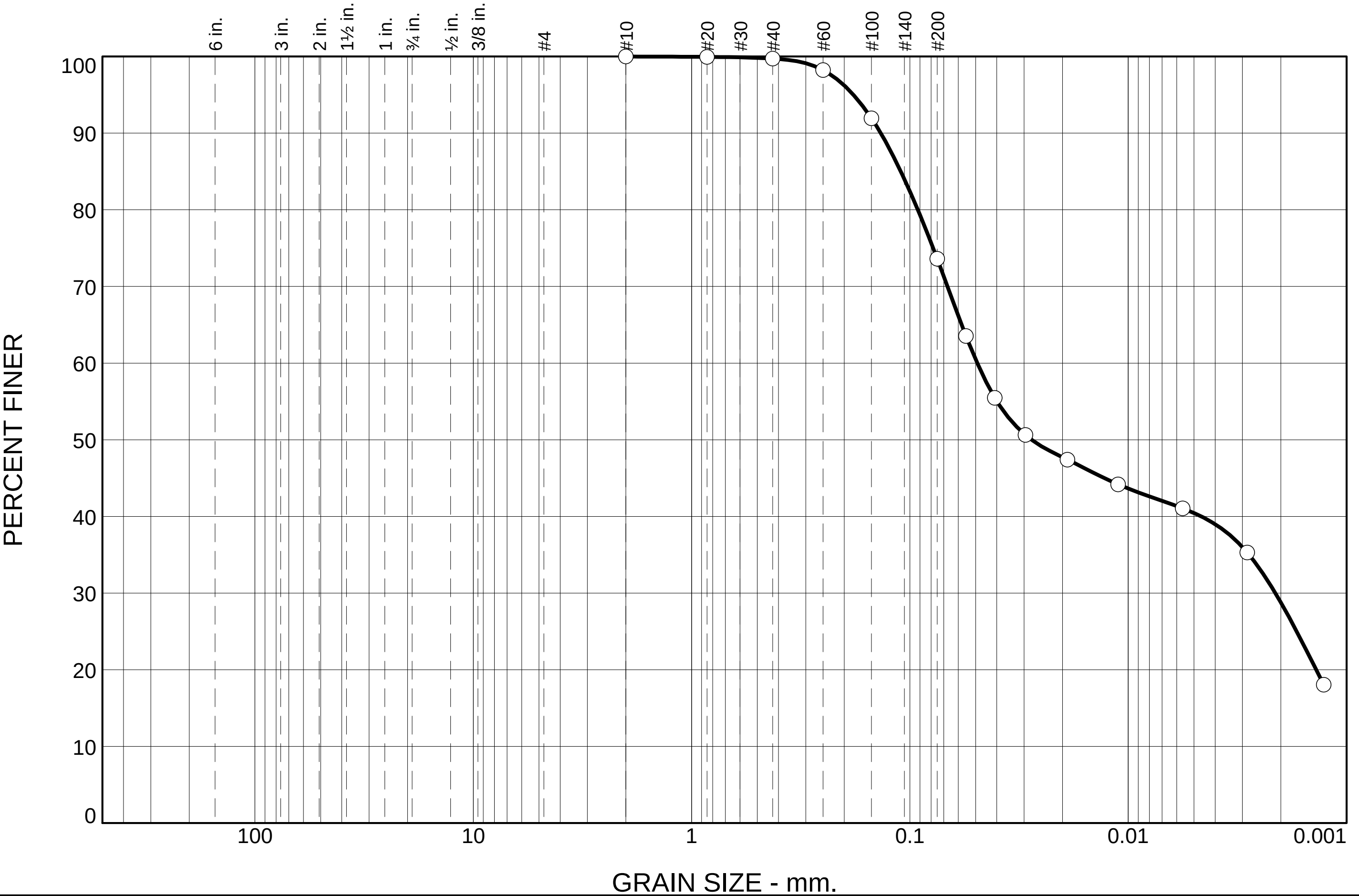
Location: TP06
Depth: 7'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	26.1	44.8	28.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.7		
#60	98.2		
#100	91.9		
#200	73.6		
0.0553 mm.	63.5		
0.0408 mm.	55.5		
0.0296 mm.	50.6		
0.0190 mm.	47.4		
0.0111 mm.	44.2		
0.0056 mm.	41.1		
0.0029 mm.	35.3		
0.0013 mm.	18.1		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 11 LL= 30 PI= 19

Coefficients

D_{90}= 0.1360 D_{85}= 0.1100 D_{60}= 0.0491
D_{50}= 0.0277 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

As received moisture 15.7%

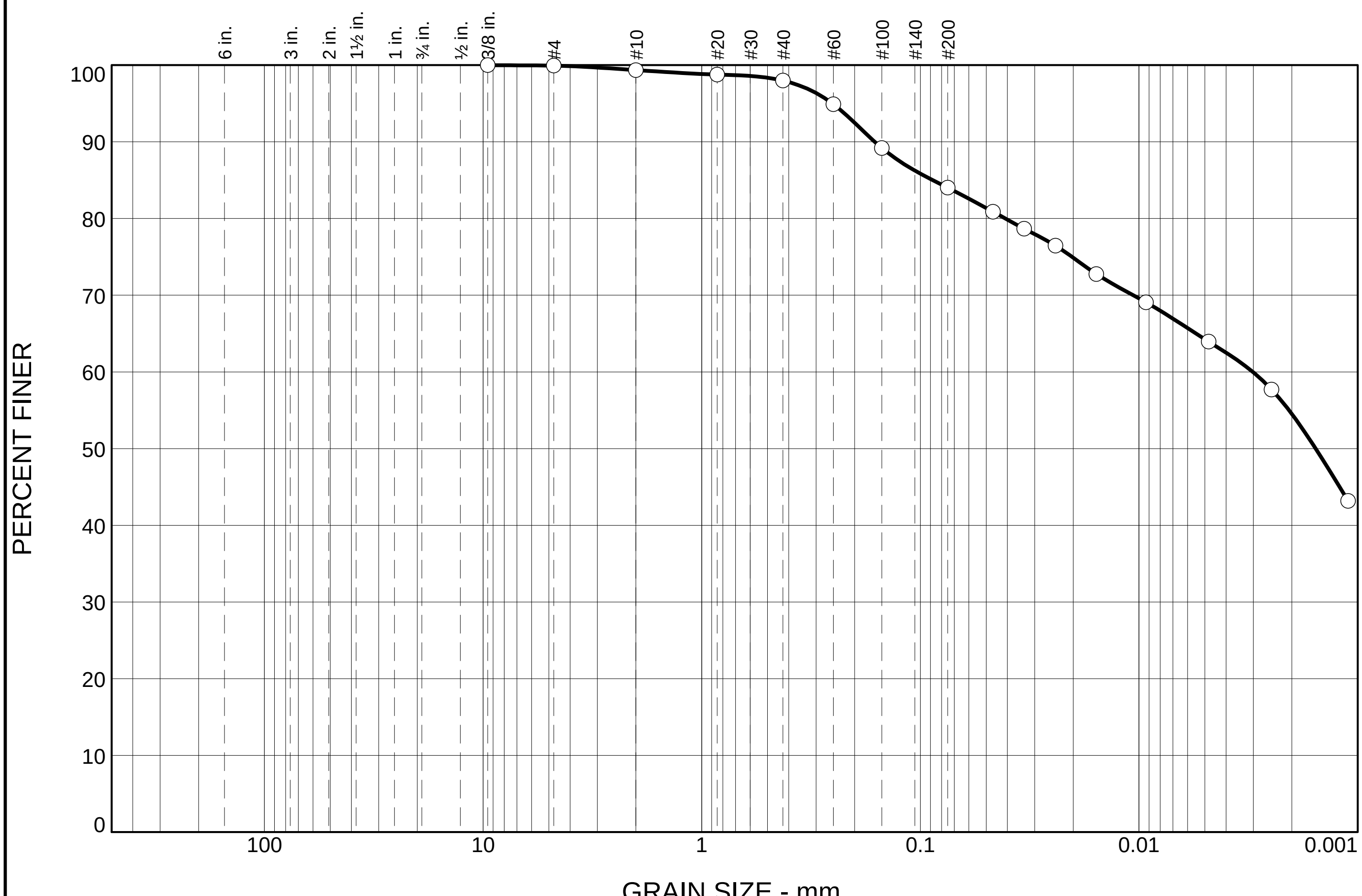
Location: TP06
Depth: 10'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.5	1.4	14.0	29.5	54.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	99.4		
#20	98.8		
#40	98.0		
#60	94.9		
#100	89.2		
#200	84.0		
0.0465 mm.	80.9		
0.0335 mm.	78.7		
0.0241 mm.	76.5		
0.0157 mm.	72.8		
0.0093 mm.	69.1		
0.0048 mm.	63.9		
0.0025 mm.	57.7		
0.0011 mm.	43.2		

* (no specification provided)

Soil Description

fat clay with sand

Atterberg Limits

PL= 17 LL= 52 PI= 35

Coefficients

D_{90}= 0.1616 D_{85}= 0.0877 D_{60}= 0.0030
D_{50}= 0.0016 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(30)

Remarks

As received moisture 12.4%

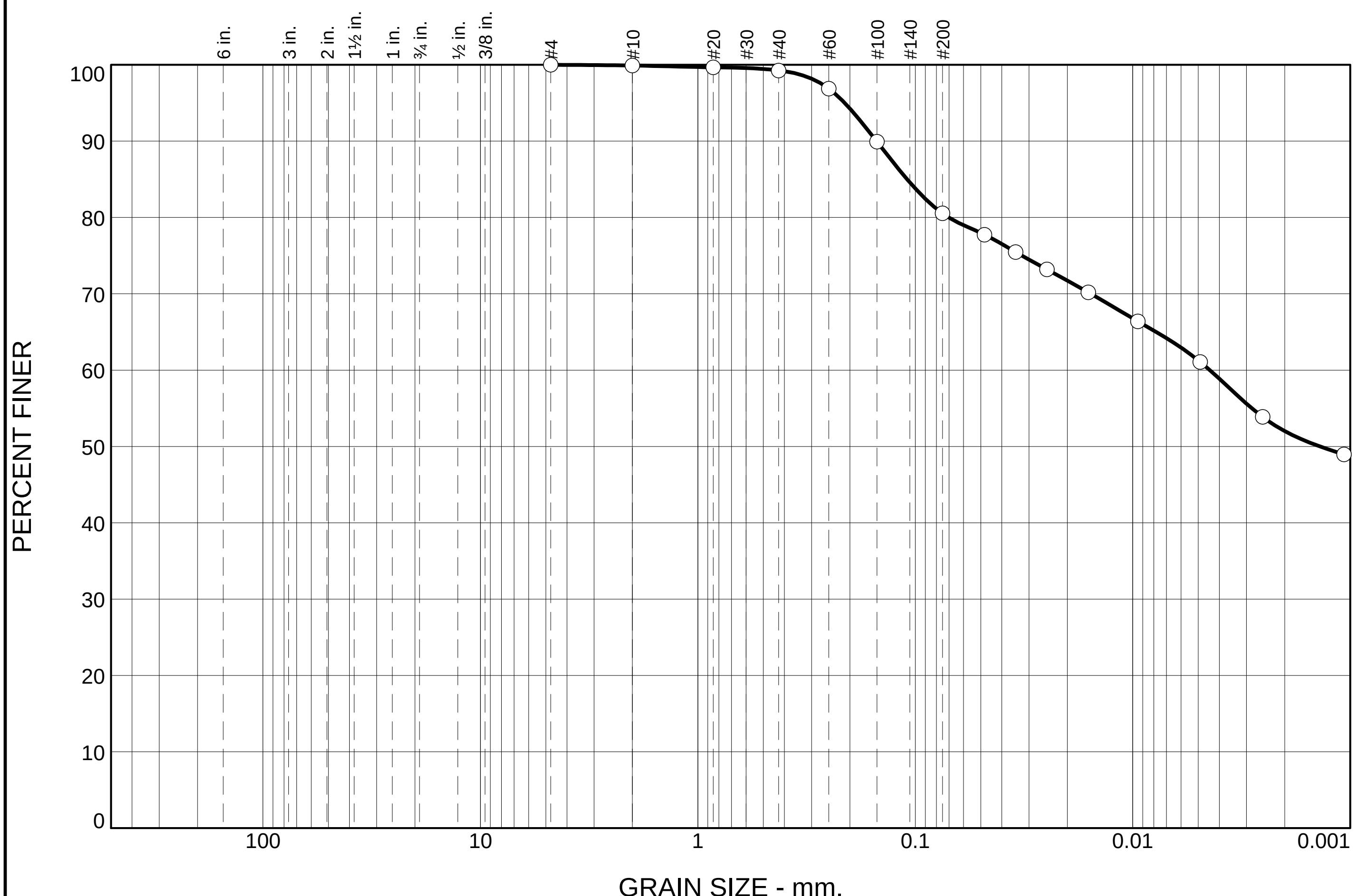
Location: TP07
Depth: 1'

Date: 8/20/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.6	18.8	28.5	52.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.7		
#40	99.3		
#60	96.9		
#100	89.9		
#200	80.5		
0.0480 mm.	77.7		
0.0345 mm.	75.5		
0.0248 mm.	73.2		
0.0160 mm.	70.2		
0.0095 mm.	66.4		
0.0049 mm.	61.1		
0.0025 mm.	53.9		
0.0011 mm.	49.0		

* (no specification provided)

Soil Description

fat clay with sand

Atterberg Limits

PL= 15 LL= 53 PI= 38

Coefficients

D_{90}= 0.1507 D_{85}= 0.1089 D_{60}= 0.0044
D_{50}= 0.0014 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(30)

Remarks

As received moisture 15.28%

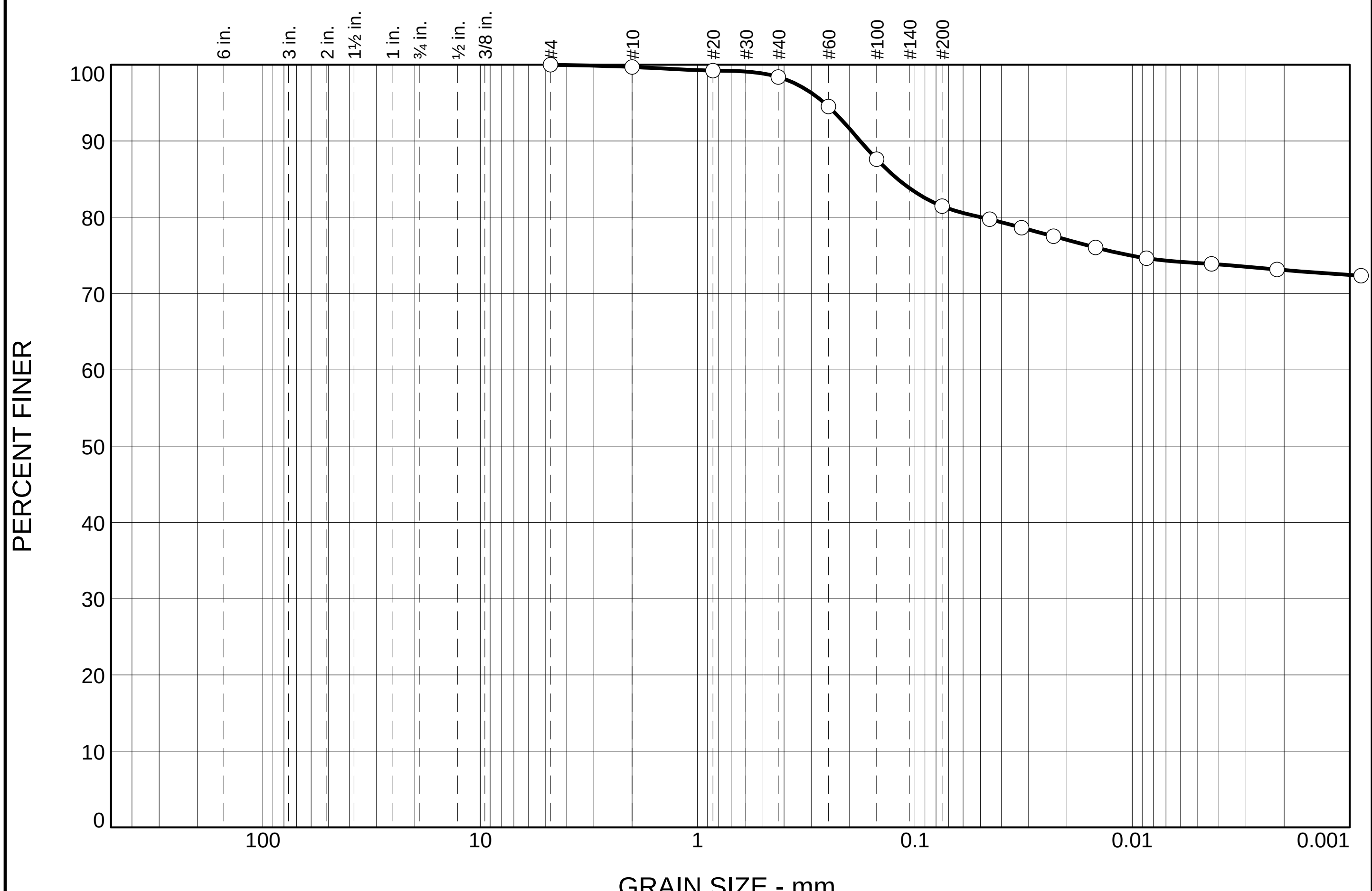
Location: TP07
Depth: 6'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	1.3	16.9	8.4	73.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	99.2		
#40	98.4		
#60	94.5		
#100	87.6		
#200	81.5		
0.0453 mm.	79.7		
0.0323 mm.	78.6		
0.0231 mm.	77.5		
0.0147 mm.	76.0		
0.0086 mm.	74.6		
0.0043 mm.	73.9		
0.0022 mm.	73.2		
0.0009 mm.	72.3		

* (no specification provided)

Soil Description

fat clay with sand

Atterberg Limits

PL= 15 LL= 55 PI= 40

Coefficients

D_{90}= 0.1784 D_{85}= 0.1198 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(33)

Remarks

As received moisture 19.3%

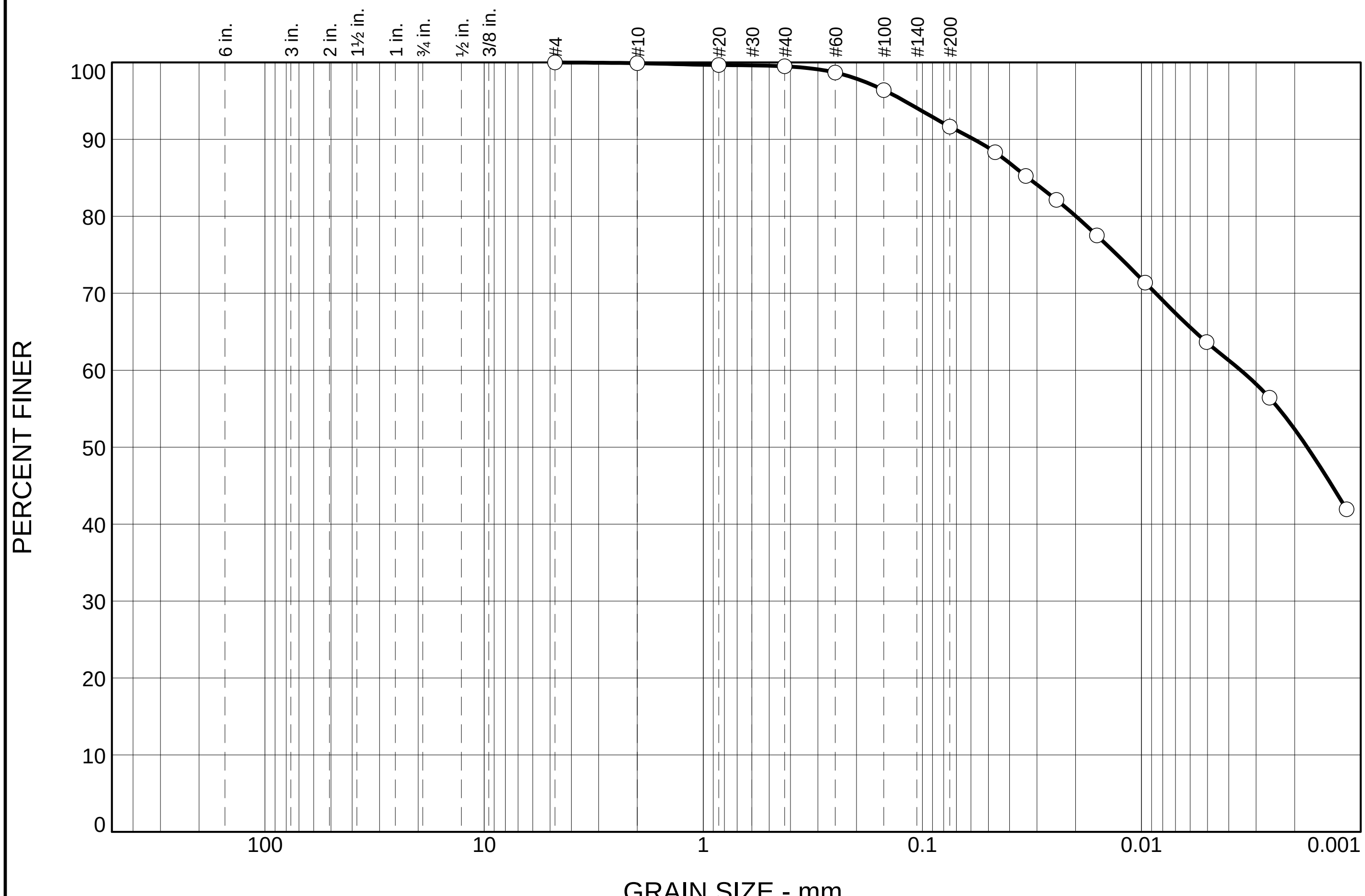
Location: TP07
Depth: 10'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.4	7.8	39.4	52.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.7		
#40	99.5		
#60	98.7		
#100	96.4		
#200	91.7		
0.0465 mm.	88.3		
0.0337 mm.	85.2		
0.0244 mm.	82.1		
0.0160 mm.	77.5		
0.0096 mm.	71.4		
0.0050 mm.	63.6		
0.0026 mm.	56.4		
0.0012 mm.	41.9		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 19 LL= 49 PI= 30

Coefficients

D_{90}= 0.0581 D_{85}= 0.0329 D_{60}= 0.0035
D_{50}= 0.0018 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(29)

Remarks

As received moisture 10.9%

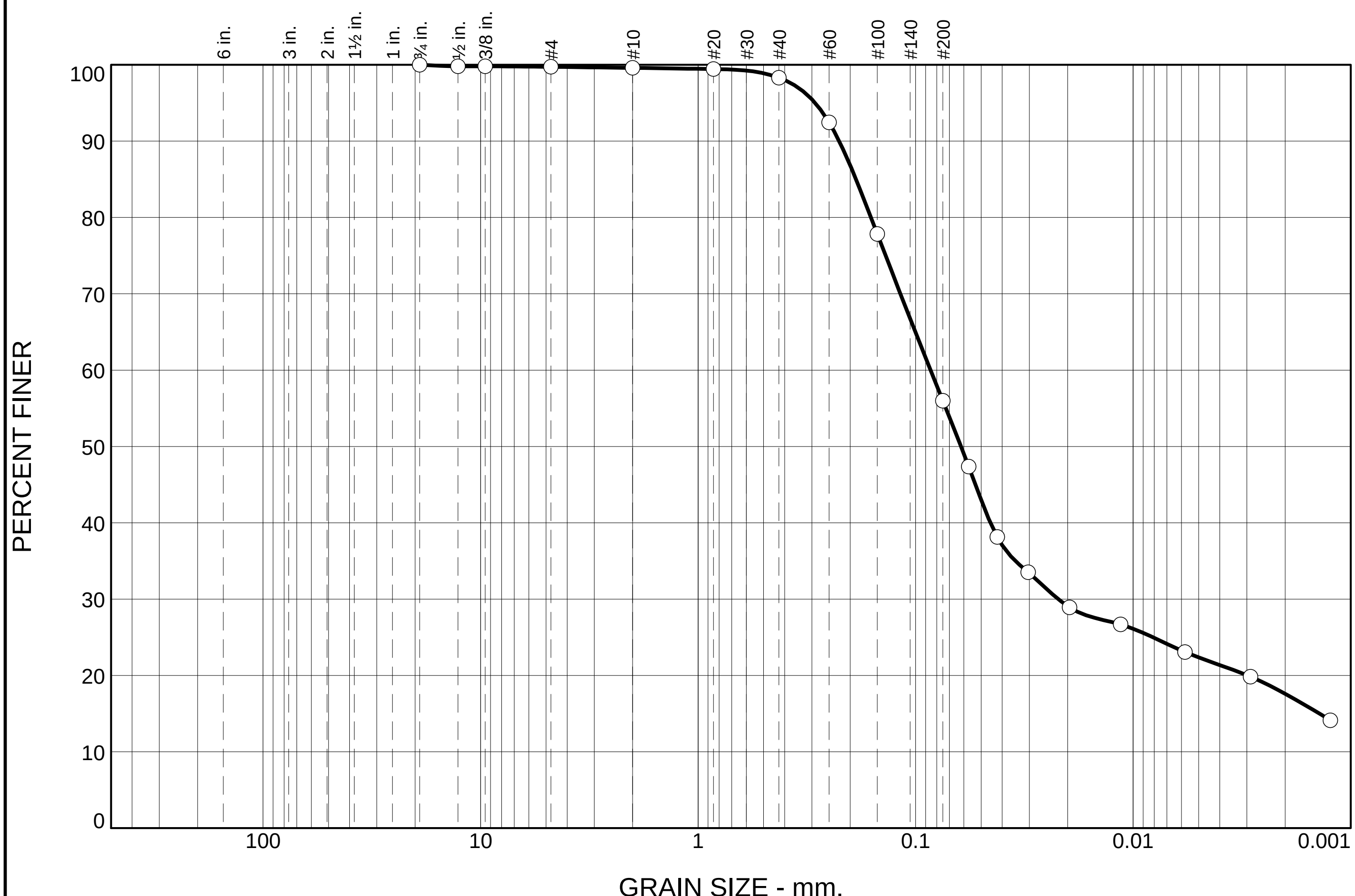
Location: TP08
Depth: 2'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.1	1.3	42.3	38.4	17.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	99.8		
0.375	99.8		
#4	99.7		
#10	99.6		
#20	99.4		
#40	98.3		
#60	92.5		
#100	77.8		
#200	56.0		
0.0570 mm.	47.4		
0.0421 mm.	38.1		
0.0304 mm.	33.5		
0.0196 mm.	28.9		
0.0114 mm.	26.7		
0.0058 mm.	23.1		
0.0029 mm.	19.8		
0.0012 mm.	14.1		

* (no specification provided)

Soil Description

sandy lean clay

Atterberg Limits

PL= 12 LL= 21 PI= 9

Coefficients

D_{90}= 0.2247 D_{85}= 0.1880 D_{60}= 0.0854
D_{50}= 0.0619 D_{30}= 0.0221 D_{15}= 0.0014
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(2)

Remarks

As received moisture 4.3%

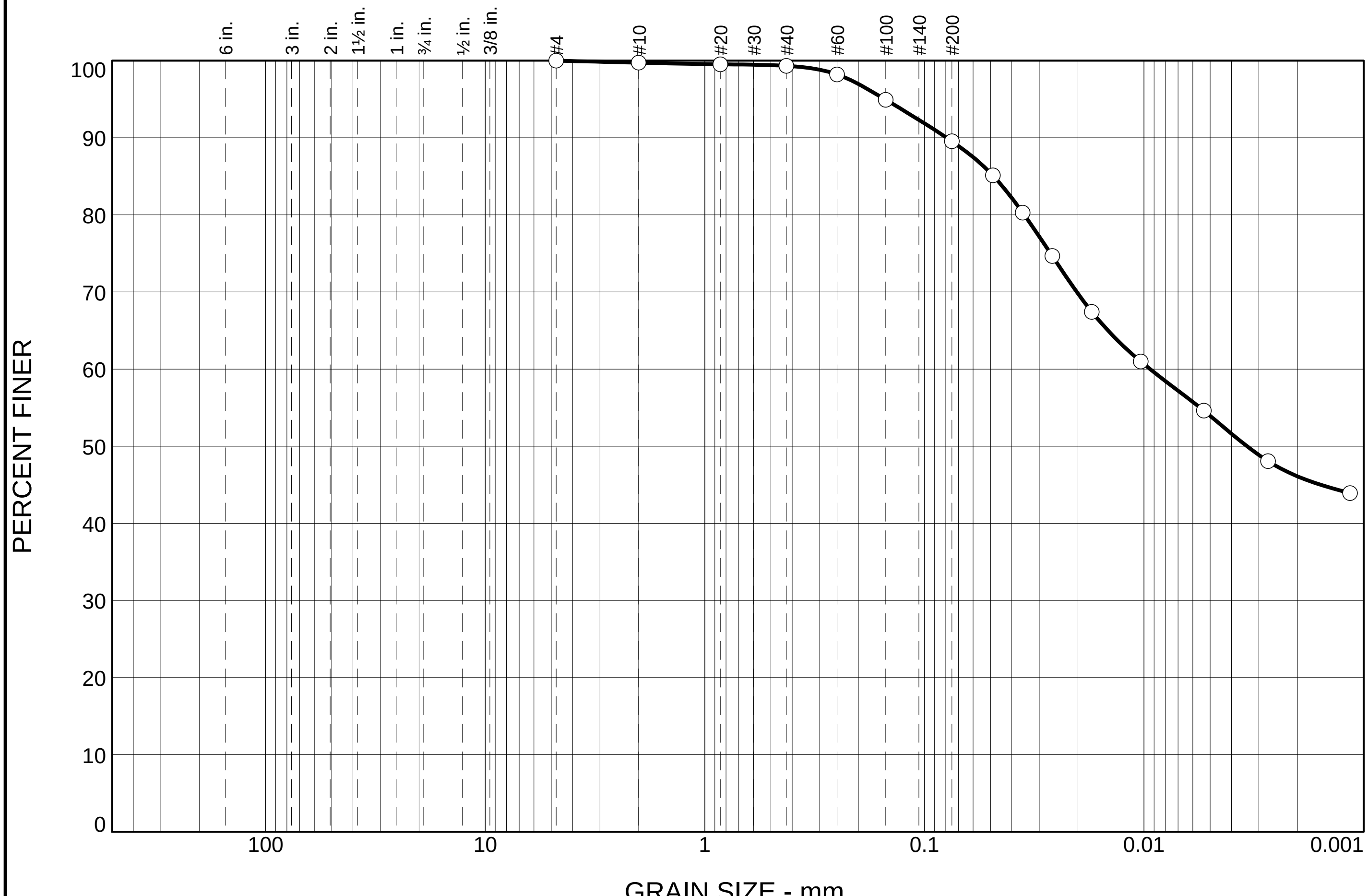
Location: TP08
Depth: 6'

Date: 7/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	0.4	9.8	43.4	46.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	99.5		
#40	99.3		
#60	98.2		
#100	94.9		
#200	89.5		
0.0488 mm.	85.1		
0.0357 mm.	80.3		
0.0262 mm.	74.7		
0.0173 mm.	67.4		
0.0103 mm.	61.0		
0.0053 mm.	54.6		
0.0027 mm.	48.1		
0.0012 mm.	43.9		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 14 LL= 44 PI= 30

Coefficients

D_{90}= 0.0792 D_{85}= 0.0483 D_{60}= 0.0094
D_{50}= 0.0034 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(27)

Remarks

As received moisture 8.9%

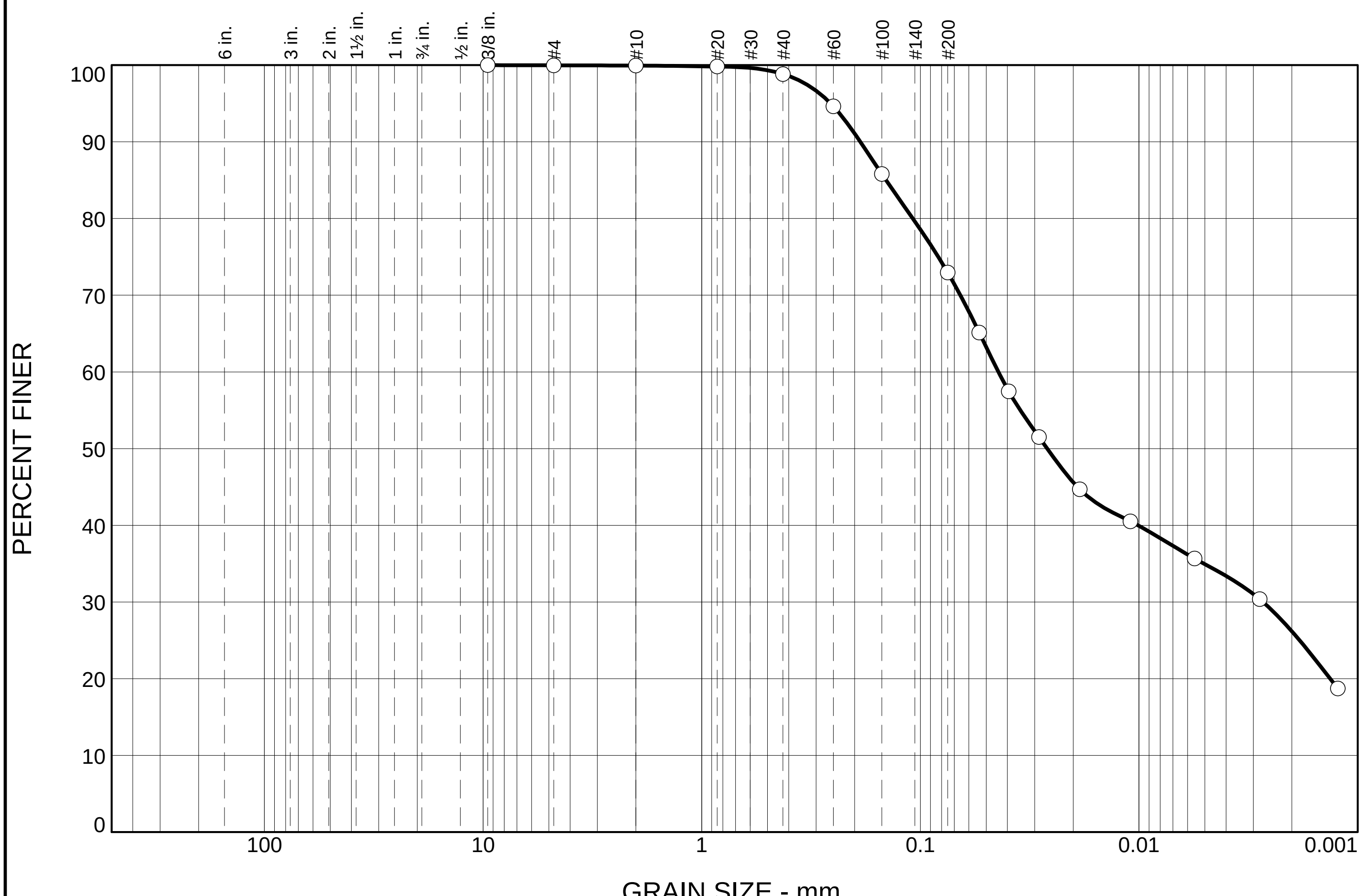
Location: TP09
Depth: 1'

Date: 8/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.1	25.8	46.8	26.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.8		
#60	94.6		
#100	85.8		
#200	73.0		
0.0538 mm.	65.1		
0.0395 mm.	57.5		
0.0287 mm.	51.5		
0.0187 mm.	44.7		
0.0109 mm.	40.5		
0.0056 mm.	35.7		
0.0028 mm.	30.4		
0.0012 mm.	18.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 10 LL= 33 PI= 23

Coefficients

D_{90}= 0.1881 D_{85}= 0.1436 D_{60}= 0.0440
D_{50}= 0.0263 D_{30}= 0.0027 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(14)

Remarks

As received moisture 12.2%

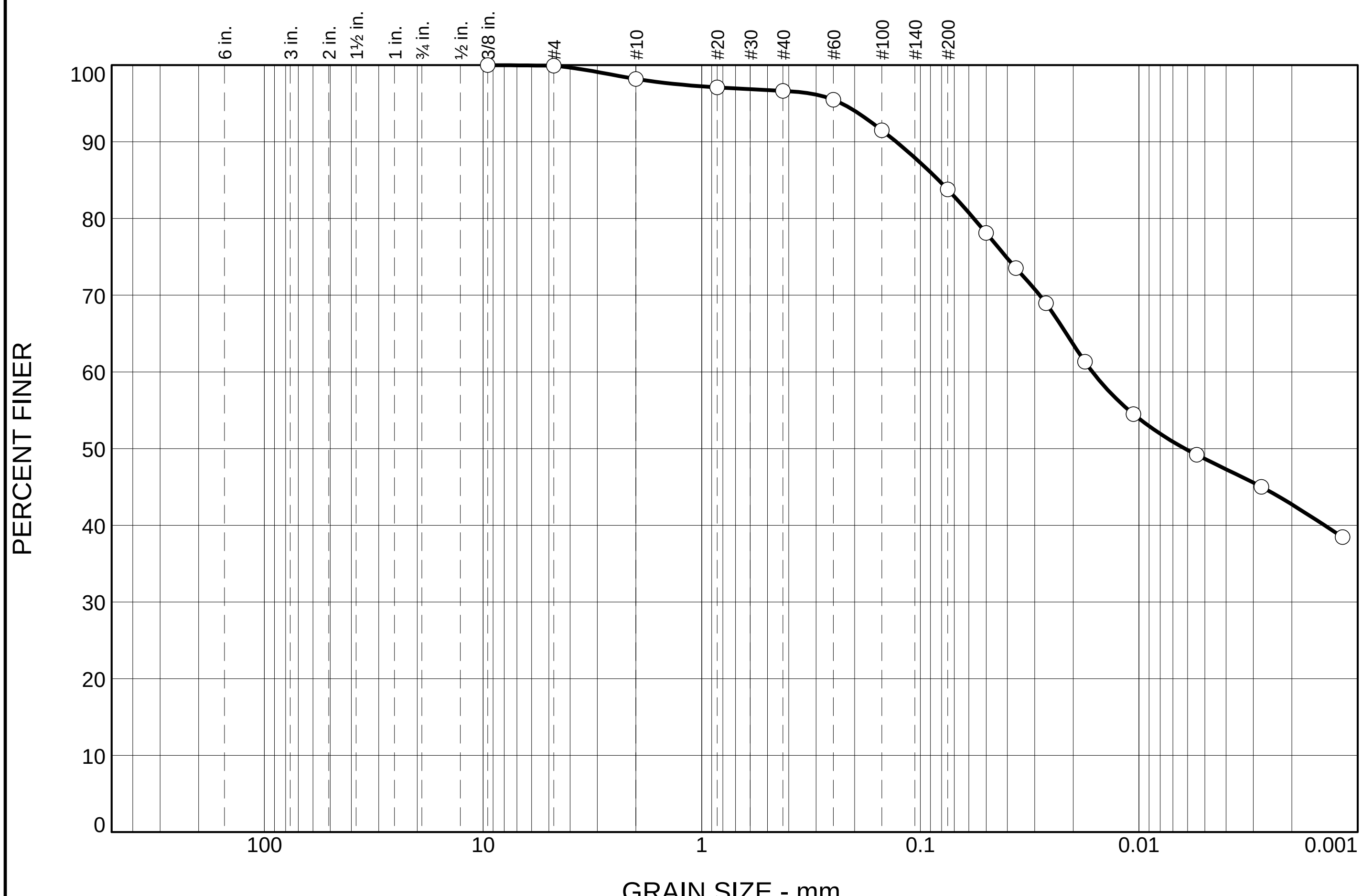
Location: TP09
Depth: 4'

Date: 7/21/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	1.7	1.6	12.8	41.1	42.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	99.9		
#10	98.2		
#20	97.1		
#40	96.6		
#60	95.5		
#100	91.5		
#200	83.8		
0.0500 mm.	78.1		
0.0365 mm.	73.5		
0.0266 mm.	68.9		
0.0177 mm.	61.3		
0.0106 mm.	54.5		
0.0054 mm.	49.2		
0.0028 mm.	45.0		
0.0012 mm.	38.5		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 14 LL= 43 PI= 29

Coefficients

D_{90}= 0.1289 D_{85}= 0.0825 D_{60}= 0.0163
D_{50}= 0.0062 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(24)

Remarks

As received moisture 10.9%

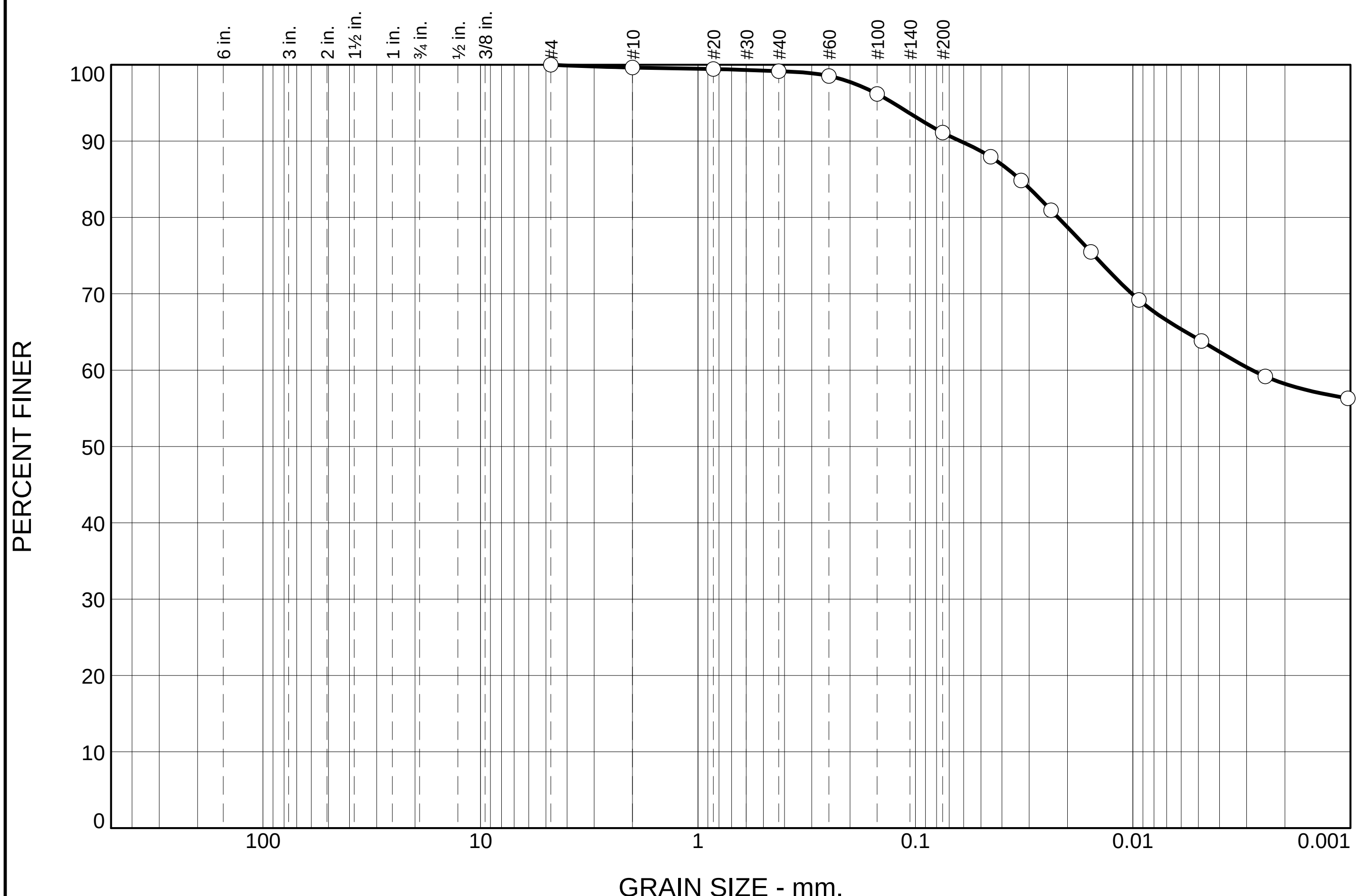
Location: TP10
Depth: 1'

Date: 8/20/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	0.4	8.1	32.9	58.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	99.4		
#40	99.2		
#60	98.5		
#100	96.2		
#200	91.1		
0.0451 mm.	88.0		
0.0327 mm.	84.8		
0.0238 mm.	80.9		
0.0156 mm.	75.5		
0.0094 mm.	69.2		
0.0048 mm.	63.8		
0.0025 mm.	59.2		
0.0010 mm.	56.3		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 11 LL= 42 PI= 31

Coefficients

D_{90}= 0.0621 D_{85}= 0.0331 D_{60}= 0.0028
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(28)

Remarks

As received moisture 19.2%

Location: TP10
Depth: 7'

Date: 7/18/08

Knight Piésold CONSULTING

Client:
Project: Powertech
Project No: DV102-279.02 **Fig.**

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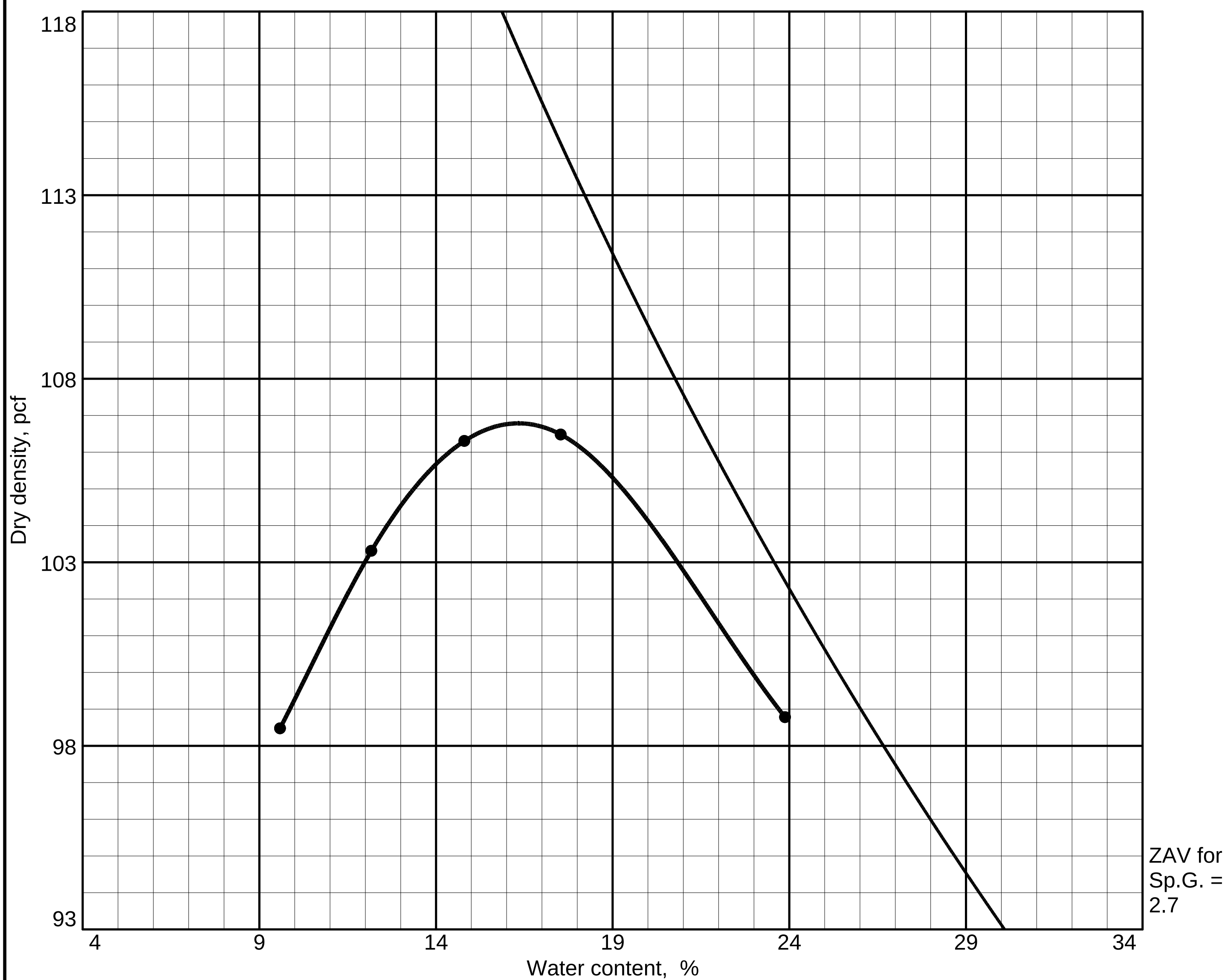
Appendix C-2

Compaction Test Results

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
7'	CL	A-7-6(23)		2.7	43	32	0.0	77.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.8 pcf Optimum moisture = 16.3 %	lean clay with sand

Project No. DV102- **Client:**

Project: Powertech

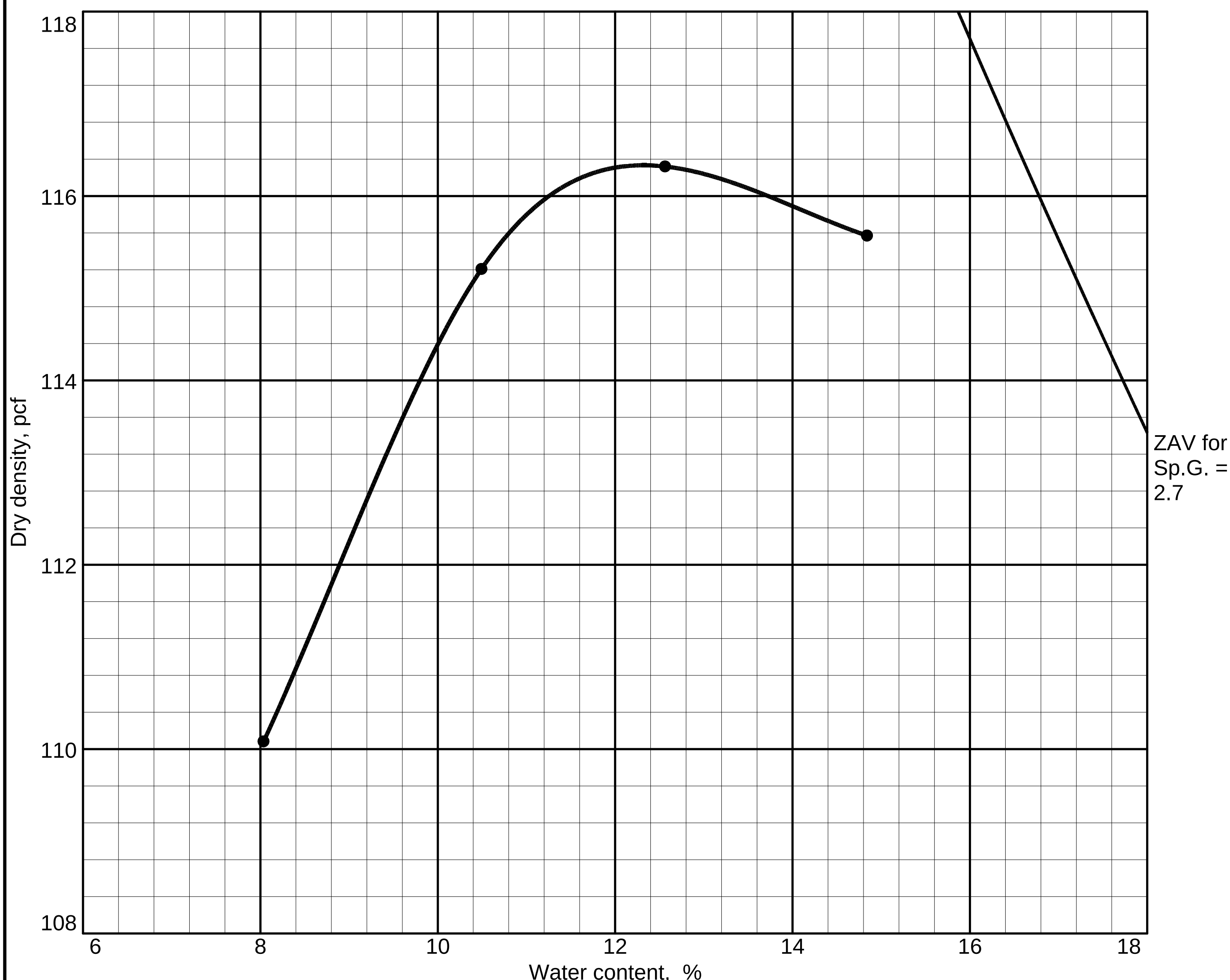
● **Location:** TP02

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
6'	CL	A-4(2)		2.7	21	9	0.3	56.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.3 pcf Optimum moisture = 12.3 %	sandy lean clay

Project No. DV102- **Client:**

Project: Powertech

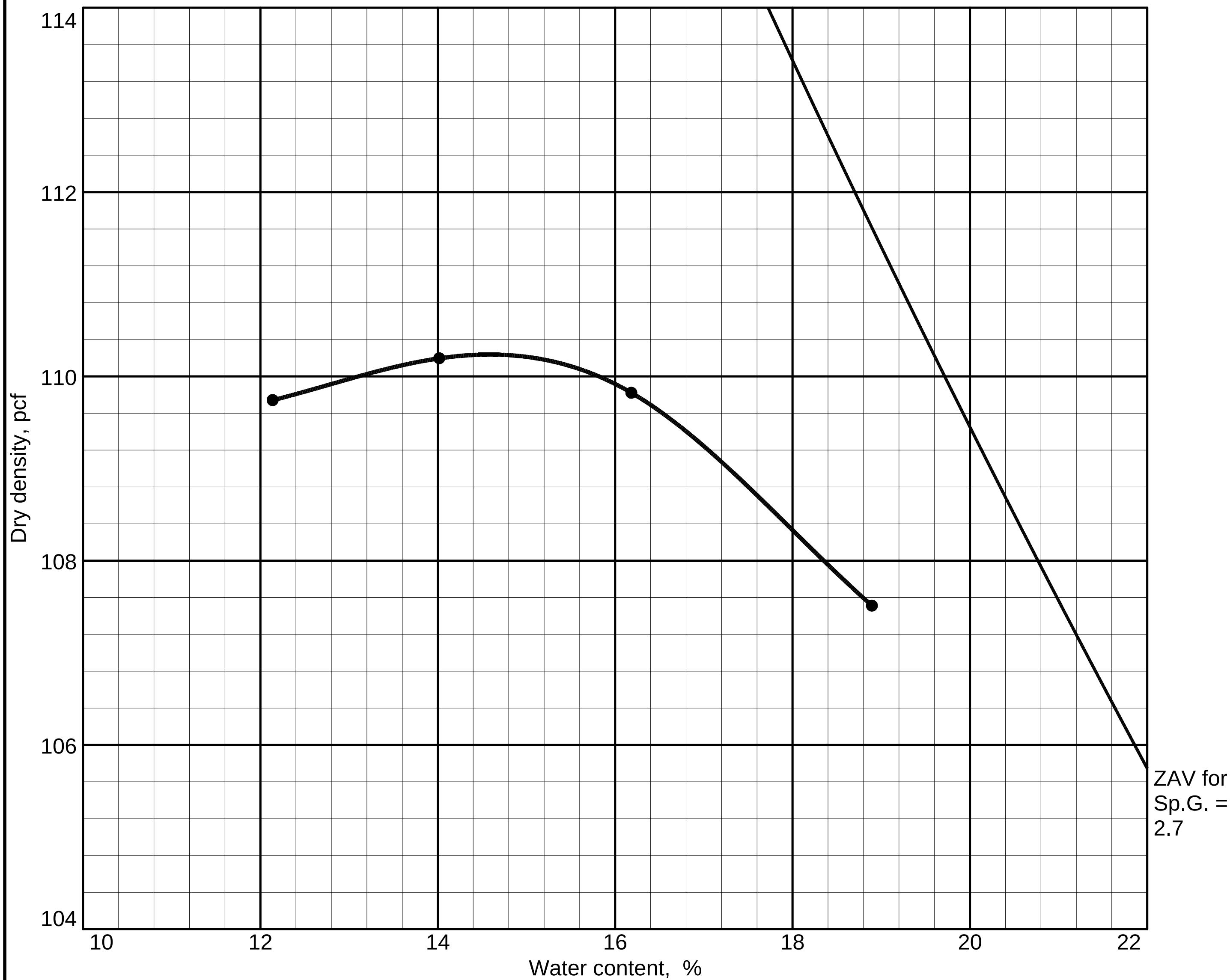
● **Location:** TP08

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
4'	CL	A-6(14)		2.7	33	23	0.0	73.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.2 pcf Optimum moisture = 14.6 %	lean clay with sand

Project No. DV102- **Client:**

Project: Powertech

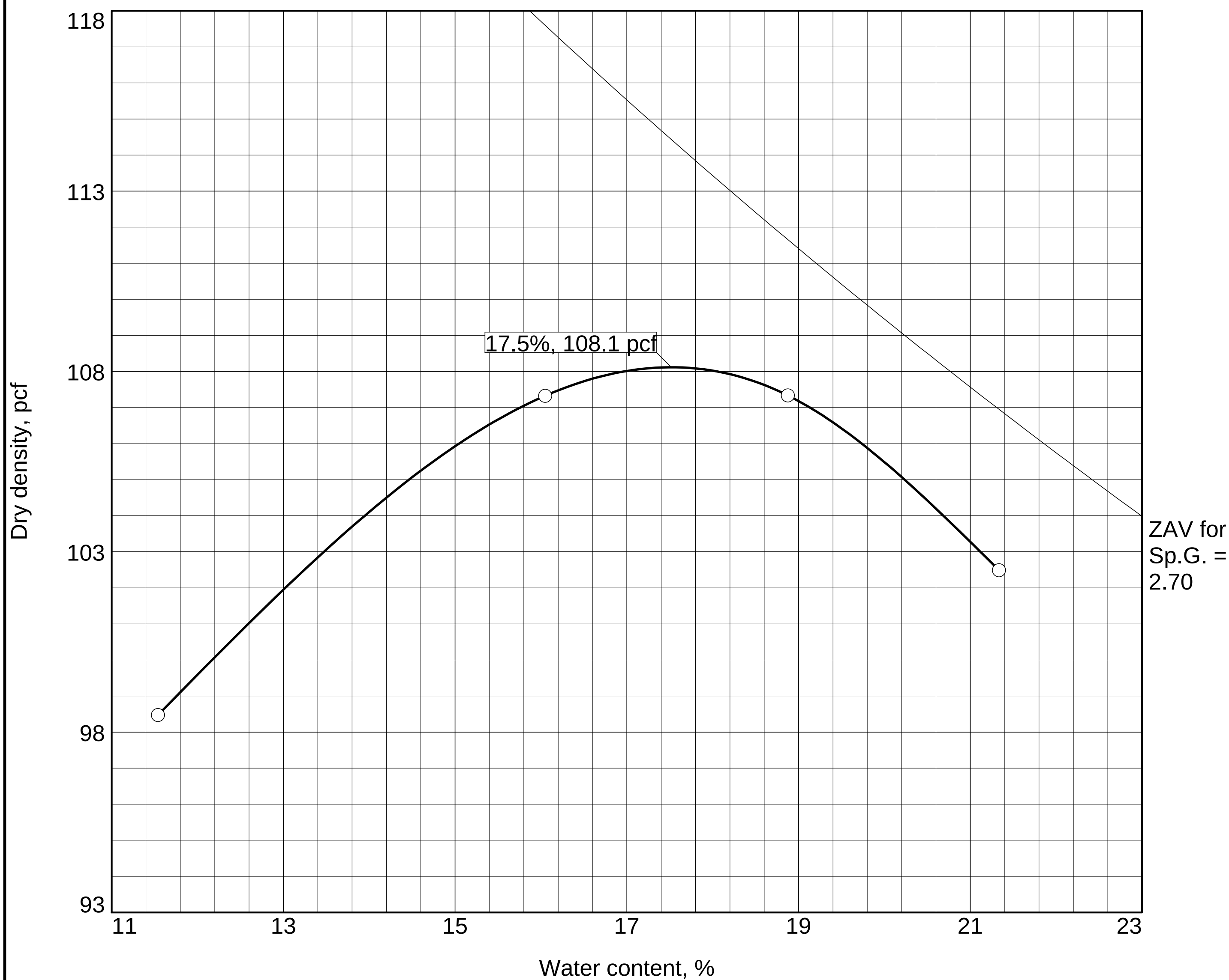
● **Location:** TP09

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1'	CL	A-7-6(27)		2.7	44	30	0.0	89.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.1 pcf Optimum moisture = 17.5 %	lean clay

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

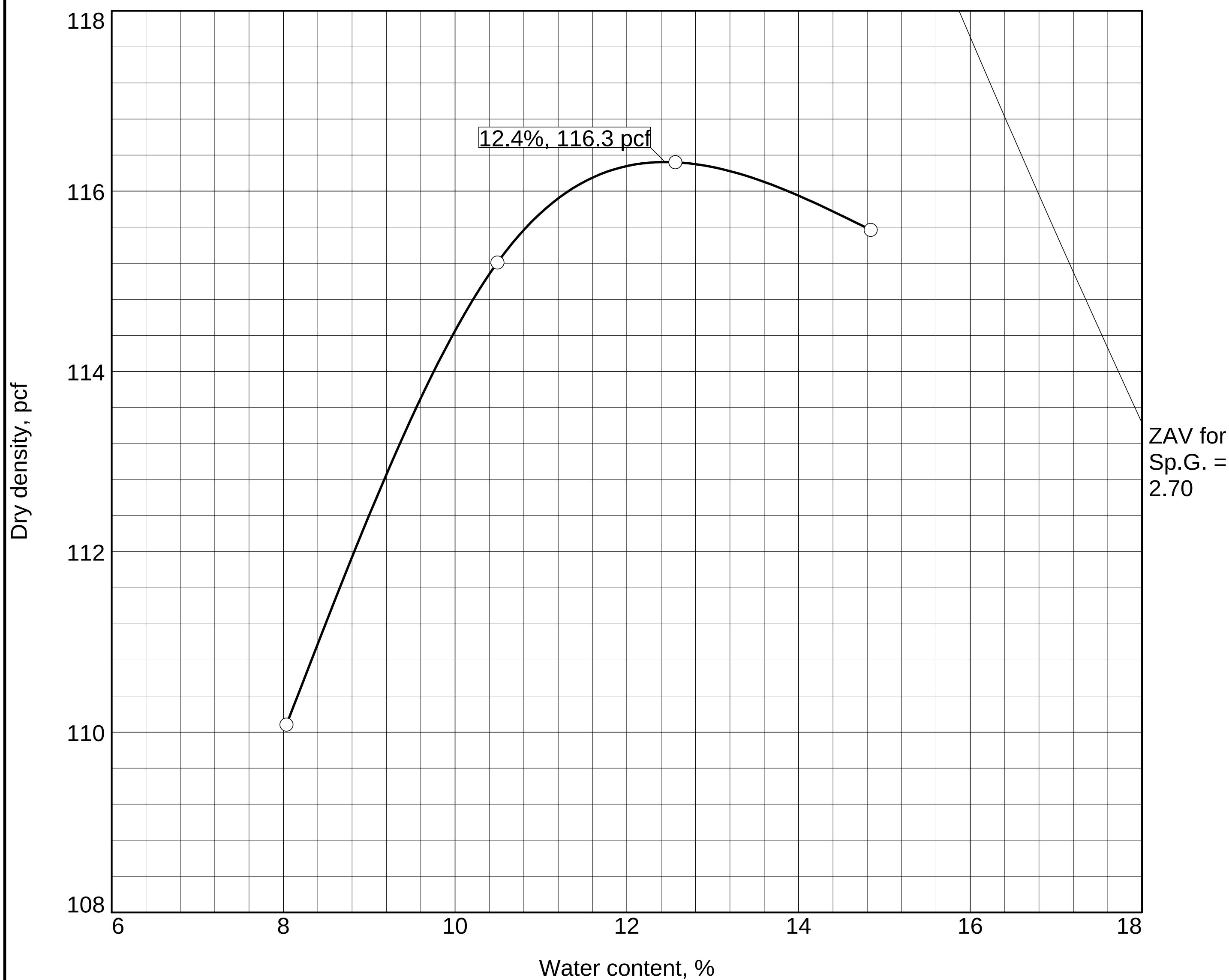
○ **Location:** TP09 @ 1' **Depth:** 1'

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
6'	CL	A-4(2)		2.7	21	9	0.3	56.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.3 pcf Optimum moisture = 12.4 %	sandy lean clay

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

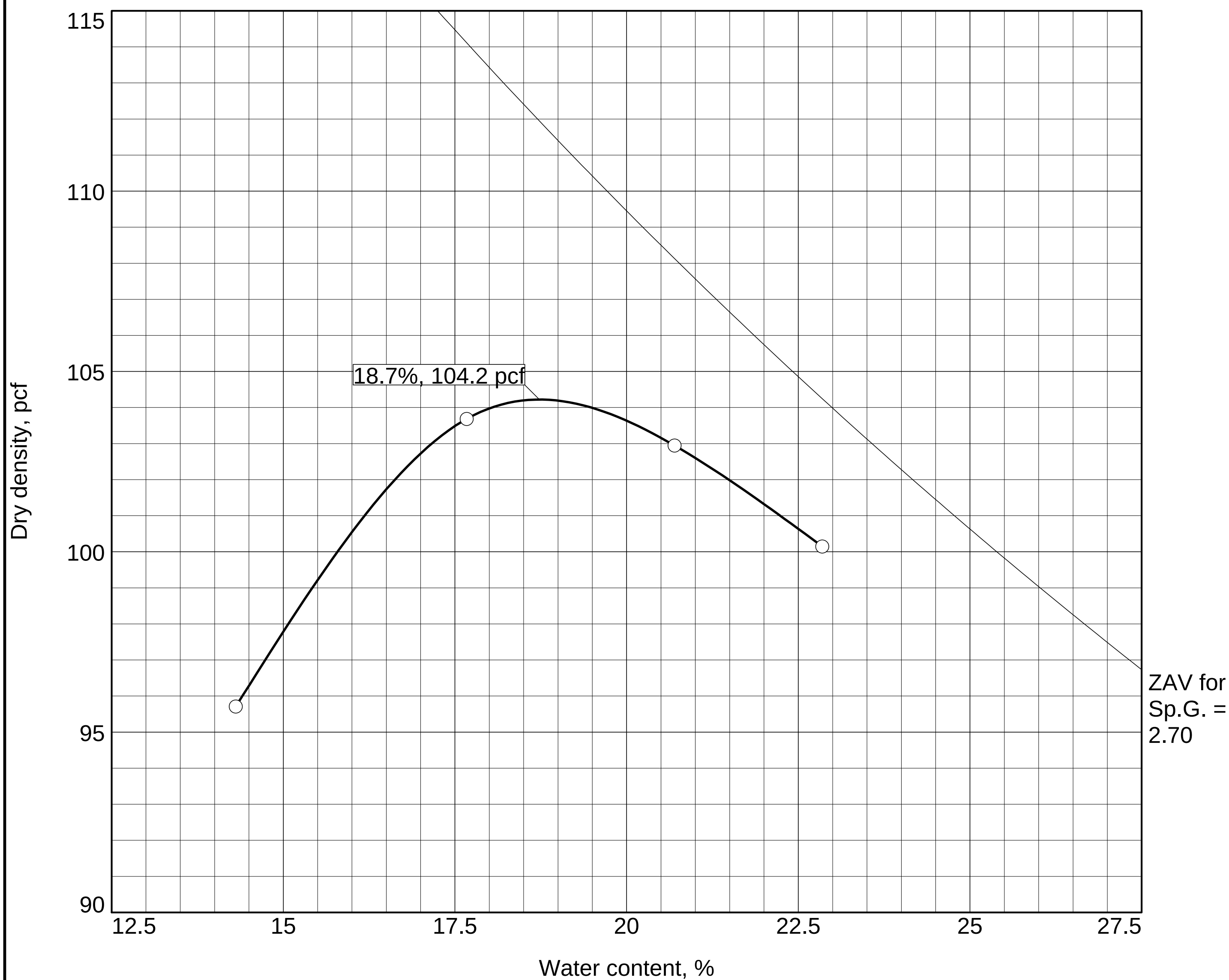
○ **Location:** TP08 @ 6' **Depth:** 6'

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
2'	CL	A-7-6(29)		2.7	49	30	0.0	91.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 104.2 pcf Optimum moisture = 18.7 %	lean clay

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

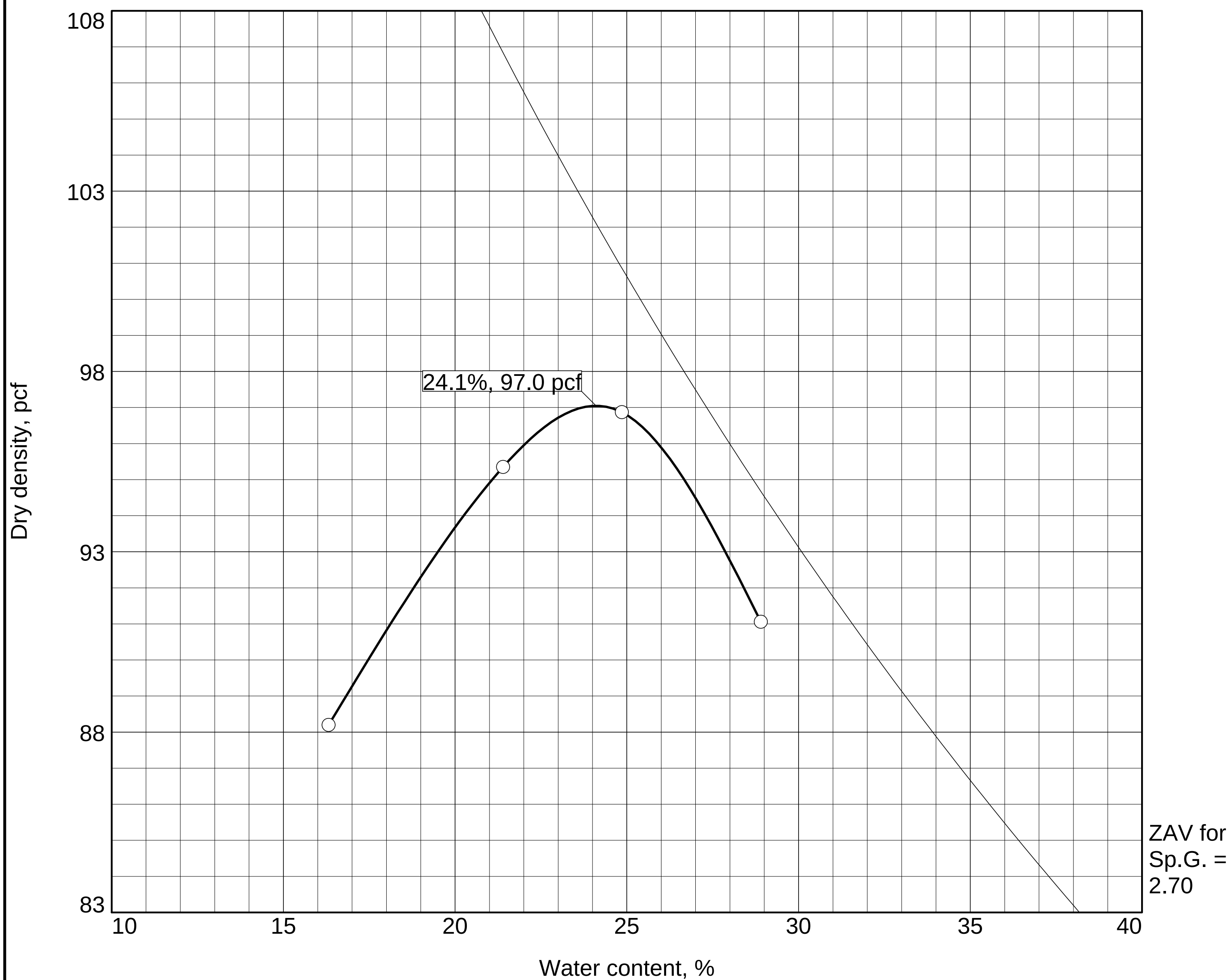
○ **Location:** TP08 @ 2' **Depth:** 2'

Knight Piésold CONSULTING

Remarks:

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
7'	CH	A-7-6(57)		2.7	69	52	0.0	98.1

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 97.0 pcf Optimum moisture = 24.1 %	fat clay

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

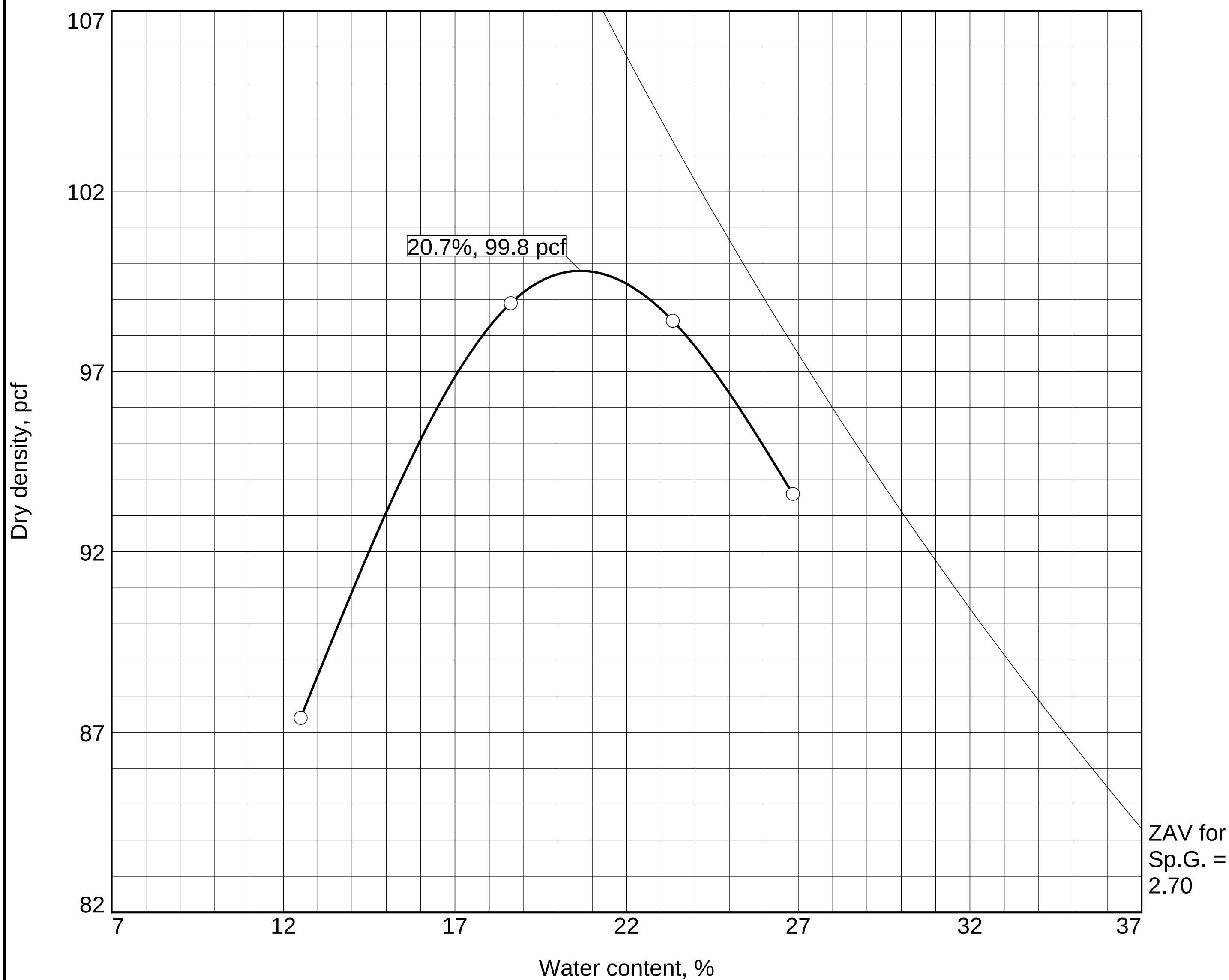
○ **Location:** TP03 @ 7' **Depth:** 7'

Knight Piésold CONSULTING

Remarks:

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1'	CH	A-7-6(28)		2.7	50	35	0.0	79.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 99.8 pcf Optimum moisture = 20.7 %	fat clay with sand

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

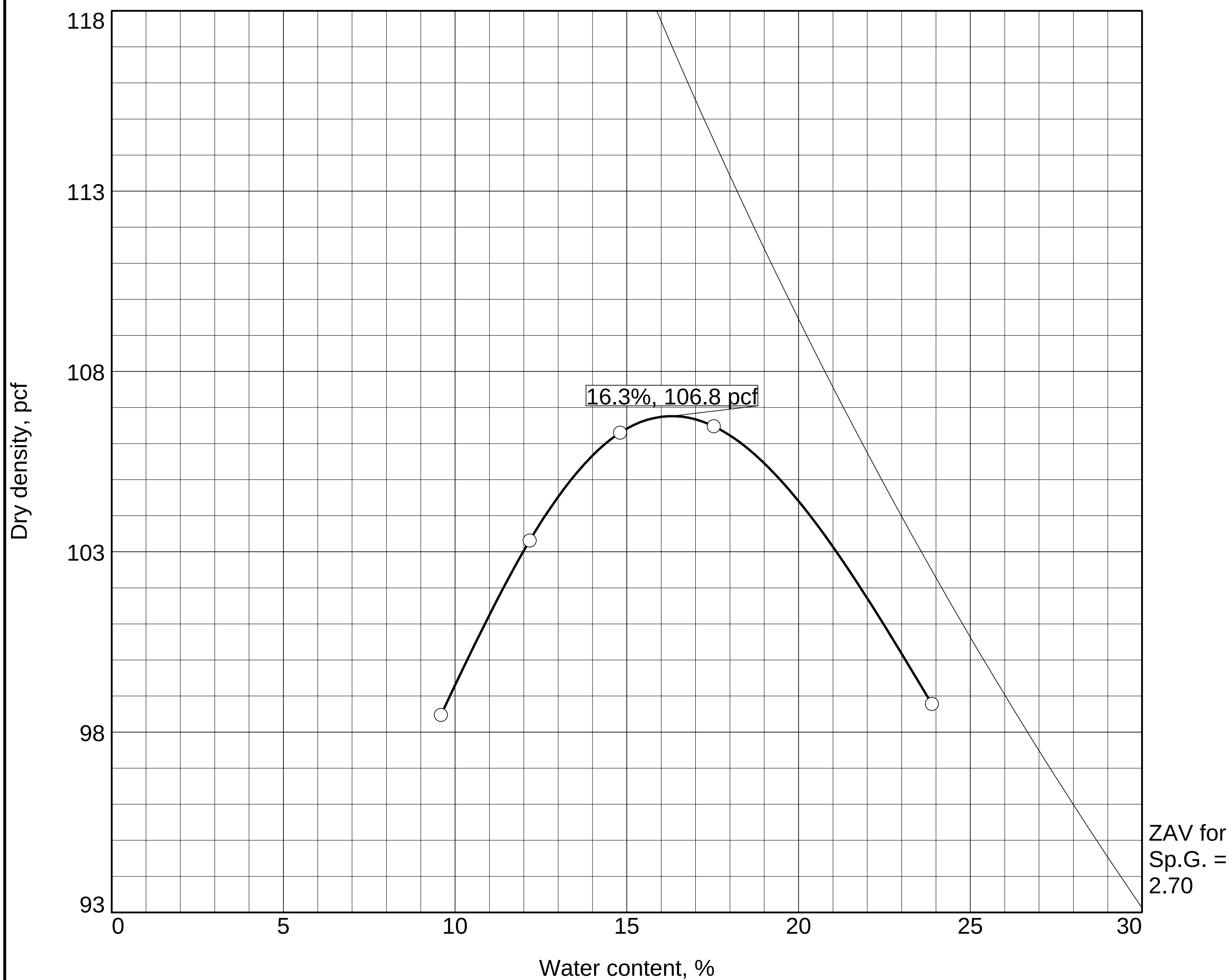
○ **Location:** TP03 @ 1' **Depth:** 1'

Knight Piésold CONSULTING

Remarks:

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
7'	CL	A-7-6(23)		2.7	43	32	0.0	77.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.8 pcf Optimum moisture = 16.3 %	lean clay with sand

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

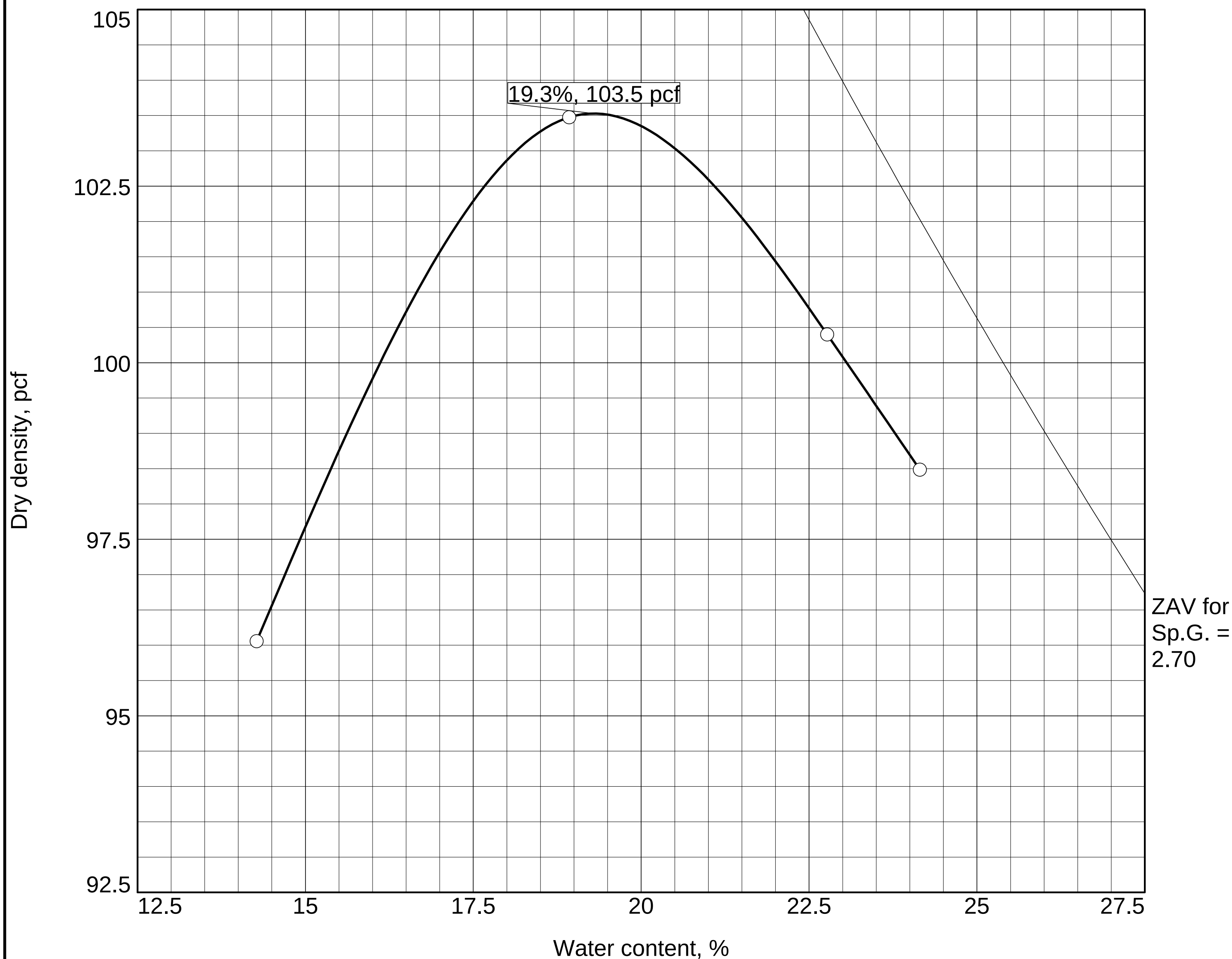
○ **Location:** TP02 @ 7' **Depth:** 7'

Knight Piésold CONSULTING

Remarks:

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1'	CL	A-7-6(27)		2.7	48	31	0.0	84.8

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 103.5 pcf Optimum moisture = 19.3 %	lean clay

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

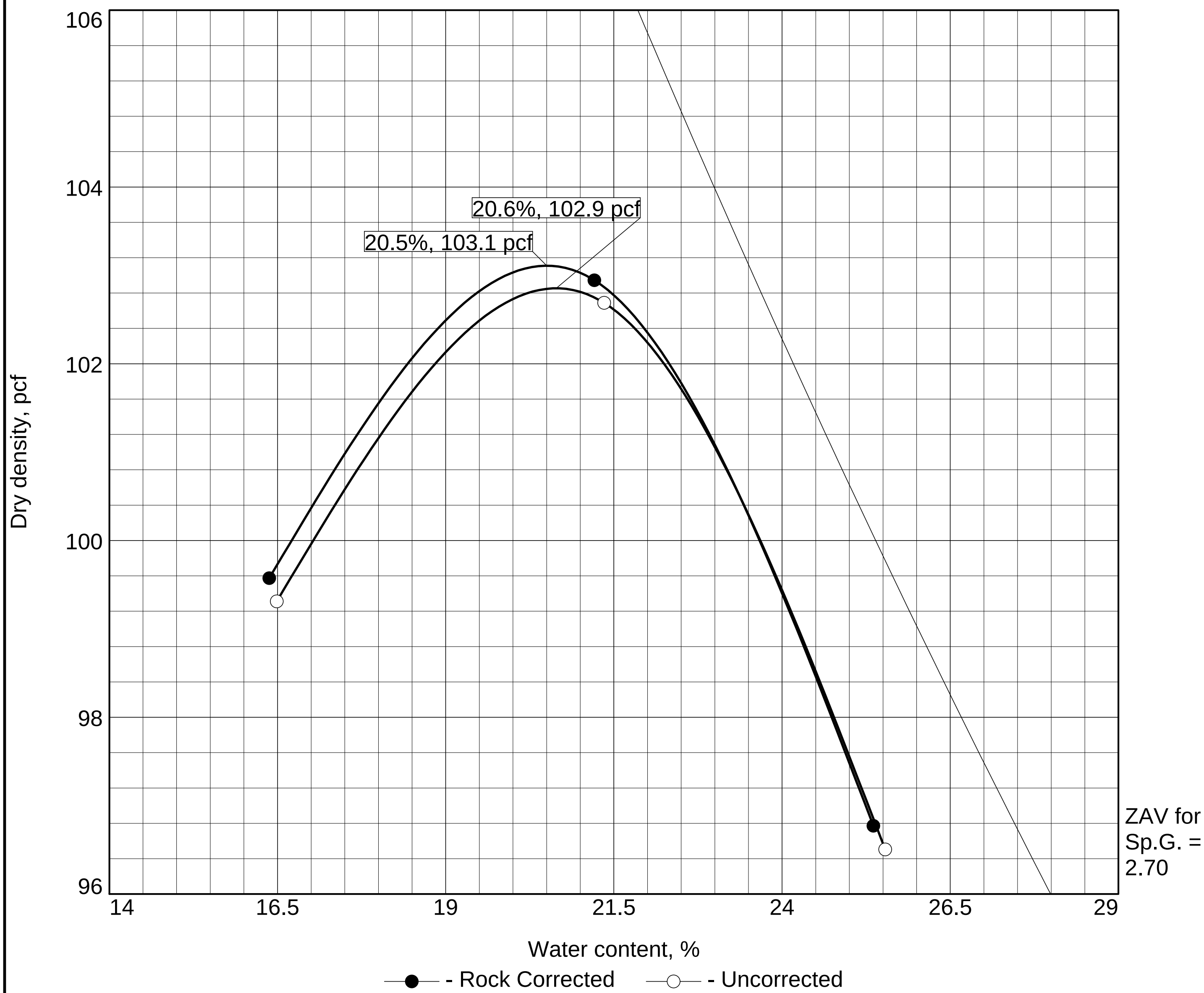
○ **Location:** TP02 @ 1' **Depth:** 1'

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
7'	CL	A-7-6(25)		2.7	42	25	0.7	95.1

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 103.1 pcf	102.9 pcf	lean clay
Optimum moisture = 20.5 %	20.6 %	

Project No. DV102279.02 **Client:** Powertech Uranium
Project: DEWEY BURDOCK

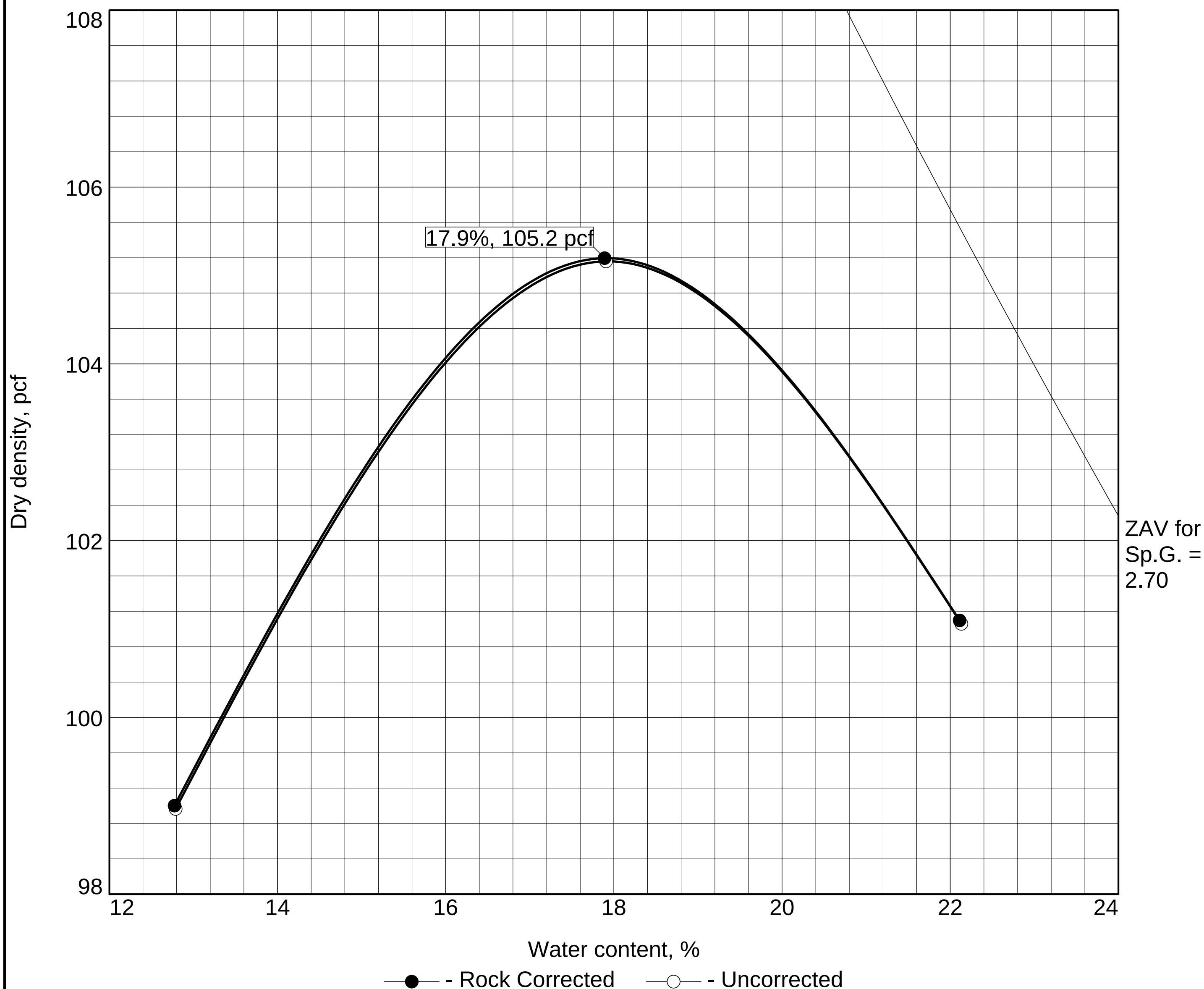
○ **Location:** TP01 @ 7' **Depth:** 7'

Remarks:

Knight Piésold CONSULTING

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1'	CL	A-7-6(22)		2.7	43	28	0.1	80.8

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 105.2 pcf	105.2 pcf	lean clay with sand
Optimum moisture = 17.9 %	17.9 %	

Project No. DV102279.02 **Client:** Powertech Uranium
Project: DEWEY BURDOCK

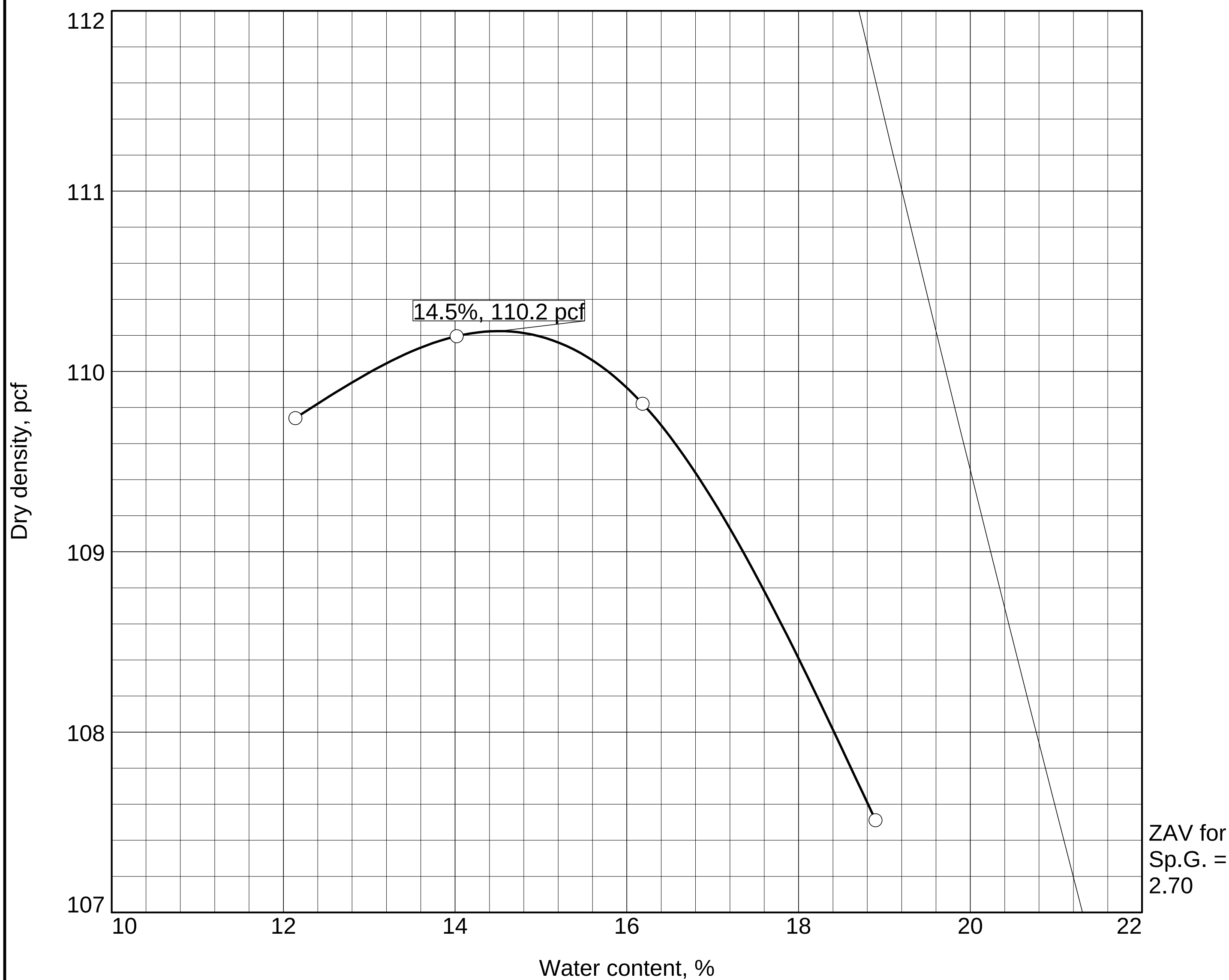
○ **Location:** TP01 @ 1' **Depth:** 1'

Knight Piésold CONSULTING

Remarks:

Fig.

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
4'	CL	A-6(14)		2.7	33	23	0.0	73.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.2 pcf Optimum moisture = 14.5 %	lean clay with sand

Project No. DV102279.02 **Client:** Powertech Uranium

Project: DEWEY BURDOCK

○ **Location:** TP09 @ 4' **Depth:** 4'

Knight Piésold CONSULTING

Remarks:

Fig.

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Appendix C-3

Specific Gravities

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Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	7/24/2008	Act. Code	500
Date Completed	7/28/2008	Lab No.	L28068
Tested By	jk	Checked By	spb

Sample No.	TP07 @ 10'		TP03 @ 7'		TP03 @ 1'		TP04 @ 7'		TP01 @ 3'	
Sample Prep. (Wet or Dry)	wet		wet		wet		wet		wet	
Flask No.	116	44	1	113	113	42	110	1	10	115
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	30.13	29.96	31.96	32.20	30.21	30.27	30.07	31.21	30.31	30.61
4) Calibrated Wt. of Flask + Water	353.61	354.62	362.23	344.35	344.40	351.35	343.15	362.18	362.27	343.24
5) #3 + #4	383.74	384.58	394.19	376.55	374.61	381.62	373.22	393.39	392.58	373.85
6) Wt. of Flask + Water + Soil	373.07	373.83	382.06	364.14	363.12	369.94	362.43	382.13	381.53	362.71
7) Volume of Soil (5 - 6)	10.67	10.75	12.13	12.41	11.49	11.68	10.79	11.26	11.05	11.14
8) Test Temperature, deg. C	26.6	26.8	25.9	26	25.3	26.6	26.7	26.6	25.2	25.2
9) Temperature Correction, k	0.998419	0.998363	0.998604	0.998577	0.998760	0.998419	0.998391	0.998419	0.998786	0.998786
10) Specific Gravity ((3 / 7) * k)	2.819	2.782	2.632	2.590	2.626	2.587	2.782	2.767	2.739	2.743
Reported Average, G_s @ 20 deg.C	2.80		2.61		2.61		2.77		2.74	
Tare	possy	16	7	12	10	6	15	61	9	1
Dry Soil + tare, g	178.91	424.1	425.05	427.96	402.49	406.26	423.66	178.32	426.32	425.18
Tare, g	148.78	394.14	393.09	395.76	372.28	375.99	393.59	147.11	396.01	394.57

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold

CONSULTING

Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	8/21/2008	Act. Code	500
Date Completed	8/25/2008	Lab No.	L28068
Tested By	jk	Checked By	spb

Sample No.	TP05 @ 7'		TP07 @ 6'		TP10 @ 1'		TP04 @ 1'		TP07 @ 1'	
Sample Prep. (Wet or Dry)	dry		dry		dry		dry		dry	
Flask No.	115	112	3	13	44	112	113	42	110	115
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	35.61	35.64	35.03	35.20	35.17	35.47	34.96	35.17	35.23	34.91
4) Calibrated Wt. of Flask + Water	352.28	346.37	365.26	364.22	354.75	346.47	344.44	351.40	343.29	352.39
5) #3 + #4	387.89	382.01	400.29	399.42	389.92	381.94	379.40	386.57	378.52	387.30
6) Wt. of Flask + Water + Soil	374.65	368.94	387.83	386.83	376.73	368.64	366.18	373.12	365.82	374.53
7) Volume of Soil (5 - 6)	13.24	13.07	12.46	12.59	13.19	13.30	13.22	13.45	12.70	12.77
8) Test Temperature, deg. C	26.2	26.2	24.6	24.5	24.8	24.7	24.7	24.5	24.5	24.6
9) Temperature Correction, k	0.998525	0.998525	0.998942	0.998968	0.998890	0.998916	0.998916	0.998968	0.998968	0.998942
10) Specific Gravity ((3 / 7) * k)	2.686	2.723	2.808	2.793	2.663	2.664	2.642	2.612	2.771	2.731
Reported Average, G_s @ 20 deg.C	2.70		2.80		2.66		2.63		2.75	
Tare	12	11	2	5	1	6	3	11	20	15
Dry Soil + tare, g	431.44	428.79	428.33	410.59	429.75	411.44	438.06	428.29	430.64	428.5
Tare, g	395.83	393.15	393.3	375.39	394.58	375.97	403.1	393.12	395.41	393.59

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold
CONSULTING

Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	8/16/2008	Act. Code	500
Date Completed	8/21/2008	Lab No.	L28068
Tested By	rss	Checked By	spb

Sample No.	TP01 @ 7'		TP09 @ 1'		TP02 @ 4'		TP08 @ 2'		TP06 @ 1'	
Sample Prep. (Wet or Dry)	dry		dry		dry		dry		dry	
Flask No.	116	110	113	42	11	3	1	44	116	13
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	35.05	35.39	35.68	35.79	35.70	36.30	35.57	35.53	35.52	35.41
4) Calibrated Wt. of Flask + Water	353.83	343.37	344.35	351.30	359.05	365.15	362.21	354.65	353.65	364.13
5) #3 + #4	388.88	378.76	380.03	387.09	394.75	401.45	397.78	390.18	389.17	399.54
6) Wt. of Flask + Water + Soil	375.69	365.35	366.61	373.57	381.24	387.83	384.54	376.68	375.76	386.20
7) Volume of Soil (5 - 6)	13.19	13.41	13.42	13.52	13.51	13.62	13.24	13.50	13.41	13.34
8) Test Temperature, deg. C	23.2	23.2	26.1	26.1	23.5	26.3	26.2	26.4	26.1	25.9
9) Temperature Correction, k	0.999291	0.999291	0.998551	0.998551	0.999219	0.998499	0.998525	0.998473	0.998551	0.998604
10) Specific Gravity ((3 / 7) * k)	2.655	2.637	2.655	2.643	2.640	2.661	2.683	2.628	2.645	2.651
Reported Average, G_s @ 20 deg.C	2.65		2.65		2.65		2.66		2.65	
Tare	3	5	17	15	20	6	8	3	20	5
Dry Soil + tare, g	438.19	410.79	430.94	429.43	431.15	412.33	427.95	438.64	430.96	410.81
Tare, g	403.14	375.4	395.26	393.64	395.45	376.03	392.38	403.11	395.44	375.4

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold

CONSULTING

Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	7/21/2008	Act. Code	500
Date Completed	7/24/2008	Lab No.	L28068
Tested By	jk	Checked By	spb

Sample No.	TP02 @ 7'		TP09 @ 4'		TP06 @ 10'		TP01 @ 1'		TP05 @ 1'	
Sample Prep. (Wet or Dry)	wet		wet		wet		wet		wet	
Flask No.	116	112	10	115	44	115	1	10	112	13
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	31.89	32.05	30.85	31.06	30.18	30.01	30.51	32.08	48.12	35.41
4) Calibrated Wt. of Flask + Water	353.70	346.43	363.76	352.35	354.83	352.46	362.39	363.85	346.57	364.28
5) #3 + #4	385.59	378.48	394.61	383.41	385.01	382.47	392.90	395.93	394.69	399.69
6) Wt. of Flask + Water + Soil	374.02	366.81	383.28	371.99	373.72	371.39	381.53	384.01	376.64	386.47
7) Volume of Soil (5 - 6)	11.57	11.67	11.33	11.42	11.29	11.08	11.37	11.92	18.05	13.22
8) Test Temperature, deg. C	25.2	25.2	25	25.1	23.5	23.3	23.3	23.5	23.1	23.5
9) Temperature Correction, k	0.998786	0.998786	0.998838	0.998812	0.999219	0.999267	0.999267	0.999219	0.999315	0.999219
10) Specific Gravity ((3 / 7) * k)	2.752	2.742	2.721	2.716	2.671	2.706	2.681	2.689	2.664	2.676
Reported Average, G_s @ 20 deg.C	2.75		2.72		2.69		2.69		2.67	
Tare	13	11	15	8	1	12	6	11	8	15
Dry Soil + tare, g	434.96	425.16	424.39	423.41	424.78	425.85	406.53	425.22	440.49	429.08
Tare, g	403.07	393.11	393.54	392.35	394.6	395.84	376.02	393.14	392.37	393.67

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold

CONSULTING

Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	7/21/2008	Act. Code	500
Date Completed	7/24/2008	Lab No.	L28068
Tested By	jk	Checked By	spb

Sample No.	TP06 @ 7'		TP05 @ 4'		TP10-7'		TP03 @ 11'		TP08 @ 6'	
Sample Prep. (Wet or Dry)	wet		wet		wet		wet		wet	
Flask No.	3	116	13	1	112	44	115	13	13	44
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	31.23	31.21	29.86	30.51	33.94	33.56	50.78	33.70	29.50	29.04
4) Calibrated Wt. of Flask + Water	365.20	353.68	364.13	362.23	346.37	354.69	352.30	364.13	364.18	354.72
5) #3 + #4	396.43	384.89	393.99	392.74	380.31	388.25	403.08	397.83	393.68	383.76
6) Wt. of Flask + Water + Soil	384.85	373.38	383.08	381.38	367.79	375.81	384.42	385.50	382.87	373.05
7) Volume of Soil (5 - 6)	11.58	11.51	10.91	11.36	12.52	12.44	18.66	12.33	10.81	10.71
8) Test Temperature, deg. C	25.6	25.6	25.8	25.8	26.2	25.7	25.9	25.7	25.1	25.2
9) Temperature Correction, k	0.998682	0.998682	0.998630	0.998630	0.998525	0.998656	0.998604	0.998656	0.998812	0.998786
10) Specific Gravity ((3 / 7) * k)	2.693	2.708	2.733	2.682	2.707	2.694	2.718	2.731	2.726	2.707
Reported Average, G_s @ 20 deg.C	2.70		2.71		2.70		2.72		2.72	
Tare	26	rp	19	f	a	33	16	2	5	3
Dry Soil + tare, g	149.46	450.36	147.98	176.64	178.95	145.38	444.86	426.96	404.91	432.16
Tare, g	118.23	419.15	118.12	146.13	145.01	111.82	394.08	393.26	375.41	403.12

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold

CONSULTING

Specific Gravity - Soil
ASTM D 854

Project	Powertech	Project No.	DV102-279.02
Date Staged	8/22/2008	Act. Code	500
Date Completed	8/26/2008	Lab No.	L28068
Tested By	rss	Checked By	spb

Sample No.	TP02 @ 1'									
Sample Prep. (Wet or Dry)	dry									
Flask No.	110	10								
1) Wt. of Flask + Soil										
2) Wt. of Flask										
3) Wt. of Soil (1-2)	35.53	35.88								
4) Calibrated Wt. of Flask + Water	343.18	363.67								
5) #3 + #4	378.71	399.55								
6) Wt. of Flask + Water + Soil	365.55	386.28								
7) Volume of Soil (5 - 6)	13.16	13.27								
8) Test Temperature, deg. C	26.2	26.3								
9) Temperature Correction, k	0.998525	0.998499								
10) Specific Gravity ((3 / 7) * k)	2.696	2.700								
Reported Average, G_s @ 20 deg.C	2.70									
Tare	2	1								
Dry Soil + tare, g	428.92	430.48								
Tare, g	393.39	394.6								

General Notes: Line 9, k, is determined by dividing the density of water at test temperature recorded by the density of water at 20 deg. C.

Wet prep samples soaked overnight prior to application of vacuum.

Knight Piésold
CONSULTING

Appendix C-4

Flexible Wall Permeability Test Results

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP01	LAB NO. :	
DEPTH	3'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/18/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/25/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	398.03	422.74
Wt. Wet Soil & Pan (g)	398.03	615.46
Wt. Dry Soil & Pan (g)	335.14	527.86
Wt. Moisture Lost (g)	62.89	87.60
Wt. of Pan Only (g)	0.00	192.72
Wt. of Dry Soil (g)	335.14	335.14
Moisture Content %	18.8	26.1
Wet Density (pcf)	120.2	125.7
Dry Density (pcf)	101.2	99.7

Init. Diameter (in)	1.928	(cm)	4.897
Init. Area (sq in)	2.919	(sq cm)	18.835
Init. Height (in)	4.320	(cm)	10.973
Height Change (in)	-0.110	(cm)	-0.279
Consol. Height (in)	4.430	(cm)	11.252
Area After Consol. (sq in)	2.891	(sq cm)	18.652

Vol. Before Consol. (cu ft)	0.00730	Specific Gravity	2.74
Vol. Before Consol. (cc)	206.7	Assumed?	No
Change in Vol. (cc)	-3.2		
Cell Exp. (cc)	0.0	Init. Saturation	74.5
Vol. After Consol. (cc)	209.9	Init. Void Ratio	0.690
Vol. After Consol. (cu ft)	0.00741	Final Saturation	100.0
Effective Porosity %	40.82	Final Void Ratio	0.716
Pressure Difference (psi):	0.00		
C =	0.64021	Buret Constant, a	0.922
k, cm/s = C/t*log(h1/h2)		Buret Stand	3

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	48.5	3.2	45.3	45.3	
3.00	47.9	3.9	44.0	44.0	4.5E-05
8.00	46.0	5.7	40.3	40.3	5.1E-05
6.00	44.7	7.1	37.6	37.6	5.4E-05
22.00	40.6	11.2	29.4	29.4	5.2E-05
7.00	39.5	12.2	27.3	27.3	4.9E-05
			Avg.of Last 4 Rdgs.		**5.1E-05**
			Max.Hyd.Gradient:	4.0	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP01	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/15/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/19/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	234.61	259.21
Wt. Wet Soil & Pan (g)	234.61	372.26
Wt. Dry Soil & Pan (g)	200.54	313.59
Wt. Moisture Lost (g)	34.07	58.67
Wt. of Pan Only (g)	0.00	113.05
Wt. of Dry Soil (g)	200.54	200.54
Moisture Content %	17.0	29.3
Wet Density (pcf)	100.9	122.3
Dry Density (pcf)	86.3	94.6

Init. Diameter (in)	1.926	(cm)	4.892
Init. Area (sq in)	2.913	(sq cm)	18.796
Init. Height (in)	3.040	(cm)	7.722
Height Change (in)	-0.009	(cm)	-0.023
Consol. Height (in)	3.049	(cm)	7.744
Area After Consol. (sq in)	2.648	(sq cm)	17.088

Vol. Before Consol. (cu ft)	0.00513	Specific Gravity	2.65
Vol. Before Consol. (cc)	145.1	Assumed?	No
Change in Vol. (cc)	12.8		
Cell Exp. (cc)	0.0	Init. Saturation	49.0
Vol. After Consol. (cc)	132.3	Init. Void Ratio	0.918
Vol. After Consol. (cu ft)	0.00467	Final Saturation	100.0
Effective Porosity %	47.86	Final Void Ratio	0.749
Pressure Difference (psi):	0.00		
C =	0.16641	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	17

Permeability Test Trials

Time sec	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	35.0	4.8	30.2	30.2	
108.95	33.0	6.8	26.2	26.2	9.4E-05
0.00	35.0	1.0	34.0	34.0	
93.96	33.0	3.0	30.0	30.0	9.6E-05
0.00	35.0	0.8	34.2	34.2	
95.89	33.0	2.8	30.2	30.2	9.4E-05
0.00	35.0	1.0	34.0	34.0	
150.35	31.4	4.0	27.4	27.4	1.0E-04
			Avg.of Last 4 Rdgs.		**9.7E-05**
			Max.Hyd.Gradient:	4.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP02	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/15/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/19/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	288.54	334.29
Wt. Wet Soil & Pan (g)	288.54	450.68
Wt. Dry Soil & Pan (g)	257.15	373.54
Wt. Moisture Lost (g)	31.39	77.14
Wt. of Pan Only (g)	0.00	116.39
Wt. of Dry Soil (g)	257.15	257.15
Moisture Content %	12.2	30.0
Wet Density (pcf)	106.1	121.8
Dry Density (pcf)	94.5	93.7

Init. Diameter (in)	1.890	(cm)	4.801
Init. Area (sq in)	2.806	(sq cm)	18.100
Init. Height (in)	3.694	(cm)	9.383
Height Change (in)	-0.052	(cm)	-0.132
Consol. Height (in)	3.746	(cm)	9.515
Area After Consol. (sq in)	2.791	(sq cm)	18.006

Vol. Before Consol. (cu ft)	0.00600	Specific Gravity	2.70
Vol. Before Consol. (cc)	169.8	Assumed?	No
Change in Vol. (cc)	-1.5		
Cell Exp. (cc)	0.0	Init. Saturation	42.1
Vol. After Consol. (cc)	171.3	Init. Void Ratio	0.783
Vol. After Consol. (cu ft)	0.00605	Final Saturation	100.0
Effective Porosity %	43.92	Final Void Ratio	0.799
Pressure Difference (psi):	0.00		
C =	0.19402	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	17

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	45.3	4.3	41.0	41.0	
0.25	44.9	4.6	40.3	40.3	9.7E-05
0.25	44.5	4.9	39.6	39.6	9.8E-05
0.50	43.8	5.6	38.2	38.2	1.0E-04
0.50	43.2	6.3	36.9	36.9	9.7E-05
1.00	41.9	7.6	34.3	34.3	1.0E-04
			Avg.of Last 4 Rdgs.		**1.0E-04**
			Max.Hyd.Gradient:	4.3	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP02	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/15/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/19/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	242.87	265.20
Wt. Wet Soil & Pan (g)	242.87	378.18
Wt. Dry Soil & Pan (g)	209.93	322.91
Wt. Moisture Lost (g)	32.94	55.27
Wt. of Pan Only (g)	0.00	112.98
Wt. of Dry Soil (g)	209.93	209.93
Moisture Content %	15.7	26.3
Wet Density (pcf)	117.4	125.2
Dry Density (pcf)	101.5	99.1

Init. Diameter (in)	1.916	(cm)	4.867
Init. Area (sq in)	2.883	(sq cm)	18.601
Init. Height (in)	2.733	(cm)	6.942
Height Change (in)	-0.065	(cm)	-0.165
Consol. Height (in)	2.798	(cm)	7.107
Area After Consol. (sq in)	2.884	(sq cm)	18.606

Vol. Before Consol. (cu ft)	0.00456	Specific Gravity	2.65
Vol. Before Consol. (cc)	129.1	Assumed?	No
Change in Vol. (cc)	-3.1		
Cell Exp. (cc)	0.0	Init. Saturation	66.0
Vol. After Consol. (cc)	132.2	Init. Void Ratio	0.630
Vol. After Consol. (cu ft)	0.00467	Final Saturation	100.0
Effective Porosity %	38.65	Final Void Ratio	0.669
Pressure Difference (psi):	0.00		
C =	0.13893	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)		Buret Stand	12

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	34.0	2.1	31.9	31.9	
39.00	24.2	11.7	12.5	12.5	2.4E-05
0.00	40.1	2.5	37.6	37.6	
0.50	39.9	2.8	37.1	37.1	2.7E-05
0.50	39.6	3.0	36.6	36.6	2.7E-05
1.00	39.2	3.4	35.8	35.8	2.2E-05
2.00	38.3	4.2	34.1	34.1	2.4E-05
4.00	36.8	5.7	31.1	31.1	2.3E-05
			Avg.of Last 4 Rdgs.		**2.4E-05**
			Max.Hyd.Gradient:	5.3	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Constant Volume

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP02	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/18/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/25/08
CONF. PRESSURE. (psi)	6	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	450.18	465.03
Wt. Wet Soil & Pan (g)	450.18	576.85
Wt. Dry Soil & Pan (g)	354.47	466.29
Wt. Moisture Lost (g)	95.71	110.56
Wt. of Pan Only (g)	0.00	111.82
Wt. of Dry Soil (g)	354.47	354.47
Moisture Content %	27.0	31.2
Wet Density (pcf)	117.5	121.2
Dry Density (pcf)	92.5	92.4

Init. Diameter (in)	1.932	(cm)	4.907
Init. Area (sq in)	2.932	(sq cm)	18.913
Init. Height (in)	4.980	(cm)	12.649
Height Change (in)	-0.080	(cm)	-0.203
Consol. Height (in)	5.060	(cm)	12.852
Area After Consol. (sq in)	2.887	(sq cm)	18.630

Vol. Before Consol. (cu ft)	0.00845	Specific Gravity	2.75
Vol. Before Consol. (cc)	239.2	Assumed?	No
Change in Vol. (cc)	-0.2		
Cell Exp. (cc)	0.0	Init. Saturation	86.7
Vol. After Consol. (cc)	239.4	Init. Void Ratio	0.856
Vol. After Consol. (cu ft)	0.00846	Final Saturation	100.0
Effective Porosity %	46.12	Final Void Ratio	0.858
Pressure Difference (psi):	0.00		
Gradient			

Permeability Flow Trials

Time min.	Pipette Elevation cm	Annulus Elevation cm	Z1 cm	D zp cm	Permeability k cm/sec
0.0	23.70	0.30	23.4		
1.0	23.40	0.30	23.1	0.3	3.7E-07
1.0	23.20	0.30	22.9	0.2	2.5E-07
3.0	22.60	0.35	22.3	0.6	2.6E-07
4.0	22.00	0.40	21.6	0.6	2.0E-07
5.0	21.20	0.45	20.8	0.8	2.3E-07
8.0	19.90	0.50	19.4	1.3	2.5E-07
			Avg.of Last 4 Rdgs.		**2.3E-07**

General Test Notes:

1) Tap water was used as the permeant.

2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP03	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/17/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/25/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	355.76	400.49
Wt. Wet Soil & Pan (g)	355.76	595.00
Wt. Dry Soil & Pan (g)	303.37	497.88
Wt. Moisture Lost (g)	52.39	97.12
Wt. of Pan Only (g)	0.00	194.51
Wt. of Dry Soil (g)	303.37	303.37
Moisture Content %	17.3	32.0
Wet Density (pcf)	105.5	117.2
Dry Density (pcf)	90.0	88.8

Init. Diameter (in)	1.927	(cm)	4.895
Init. Area (sq in)	2.916	(sq cm)	18.816
Init. Height (in)	4.405	(cm)	11.189
Height Change (in)	-0.140	(cm)	-0.356
Consol. Height (in)	4.545	(cm)	11.544
Area After Consol. (sq in)	2.864	(sq cm)	18.479

Vol. Before Consol. (cu ft)	0.00743	Specific Gravity	2.61
Vol. Before Consol. (cc)	210.5	Assumed?	No
Change in Vol. (cc)	-2.8		
Cell Exp. (cc)	0.0	Init. Saturation	55.6
Vol. After Consol. (cc)	213.3	Init. Void Ratio	0.811
Vol. After Consol. (cu ft)	0.00753	Final Saturation	100.0
Effective Porosity %	44.79	Final Void Ratio	0.835
Pressure Difference (psi):	0.00		
C =	0.66298	Buret Constant, a	0.922
k, cm/s = C/t*log(h1/h2)		Buret Stand	2

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	46.1	4.0	42.1	42.1	
3.00	44.8	5.2	39.6	39.6	9.8E-05
3.00	43.7	6.4	37.3	37.3	9.6E-05
6.00	41.8	8.4	33.4	33.4	8.8E-05
4.00	40.5	9.6	30.9	30.9	9.3E-05
6.00	39.0	11.2	27.8	27.8	8.5E-05
19.00	35.3	15.0	20.3	20.3	7.9E-05
12.00	33.6	16.8	16.8	16.8	7.6E-05
			Avg.of Last 4 Rdgs.		**8.3E-05**
			Max.Hyd.Gradient:	3.5	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP03	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/17/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/24/08
CONF. PRESSURE. (	6	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	436.02	474.76
Wt. Wet Soil & Pan (g)	436.02	668.60
Wt. Dry Soil & Pan (g)	380.93	574.77
Wt. Moisture Lost (g)	55.09	93.83
Wt. of Pan Only (g)	0.00	193.84
Wt. of Dry Soil (g)	380.93	380.93
Moisture Content %	14.5	24.6
Wet Density (pcf)	119.8	123.8
Dry Density (pcf)	104.6	99.3

Init. Diameter (in)	1.930	(cm)	4.902
Init. Area (sq in)	2.926	(sq cm)	18.874
Init. Height (in)	4.740	(cm)	12.040
Height Change (in)	-0.250	(cm)	-0.635
Consol. Height (in)	4.990	(cm)	12.675
Area After Consol. (sq in)	2.928	(sq cm)	18.891

Vol. Before Consol. (cu ft)	0.00802	Specific Gravity	2.61
Vol. Before Consol. (cc)	227.2	Assumed?	No
Change in Vol. (cc)	-12.2		
Cell Exp. (cc)	0.0	Init. Saturation	67.8
Vol. After Consol. (cc)	239.4	Init. Void Ratio	0.557
Vol. After Consol. (cu ft)	0.00846	Final Saturation	100.0
Effective Porosity %	35.77	Final Void Ratio	0.641
Pressure Difference (psi):	0.00		
C =	0.71200	Buret Constant, a	0.922
k, cm/s = C/t*log(h1/h2)		Buret Stand	3

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	48.8	0.9	47.9	47.9	
23.00	42.0	7.6	34.4	34.4	7.4E-05
50.00	40.3	9.4	30.9	30.9	1.1E-05
89.00	36.5	12.1	24.4	24.4	1.4E-05
0.00	50.0	3.3	46.7	46.7	
3.00	49.7	3.5	46.2	46.2	1.8E-05
8.00	49.2	4.0	45.2	45.2	1.4E-05
29.00	47.6	5.5	42.1	42.1	1.3E-05
			Avg.of Last 4 Rdgs.		**1.5E-05**
			Max.Hyd.Gradient:	3.2	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP04	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/18/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/25/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	201.79	232.22
Wt. Wet Soil & Pan (g)	661.20	426.02
Wt. Dry Soil & Pan (g)	642.30	379.40
Wt. Moisture Lost (g)	18.90	46.62
Wt. of Pan Only (g)	394.58	193.80
Wt. of Dry Soil (g)	247.72	185.60
Moisture Content %	7.6	25.1
Wet Density (pcf)	105.6	123.7
Dry Density (pcf)	98.1	98.9

Init. Diameter (in)	1.919	(cm)	4.874
Init. Area (sq in)	2.892	(sq cm)	18.660
Init. Height (in)	2.517	(cm)	6.393
Height Change (in)	-0.122	(cm)	-0.310
Consol. Height (in)	2.639	(cm)	6.703
Area After Consol. (sq in)	2.710	(sq cm)	17.484

Vol. Before Consol. (cu ft)	0.00421	Specific Gravity	2.63
Vol. Before Consol. (cc)	119.3	Assumed?	No
Change in Vol. (cc)	2.1		
Cell Exp. (cc)	0.0	Init. Saturation	33.2
Vol. After Consol. (cc)	117.2	Init. Void Ratio	0.690
Vol. After Consol. (cu ft)	0.00414	Final Saturation	100.0
Effective Porosity %	40.24	Final Void Ratio	0.661
Pressure Difference (psi):	0.00		
C =	0.14077	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	17

Permeability Test Trials

Time sec	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	40.0	1.0	39.0	39.0	
36.83	35.0	6.0	29.0	29.0	4.9E-04
0.00	40.0	1.0	39.0	39.0	
36.77	35.0	6.0	29.0	29.0	4.9E-04
0.00	40.0	1.0	39.0	39.0	
37.37	35.0	6.0	29.0	29.0	4.8E-04
0.00	40.0	1.0	39.0	39.0	
37.10	35.0	6.0	29.0	29.0	4.9E-04
			Avg.of Last 4 Rdgs.		**4.9E-04**
			Max.Hyd.Gradient:	5.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP04	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/26/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/30/08
CONF. PRESSURE. (	6	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	317.46	345.97
Wt. Wet Soil & Pan (g)	317.46	739.60
Wt. Dry Soil & Pan (g)	287.97	681.60
Wt. Moisture Lost (g)	29.49	58.00
Wt. of Pan Only (g)	0.00	393.63
Wt. of Dry Soil (g)	287.97	287.97
Moisture Content %	10.2	20.1
Wet Density (pcf)	124.9	133.5
Dry Density (pcf)	113.3	111.1

Init. Diameter (in)	1.933	(cm)	4.910
Init. Area (sq in)	2.935	(sq cm)	18.933
Init. Height (in)	3.300	(cm)	8.382
Height Change (in)	-0.080	(cm)	-0.203
Consol. Height (in)	3.380	(cm)	8.585
Area After Consol. (sq in)	2.921	(sq cm)	18.846

Vol. Before Consol. (cu ft)	0.00560	Specific Gravity	2.77
Vol. Before Consol. (cc)	158.7	Assumed?	No
Change in Vol. (cc)	-3.1		
Cell Exp. (cc)	0.0	Init. Saturation	53.9
Vol. After Consol. (cc)	161.8	Init. Void Ratio	0.527
Vol. After Consol. (cu ft)	0.00571	Final Saturation	100.0
Effective Porosity %	34.49	Final Void Ratio	0.556
Pressure Difference (psi):	0.00		
C =	0.16726	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	17

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	45.7	5.8	39.9	39.9	
17.00	44.8	6.7	38.1	38.1	3.3E-06
31.00	43.3	8.0	35.3	35.3	3.0E-06
76.00	40.2	11.1	29.1	29.1	3.1E-06
185.00	34.8	16.1	18.7	18.7	2.9E-06
			Avg.of Last 4 Rdgs.		**3.1E-06**
			Max.Hyd.Gradient:	4.5	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP05	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/21/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/26/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	238.42	278.12
Wt. Wet Soil & Pan (g)	238.42	394.48
Wt. Dry Soil & Pan (g)	214.28	330.64
Wt. Moisture Lost (g)	24.14	63.84
Wt. of Pan Only (g)	0.00	116.36
Wt. of Dry Soil (g)	214.28	214.28
Moisture Content %	11.3	29.8
Wet Density (pcf)	107.9	120.5
Dry Density (pcf)	97.0	92.8

Init. Diameter (in)	1.934	(cm)	4.912
Init. Area (sq in)	2.938	(sq cm)	18.953
Init. Height (in)	2.865	(cm)	7.277
Height Change (in)	-0.160	(cm)	-0.406
Consol. Height (in)	3.025	(cm)	7.684
Area After Consol. (sq in)	2.907	(sq cm)	18.757

Vol. Before Consol. (cu ft)	0.00487	Specific Gravity	2.67
Vol. Before Consol. (cc)	137.9	Assumed?	No
Change in Vol. (cc)	-6.2		
Cell Exp. (cc)	0.0	Init. Saturation	41.9
Vol. After Consol. (cc)	144.1	Init. Void Ratio	0.719
Vol. After Consol. (cu ft)	0.00509	Final Saturation	100.0
Effective Porosity %	41.81	Final Void Ratio	0.796
Pressure Difference (psi):	0.00		
C =	0.14946	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time sec	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	30.0	5.0	25.0	25.0	
30.18	25.0	10.0	15.0	15.0	1.8E-05
0.00	30.0	5.0	25.0	25.0	
30.99	25.0	10.0	15.0	15.0	1.8E-05
0.00	30.0	5.0	25.0	25.0	
30.38	25.0	10.0	15.0	15.0	1.8E-05
0.00	30.0	5.0	25.0	25.0	
30.62	25.0	10.0	15.0	15.0	1.8E-05
			Avg.of Last 4 Rdgs.		**1.8E-05**
			Max.Hyd.Gradient:	2.6	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP05	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/26/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	07/31/08
CONF. PRESSURE. (	5	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	286.03	325.14
Wt. Wet Soil & Pan (g)	286.03	520.81
Wt. Dry Soil & Pan (g)	256.01	451.68
Wt. Moisture Lost (g)	30.02	69.13
Wt. of Pan Only (g)	0.00	195.67
Wt. of Dry Soil (g)	256.01	256.01
Moisture Content %	11.7	27.0
Wet Density (pcf)	105.9	124.4
Dry Density (pcf)	94.8	98.0

Init. Diameter (in)	1.924	(cm)	4.887
Init. Area (sq in)	2.907	(sq cm)	18.757
Init. Height (in)	3.540	(cm)	8.992
Height Change (in)	0.090	(cm)	0.229
Consol. Height (in)	3.450	(cm)	8.763
Area After Consol. (sq in)	2.886	(sq cm)	18.619

Vol. Before Consol. (cu ft)	0.00596	Specific Gravity	2.71
Vol. Before Consol. (cc)	168.7	Assumed?	No
Change in Vol. (cc)	5.5		
Cell Exp. (cc)	0.0	Init. Saturation	40.5
Vol. After Consol. (cc)	163.2	Init. Void Ratio	0.785
Vol. After Consol. (cu ft)	0.00576	Final Saturation	100.0
Effective Porosity %	43.99	Final Void Ratio	0.727
Pressure Difference (psi):	0.00		
C =	0.17173	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	40.6	1.7	38.9	38.9	
0.50	40.4	2.0	38.4	38.4	3.2E-05
1.50	39.7	2.8	36.9	36.9	3.3E-05
5.00	37.3	5.1	32.2	32.2	3.4E-05
26.00	29.6	12.8	16.8	16.8	3.1E-05
51.00	23.7	18.5	5.2	5.2	2.9E-05
			Avg.of Last 4 Rdgs.		**3.2E-05**
			Max.Hyd.Gradient:	4.4	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP05	LAB NO. :	
DEPTH	8'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/21/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/26/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	337.81	368.50
Wt. Wet Soil & Pan (g)	337.81	564.36
Wt. Dry Soil & Pan (g)	292.11	487.97
Wt. Moisture Lost (g)	45.70	76.39
Wt. of Pan Only (g)	0.00	195.86
Wt. of Dry Soil (g)	292.11	292.11
Moisture Content %	15.6	26.2
Wet Density (pcf)	123.0	125.5
Dry Density (pcf)	106.3	99.5

Init. Diameter (in)	1.931	(cm)	4.905
Init. Area (sq in)	2.929	(sq cm)	18.894
Init. Height (in)	3.573	(cm)	9.075
Height Change (in)	-0.110	(cm)	-0.279
Consol. Height (in)	3.683	(cm)	9.355
Area After Consol. (sq in)	3.036	(sq cm)	19.591

Vol. Before Consol. (cu ft)	0.00606	Specific Gravity	2.70
Vol. Before Consol. (cc)	171.5	Assumed?	No
Change in Vol. (cc)	-11.8		
Cell Exp. (cc)	0.0	Init. Saturation	72.2
Vol. After Consol. (cc)	183.3	Init. Void Ratio	0.585
Vol. After Consol. (cu ft)	0.00647	Final Saturation	100.0
Effective Porosity %	36.91	Final Void Ratio	0.694
Pressure Difference (psi):	0.00		
C =	0.17423	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	50.7	1.5	49.2	49.2	
22.00	49.4	2.8	46.6	46.6	3.1E-06
30.00	48.0	4.3	43.7	43.7	2.7E-06
115.00	43.4	9.0	34.4	34.4	2.6E-06
64.00	41.3	11.1	30.2	30.2	2.6E-06
			Avg.of Last 4 Rdgs.		**2.8E-06**
			Max.Hyd.Gradient:	5.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP06	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/21/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/26/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	231.30	268.74
Wt. Wet Soil & Pan (g)	231.30	463.56
Wt. Dry Soil & Pan (g)	204.76	399.58
Wt. Moisture Lost (g)	26.54	63.98
Wt. of Pan Only (g)	194.86	194.82
Wt. of Dry Soil (g)	9.90	204.76
Moisture Content %	268.1	31.2
Wet Density (pcf)	104.9	118.8
Dry Density (pcf)	28.5	90.5

Init. Diameter (in)	1.920	(cm)	4.877
Init. Area (sq in)	2.895	(sq cm)	18.679
Init. Height (in)	2.900	(cm)	7.366
Height Change (in)	-0.162	(cm)	-0.411
Consol. Height (in)	3.062	(cm)	7.777
Area After Consol. (sq in)	2.814	(sq cm)	18.154

Vol. Before Consol. (cu ft)	0.00486	Specific Gravity	2.65
Vol. Before Consol. (cc)	137.6	Assumed?	No
Change in Vol. (cc)	-3.6		
Cell Exp. (cc)	0.0	Init. Saturation	44.0
Vol. After Consol. (cc)	141.2	Init. Void Ratio	0.781
Vol. After Consol. (cu ft)	0.00499	Final Saturation	100.0
Effective Porosity %	82.77	Final Void Ratio	0.827
Pressure Difference (psi):	0.00		
C =	0.15582	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)		Buret Stand	12

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	28.6	0.7	27.9	27.9	
3.00	28.4	0.9	27.5	27.5	5.4E-06
22.00	27.6	1.8	25.8	25.8	3.3E-06
30.00	26.5	2.6	23.9	23.9	2.9E-06
115.00	23.5	5.4	18.1	18.1	2.7E-06
64.00	22.2	6.5	15.7	15.7	2.5E-06
			Avg.of Last 4 Rdgs.		**2.8E-06**
			Max.Hyd.Gradient:	3.6	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP07	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/25/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	09/02/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	260.81	296.42
Wt. Wet Soil & Pan (g)	260.81	490.23
Wt. Dry Soil & Pan (g)	231.60	425.41
Wt. Moisture Lost (g)	29.21	64.82
Wt. of Pan Only (g)	0.00	193.81
Wt. of Dry Soil (g)	231.60	231.60
Moisture Content %	12.6	28.0
Wet Density (pcf)	118.6	124.4
Dry Density (pcf)	105.3	97.2

Init. Diameter (in)	1.922	(cm)	4.882
Init. Area (sq in)	2.901	(sq cm)	18.718
Init. Height (in)	2.888	(cm)	7.336
Height Change (in)	-0.100	(cm)	-0.254
Consol. Height (in)	2.988	(cm)	7.590
Area After Consol. (sq in)	3.037	(sq cm)	19.594

Vol. Before Consol. (cu ft)	0.00485	Specific Gravity	2.75
Vol. Before Consol. (cc)	137.3	Assumed?	No
Change in Vol. (cc)	-11.4		
Cell Exp. (cc)	0.0	Init. Saturation	55.0
Vol. After Consol. (cc)	148.7	Init. Void Ratio	0.630
Vol. After Consol. (cu ft)	0.00525	Final Saturation	100.0
Effective Porosity %	38.66	Final Void Ratio	0.766
Pressure Difference (psi):	2.00		
C =	0.14111	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	47.2	5.4	41.8	182.4	
93.0	46.7	5.7	41.0	181.6	4.8E-08
39.0	46.6	5.8	40.8	181.4	2.9E-08
37.0	46.5	6.0	40.5	181.1	4.6E-08
88.0	46.1	6.3	39.8	180.4	4.5E-08
127.0	45.5	6.8	38.8	179.4	4.7E-08
42.0	45.4	6.9	38.5	179.1	4.1E-08
142.0	44.9	7.3	37.6	178.2	3.4E-08
			Avg.of Last 4 Rdgs.		4.2E-08
			Max.Hyd.Gradient:	24.0	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP07	LAB NO. :	
DEPTH	6'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/27/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	09/03/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	243.01	271.19
Wt. Wet Soil & Pan (g)	243.01	466.02
Wt. Dry Soil & Pan (g)	212.83	407.66
Wt. Moisture Lost (g)	30.18	58.36
Wt. of Pan Only (g)	0.00	194.83
Wt. of Dry Soil (g)	212.83	212.83
Moisture Content %	14.2	27.4
Wet Density (pcf)	118.6	126.0
Dry Density (pcf)	103.9	98.9

Init. Diameter (in)	1.931	(cm)	4.905
Init. Area (sq in)	2.929	(sq cm)	18.894
Init. Height (in)	2.665	(cm)	6.769
Height Change (in)	-0.051	(cm)	-0.130
Consol. Height (in)	2.716	(cm)	6.899
Area After Consol. (sq in)	3.019	(sq cm)	19.481

Vol. Before Consol. (cu ft)	0.00452	Specific Gravity	2.80
Vol. Before Consol. (cc)	127.9	Assumed?	No
Change in Vol. (cc)	-6.5		
Cell Exp. (cc)	0.0	Init. Saturation	58.2
Vol. After Consol. (cc)	134.4	Init. Void Ratio	0.683
Vol. After Consol. (cu ft)	0.00475	Final Saturation	100.0
Effective Porosity %	40.57	Final Void Ratio	0.768
Pressure Difference (psi):	0.00		
C =	0.12900	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	40.3	0.9	39.4	39.4	
41.0	34.9	6.3	28.6	28.6	7.3E-06
17.0	33.4	7.8	25.6	25.6	6.1E-06
17.0	32.1	9.0	23.1	23.1	5.6E-06
18.0	30.9	10.2	20.7	20.7	5.7E-06
31.0	29.3	11.8	17.5	17.5	5.1E-06
			Avg.of Last 4 Rdgs.		**5.6E-06**
			Max.Hyd.Gradient:	4.9	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP07	LAB NO. :	
DEPTH	10'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/03/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/10/08
CONF. PRESSURE. (	8	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	144.55	151.22
Wt. Wet Soil & Pan (g)	144.55	347.12
Wt. Dry Soil & Pan (g)	121.17	317.07
Wt. Moisture Lost (g)	23.38	30.05
Wt. of Pan Only (g)	0.00	195.90
Wt. of Dry Soil (g)	121.17	121.17
Moisture Content %	19.3	24.8
Wet Density (pcf)	125.7	129.0
Dry Density (pcf)	105.4	103.4

Init. Diameter (in)	1.925	(cm)	4.890
Init. Area (sq in)	2.910	(sq cm)	18.777
Init. Height (in)	1.505	(cm)	3.823
Height Change (in)	-0.035	(cm)	-0.089
Consol. Height (in)	1.540	(cm)	3.912
Area After Consol. (sq in)	2.900	(sq cm)	18.708

Vol. Before Consol. (cu ft)	0.00253	Specific Gravity	2.80
Vol. Before Consol. (cc)	71.8	Assumed?	No
Change in Vol. (cc)	-1.4		
Cell Exp. (cc)	0.0	Init. Saturation	82.0
Vol. After Consol. (cc)	73.2	Init. Void Ratio	0.659
Vol. After Consol. (cu ft)	0.00258	Final Saturation	100.0
Effective Porosity %	39.71	Final Void Ratio	0.691
Pressure Difference (psi):	0.00		
C =	0.07617	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	79.9	0.8	79.1	79.1	
1263.0	66.5	12.2	54.3	54.3	1.6E-07
117.0	65.6	13.0	52.6	52.6	1.5E-07
122.0	64.8	13.8	51.0	51.0	1.4E-07
88.0	64.1	14.4	49.7	49.7	1.6E-07
1262.0	56.4	20.7	35.7	35.7	1.4E-07
			Avg.of Last 4 Rdgs.		1.5E-07
			Max.Hyd.Gradient:	17.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP08	LAB NO. :	
DEPTH	2'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/25/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/28/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	311.11	357.92
Wt. Wet Soil & Pan (g)	311.11	552.71
Wt. Dry Soil & Pan (g)	277.05	471.84
Wt. Moisture Lost (g)	34.06	80.87
Wt. of Pan Only (g)	0.00	194.79
Wt. of Dry Soil (g)	277.05	277.05
Moisture Content %	12.3	29.2
Wet Density (pcf)	106.9	121.4
Dry Density (pcf)	95.2	94.0

Init. Diameter (in)	1.927	(cm)	4.895
Init. Area (sq in)	2.916	(sq cm)	18.816
Init. Height (in)	3.802	(cm)	9.657
Height Change (in)	-0.093	(cm)	-0.236
Consol. Height (in)	3.895	(cm)	9.893
Area After Consol. (sq in)	2.883	(sq cm)	18.599

Vol. Before Consol. (cu ft)	0.00642	Specific Gravity	2.66
Vol. Before Consol. (cc)	181.7	Assumed?	No
Change in Vol. (cc)	-2.3		
Cell Exp. (cc)	0.0	Init. Saturation	43.9
Vol. After Consol. (cc)	184.0	Init. Void Ratio	0.745
Vol. After Consol. (cu ft)	0.00650	Final Saturation	100.0
Effective Porosity %	42.68	Final Void Ratio	0.767
Pressure Difference (psi):	0.00		
C =	0.56449	Buret Constant, a	0.922
k, cm/s = C/t*log(h1/h2)		Buret Stand	3

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	48.4	0.1	48.3	48.3	
1.00	47.8	1.0	46.8	46.8	1.3E-04
8.00	44.4	4.5	39.9	39.9	8.1E-05
3.00	43.3	5.6	37.7	37.7	7.7E-05
6.00	41.2	7.6	33.6	33.6	7.8E-05
8.00	38.8	10.1	28.7	28.7	8.1E-05
16.00	34.8	14.0	20.8	20.8	8.2E-05
			Avg.of Last 4 Rdgs.		**8.0E-05**
			Max.Hyd.Gradient:	4.8	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP08	LAB NO. :	
DEPTH	6'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/29/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/05/08
CONF. PRESSURE. (	5	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	375.45	441.82
Wt. Wet Soil & Pan (g)	375.45	636.80
Wt. Dry Soil & Pan (g)	360.13	555.11
Wt. Moisture Lost (g)	15.32	81.69
Wt. of Pan Only (g)	0.00	194.98
Wt. of Dry Soil (g)	360.13	360.13
Moisture Content %	4.3	22.7
Wet Density (pcf)	107.8	128.9
Dry Density (pcf)	103.4	105.0

Init. Diameter (in)	1.942	(cm)	4.933
Init. Area (sq in)	2.962	(sq cm)	19.110
Init. Height (in)	4.480	(cm)	11.379
Height Change (in)	-0.038	(cm)	-0.097
Consol. Height (in)	4.518	(cm)	11.476
Area After Consol. (sq in)	2.891	(sq cm)	18.653

Vol. Before Consol. (cu ft)	0.00768	Specific Gravity	2.72
Vol. Before Consol. (cc)	217.5	Assumed?	No
Change in Vol. (cc)	3.4		
Cell Exp. (cc)	0.0	Init. Saturation	18.0
Vol. After Consol. (cc)	214.1	Init. Void Ratio	0.642
Vol. After Consol. (cu ft)	0.00756	Final Saturation	100.0
Effective Porosity %	39.11	Final Void Ratio	0.617
Pressure Difference (psi):	0.00		
C =	0.22448	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	15

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	37.6	3.9	33.7	33.7	
0.25	36.3	5.3	31.0	31.0	5.4E-04
0.25	34.9	6.6	28.3	28.3	5.9E-04
0.25	33.7	7.8	25.9	25.9	5.8E-04
0.25	32.6	8.9	23.7	23.7	5.8E-04
0.50	30.8	10.8	20.0	20.0	5.5E-04
0.50	29.1	12.4	16.7	16.7	5.9E-04
			Avg.of Last 4 Rdgs.		**5.7E-04**
			Max.Hyd.Gradient:	2.8	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP09	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/18/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/25/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	238.19	271.28
Wt. Wet Soil & Pan (g)	238.19	466.86
Wt. Dry Soil & Pan (g)	210.93	406.51
Wt. Moisture Lost (g)	27.26	60.35
Wt. of Pan Only (g)	0.00	195.58
Wt. of Dry Soil (g)	210.93	210.93
Moisture Content %	12.9	28.6
Wet Density (pcf)	107.2	122.8
Dry Density (pcf)	94.9	95.5

Init. Diameter (in)	1.930	(cm)	4.902
Init. Area (sq in)	2.926	(sq cm)	18.874
Init. Height (in)	2.893	(cm)	7.348
Height Change (in)	-0.117	(cm)	-0.297
Consol. Height (in)	3.010	(cm)	7.645
Area After Consol. (sq in)	2.795	(sq cm)	18.036

Vol. Before Consol. (cu ft)	0.00490	Specific Gravity	2.65
Vol. Before Consol. (cc)	138.7	Assumed?	No
Change in Vol. (cc)	0.8		
Cell Exp. (cc)	0.0	Init. Saturation	46.1
Vol. After Consol. (cc)	137.9	Init. Void Ratio	0.742
Vol. After Consol. (cu ft)	0.00487	Final Saturation	100.0
Effective Porosity %	42.61	Final Void Ratio	0.732
Pressure Difference (psi):	0.00		
C =	0.15564	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	13

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	35.2	0.9	34.3	34.3	
0.5	34.8	1.3	33.5	33.5	5.3E-05
0.5	34.3	1.8	32.5	32.5	6.8E-05
0.5	33.9	2.2	31.7	31.7	5.6E-05
1.0	33.0	3.0	30.0	30.0	6.2E-05
3.0	31.0	5.1	25.9	25.9	5.5E-05
6.5	27.3	8.8	18.5	18.5	5.8E-05
			Avg.of Last 4 Rdgs.		**5.8E-05**
			Max.Hyd.Gradient:	4.4	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP09	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/30/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/06/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	308.97	334.29
Wt. Wet Soil & Pan (g)	308.97	529.56
Wt. Dry Soil & Pan (g)	275.47	470.74
Wt. Moisture Lost (g)	33.50	58.82
Wt. of Pan Only (g)	0.00	195.27
Wt. of Dry Soil (g)	275.47	275.47
Moisture Content %	12.2	21.4
Wet Density (pcf)	122.9	130.5
Dry Density (pcf)	109.6	107.5

Init. Diameter (in)	1.937	(cm)	4.920
Init. Area (sq in)	2.947	(sq cm)	19.011
Init. Height (in)	3.250	(cm)	8.255
Height Change (in)	-0.008	(cm)	-0.020
Consol. Height (in)	3.258	(cm)	8.275
Area After Consol. (sq in)	2.996	(sq cm)	19.327

Vol. Before Consol. (cu ft)	0.00554	Specific Gravity	2.72
Vol. Before Consol. (cc)	156.9	Assumed?	No
Change in Vol. (cc)	-3.0		
Cell Exp. (cc)	0.0	Init. Saturation	60.2
Vol. After Consol. (cc)	159.9	Init. Void Ratio	0.550
Vol. After Consol. (cu ft)	0.00565	Final Saturation	100.0
Effective Porosity %	35.47	Final Void Ratio	0.579
Pressure Difference (psi):	0.00		
C =	0.15598	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	29.7	9.7	20.0	20.0	
15.0	28.4	10.8	17.6	17.6	9.6E-06
6.0	28.0	11.1	16.9	16.9	7.6E-06
6.0	27.6	11.5	16.1	16.1	9.1E-06
6.0	27.2	11.8	15.4	15.4	8.4E-06
6.0	26.8	12.2	14.6	14.6	1.0E-05
			Avg.of Last 4 Rdgs.		8.8E-06
			Max.Hyd.Gradient:	2.3	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP09	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/30/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/06/08
CONF. PRESSURE. (	6	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	308.97	330.49
Wt. Wet Soil & Pan (g)	308.97	525.76
Wt. Dry Soil & Pan (g)	275.47	470.74
Wt. Moisture Lost (g)	33.50	55.02
Wt. of Pan Only (g)	0.00	195.27
Wt. of Dry Soil (g)	275.47	275.47
Moisture Content %	12.2	20.0
Wet Density (pcf)	122.9	132.1
Dry Density (pcf)	109.6	110.1

Init. Diameter (in)	1.937	(cm)	4.920
Init. Area (sq in)	2.947	(sq cm)	19.011
Init. Height (in)	3.250	(cm)	8.255
Height Change (in)	0.000	(cm)	0.000
Consol. Height (in)	3.250	(cm)	8.255
Area After Consol. (sq in)	2.932	(sq cm)	18.915

Vol. Before Consol. (cu ft)	0.00554	Specific Gravity	2.72
Vol. Before Consol. (cc)	156.9	Assumed?	No
Change in Vol. (cc)	0.8		
Cell Exp. (cc)	0.0	Init. Saturation	60.2
Vol. After Consol. (cc)	156.1	Init. Void Ratio	0.550
Vol. After Consol. (cu ft)	0.00551	Final Saturation	100.0
Effective Porosity %	35.47	Final Void Ratio	0.542
Pressure Difference (psi):	0.00		
C =	0.15899	Buret Constant, a	0.317
k, cm/s = C/t*log(h1/h2)		Buret Stand	11

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	37.4	0.3	37.2	37.2	
32.0	34.2	3.2	31.1	31.1	6.5E-06
47.0	30.7	6.2	24.5	24.5	5.8E-06
36.0	28.6	8.0	20.6	20.6	5.5E-06
23.0	27.3	9.0	18.3	18.3	5.9E-06
170.0	22.4	13.4	9.0	9.0	4.8E-06
			Avg.of Last 4 Rdgs.		5.5E-06
			Max.Hyd.Gradient:	4.1	

General Test Notes:

1) Tap water was used as the permeant.

2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP10	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	08/18/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/25/08
CONF. PRESSURE. (	3	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	237.94	274.83
Wt. Wet Soil & Pan (g)	237.94	469.78
Wt. Dry Soil & Pan (g)	220.02	414.97
Wt. Moisture Lost (g)	17.92	54.81
Wt. of Pan Only (g)	0.00	194.95
Wt. of Dry Soil (g)	220.02	220.02
Moisture Content %	8.1	24.9
Wet Density (pcf)	107.2	124.9
Dry Density (pcf)	99.1	100.0

Init. Diameter (in)	1.927	(cm)	4.895
Init. Area (sq in)	2.916	(sq cm)	18.816
Init. Height (in)	2.900	(cm)	7.366
Height Change (in)	0.014	(cm)	0.036
Consol. Height (in)	2.886	(cm)	7.330
Area After Consol. (sq in)	2.905	(sq cm)	18.743

Vol. Before Consol. (cu ft)	0.00489	Specific Gravity	2.66
Vol. Before Consol. (cc)	138.6	Assumed?	No
Change in Vol. (cc)	1.2		
Cell Exp. (cc)	0.0	Init. Saturation	32.1
Vol. After Consol. (cc)	137.4	Init. Void Ratio	0.676
Vol. After Consol. (cu ft)	0.00485	Final Saturation	100.0
Effective Porosity %	40.32	Final Void Ratio	0.661
Pressure Difference (psi):	0.00		
C =	0.14225	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)		Buret Stand	15

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	39.5	1.9	37.6	37.6	
0.50	38.8	2.5	36.3	36.3	7.2E-05
0.50	38.1	3.2	34.9	34.9	8.1E-05
1.00	36.9	4.4	32.5	32.5	7.3E-05
1.00	35.8	5.5	30.3	30.3	7.2E-05
5.00	31.2	10.1	21.1	21.1	7.5E-05
			Avg.of Last 4 Rdgs.		**7.5E-05**
			Max.Hyd.Gradient:	5.0	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:			
PROJECT:	POWERTECH	PROJECT NO. :	DV102-00279.02
BORING NO.	TP10	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.		TEST STARTED :	07/30/08
SAMPLE TYPE	Undisturbed	TEST FINISHED :	08/05/08
CONF. PRESSURE. (	6	SATURATED TEST:	yes

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	305.05	317.61
Wt. Wet Soil & Pan (g)	322.58	429.82
Wt. Dry Soil & Pan (g)	289.25	369.48
Wt. Moisture Lost (g)	33.33	60.34
Wt. of Pan Only (g)	115.33	112.21
Wt. of Dry Soil (g)	173.92	257.27
Moisture Content %	19.2	23.5
Wet Density (pcf)	126.1	128.3
Dry Density (pcf)	105.8	103.9

Init. Diameter (in)	1.922	(cm)	4.882
Init. Area (sq in)	2.901	(sq cm)	18.718
Init. Height (in)	3.177	(cm)	8.070
Height Change (in)	-0.050	(cm)	-0.127
Consol. Height (in)	3.227	(cm)	8.197
Area After Consol. (sq in)	2.922	(sq cm)	18.855

Vol. Before Consol. (cu ft)	0.00533	Specific Gravity	2.70
Vol. Before Consol. (cc)	151.0	Assumed?	No
Change in Vol. (cc)	-3.5		
Cell Exp. (cc)	0.0	Init. Saturation	85.7
Vol. After Consol. (cc)	154.5	Init. Void Ratio	0.585
Vol. After Consol. (cu ft)	0.00546	Final Saturation	100.0
Effective Porosity %	37.23	Final Void Ratio	0.622
Pressure Difference (psi):	0.00		
C =	0.15961	Buret Constant, a	0.319
k, cm/s = C/t*log(h1/h2)		Buret Stand	12

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.00	43.2	0.3	42.9	42.9	
48.00	42.9	0.4	42.5	42.5	2.3E-07
57.00	42.7	0.6	42.1	42.1	1.9E-07
42.00	42.5	0.8	41.8	41.8	2.3E-07
76.00	42.3	0.9	41.4	41.4	1.3E-07
169.00	42.0	1.4	40.7	40.7	1.2E-07
736.00	39.9	2.9	37.1	37.1	1.5E-07
			Avg.of Last 4 Rdgs.		**1.6E-07**
			Max.Hyd.Gradient:	5.2	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP01-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/11/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/21/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	211.63	228.35
Wt. Wet Soil & Pan (g)	211.63	423.62
Wt. Dry Soil & Pan (g)	178.47	373.74
Wt. Moisture Lost (g)	33.16	49.88
Wt. of Pan Only (g)	0.00	195.27
Wt. of Dry Soil (g)	178.47	178.47
Moisture Content %	18.6	27.9
Wet Density (pcf)	118.0	124.0
Dry Density (pcf)	99.5	96.9

Init. Diameter (in)	1.932	(cm)	4.907
Init. Area (sq in)	2.932	(sq cm)	18.913
Init. Height (in)	2.330	(cm)	5.918
Height Change (in)	-0.068	(cm)	-0.173
Consol. Height (in)	2.398	(cm)	6.091
Area After Consol. (sq in)	2.925	(sq cm)	18.870

Vol. Before Consol. (cu ft)	0.00395	Specific Gravity	2.72
Vol. Before Consol. (cc)	111.9	Assumed?	Yes
Change in Vol. (cc)	-3.0		
Cell Exp. (cc)	0.0	Init. Saturation	71.6
Vol. After Consol. (cc)	114.9	Init. Void Ratio	0.706
Vol. After Consol. (cu ft)	0.0041	Final Saturation	100.0
Effective Porosity %	41.38	Final Void Ratio	0.752
Pressure Difference (psi):	0.00		
C =	0.11703	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	56.8	2.9	53.9	53.9	
31.0	52.2	7.4	44.8	44.8	5.1E-06
61.0	45.7	13.7	32.0	32.0	4.7E-06
47.0	42.1	16.9	25.2	25.2	4.3E-06
71.0	38.0	20.0	18.0	18.0	4.0E-06
104.0	36.1	21.3	14.8	14.8	1.6E-06
54.0	35.2	22.0	13.2	13.2	1.8E-06
			Avg.of Last 4 Rdgs.		**2.9E-06**
			Max.Hyd.Gradient:	8.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 99.9 pcf @ 17.9% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP01-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/11/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/21/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	211.63	224.35
Wt. Wet Soil & Pan (g)	211.63	419.62
Wt. Dry Soil & Pan (g)	178.47	373.74
Wt. Moisture Lost (g)	33.16	45.88
Wt. of Pan Only (g)	0.00	195.27
Wt. of Dry Soil (g)	178.47	178.47
Moisture Content %	18.6	25.7
Wet Density (pcf)	118.0	126.3
Dry Density (pcf)	99.5	100.4

Init. Diameter (in)	1.932	(cm)	4.907
Init. Area (sq in)	2.932	(sq cm)	18.913
Init. Height (in)	2.330	(cm)	5.918
Height Change (in)	-0.045	(cm)	-0.114
Consol. Height (in)	2.375	(cm)	6.033
Area After Consol. (sq in)	2.850	(sq cm)	18.389

Vol. Before Consol. (cu ft)	0.00395	Specific Gravity	2.72
Vol. Before Consol. (cc)	111.9	Assumed?	Yes
Change in Vol. (cc)	1.0		
Cell Exp. (cc)	0.0	Init. Saturation	71.6
Vol. After Consol. (cc)	110.9	Init. Void Ratio	0.706
Vol. After Consol. (cu ft)	0.0039	Final Saturation	100.0
Effective Porosity %	41.38	Final Void Ratio	0.691
Pressure Difference (psi):	0.00		
C =	0.11894	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	58.1	4.9	53.2	53.2	
40.0	57.3	5.6	51.7	51.7	6.2E-07
151.0	54.4	8.5	45.9	45.9	6.8E-07
945.0	44.1	17.7	26.4	26.4	5.0E-07
200.0	42.7	19.1	23.6	23.6	4.8E-07
166.0	41.7	20.2	21.5	21.5	4.8E-07
1166.0	36.1	24.2	11.9	11.9	4.4E-07
			Avg.of Last 4 Rdgs.		**4.8E-07**
			Max.Hyd.Gradient:	8.7	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 99.9 pcf @ 17.9% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP01-7	LAB NO. :	
DEPTH	4-8'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/28/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/15/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	579.10	607.99
Wt. Wet Soil & Pan (g)	579.10	718.20
Wt. Dry Soil & Pan (g)	478.18	588.39
Wt. Moisture Lost (g)	100.92	129.81
Wt. of Pan Only (g)	0.00	110.21
Wt. of Dry Soil (g)	478.18	478.18
Moisture Content %	21.1	27.1
Wet Density (pcf)	118.8	125.7
Dry Density (pcf)	98.1	98.9

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.870	(cm)	7.290
Height Change (in)	-0.057	(cm)	-0.145
Consol. Height (in)	2.927	(cm)	7.435
Area After Consol. (sq in)	6.293	(sq cm)	40.601

Vol. Before Consol. (cu ft)	0.01074	Specific Gravity	2.75
Vol. Before Consol. (cc)	304.3	Assumed?	Yes
Change in Vol. (cc)	2.4		
Cell Exp. (cc)	0.0	Init. Saturation	77.4
Vol. After Consol. (cc)	301.9	Init. Void Ratio	0.750
Vol. After Consol. (cu ft)	0.0107	Final Saturation	100.0
Effective Porosity %	42.85	Final Void Ratio	0.736
Pressure Difference (psi):	0.00		
C =	0.06639	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	49.6	3.1	46.5	46.5	
63.0	47.9	4.9	43.0	43.0	6.0E-07
58.0	46.5	6.4	40.1	40.1	5.8E-07
1045.0	33.0	19.8	13.2	13.2	5.1E-07
0.0	50.5	3.7	46.8	46.8	
32.0	49.7	4.5	45.2	45.2	5.2E-07
63.0	48.2	6.1	42.1	42.1	5.4E-07
116.0	44.8	9.8	35.0	35.0	7.7E-07
			Avg.of Last 4 Rdgs.		**5.9E-07**
			Max.Hyd.Gradient:	6.2	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 97.7 pcf @ 20.8% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP01-7	LAB NO. :	
DEPTH	4-8'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/28/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/15/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	579.10	597.79
Wt. Wet Soil & Pan (g)	579.10	708.00
Wt. Dry Soil & Pan (g)	478.18	588.39
Wt. Moisture Lost (g)	100.92	119.61
Wt. of Pan Only (g)	0.00	110.21
Wt. of Dry Soil (g)	478.18	478.18
Moisture Content %	21.1	25.0
Wet Density (pcf)	118.8	128.0
Dry Density (pcf)	98.1	102.4

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.870	(cm)	7.290
Height Change (in)	-0.034	(cm)	-0.086
Consol. Height (in)	2.904	(cm)	7.376
Area After Consol. (sq in)	6.128	(sq cm)	39.540

Vol. Before Consol. (cu ft)	0.01074	Specific Gravity	2.75
Vol. Before Consol. (cc)	304.3	Assumed?	Yes
Change in Vol. (cc)	12.6		
Cell Exp. (cc)	0.0	Init. Saturation	77.4
Vol. After Consol. (cc)	291.7	Init. Void Ratio	0.750
Vol. After Consol. (cu ft)	0.0103	Final Saturation	100.0
Effective Porosity %	42.85	Final Void Ratio	0.677
Pressure Difference (psi):	0.00		
C =	0.06764	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	59.7	2.7	57.0	57.0	
342.0	58.5	5.3	53.2	53.2	9.9E-08
1021.0	55.1	12.4	42.7	42.7	1.1E-07
1409.0	52.6	18.5	34.1	34.1	7.8E-08
421.0	52.2	20.2	32.0	32.0	7.4E-08
1031.0	50.3	23.9	26.4	26.4	9.1E-08
			Avg.of Last 4 Rdgs.		**8.7E-08**
			Max.Hyd.Gradient:	7.5	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 97.7 pcf @ 20.8% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP02-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/12/08
SAMPLE TYPE	Remolded	TEST FINISHED :	01/06/09
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	578.90	628.70
Wt. Wet Soil & Pan (g)	578.90	738.90
Wt. Dry Soil & Pan (g)	488.00	598.20
Wt. Moisture Lost (g)	90.90	140.70
Wt. of Pan Only (g)	0.00	110.20
Wt. of Dry Soil (g)	488.00	488.00
Moisture Content %	18.6	28.8
Wet Density (pcf)	116.6	125.6
Dry Density (pcf)	98.3	97.5

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.909	(cm)	7.389
Height Change (in)	-0.074	(cm)	-0.188
Consol. Height (in)	2.983	(cm)	7.577
Area After Consol. (sq in)	6.394	(sq cm)	41.257

Vol. Before Consol. (cu ft)	0.01094	Specific Gravity	2.72
Vol. Before Consol. (cc)	309.9	Assumed?	Yes
Change in Vol. (cc)	-2.7		
Cell Exp. (cc)	0.0	Init. Saturation	69.7
Vol. After Consol. (cc)	312.6	Init. Void Ratio	0.727
Vol. After Consol. (cu ft)	0.0110	Final Saturation	100.0
Effective Porosity %	42.11	Final Void Ratio	0.742
Pressure Difference (psi):	0.00		
C =	0.06680	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	49.1	1.5	47.6	47.6	
32.0	48.2	2.8	45.4	45.4	7.1E-07
60.0	46.7	4.7	42.0	42.0	6.3E-07
47.0	45.6	6.1	39.5	39.5	6.3E-07
71.0	44.2	7.9	36.3	36.3	5.8E-07
44.0	43.4	9.0	34.4	34.4	5.9E-07
			Avg.of Last 4 Rdgs.		**6.1E-07**
			Max.Hyd.Gradient:	6.1	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 98.4 pcf @ 19.4% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP02-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/12/08
SAMPLE TYPE	Remolded	TEST FINISHED :	01/06/09
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	578.90	613.70
Wt. Wet Soil & Pan (g)	578.90	723.90
Wt. Dry Soil & Pan (g)	488.00	598.20
Wt. Moisture Lost (g)	90.90	125.70
Wt. of Pan Only (g)	0.00	110.20
Wt. of Dry Soil (g)	488.00	488.00
Moisture Content %	18.6	25.8
Wet Density (pcf)	116.6	129.3
Dry Density (pcf)	98.3	102.9

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.909	(cm)	7.389
Height Change (in)	-0.034	(cm)	-0.086
Consol. Height (in)	2.943	(cm)	7.475
Area After Consol. (sq in)	6.141	(sq cm)	39.624

Vol. Before Consol. (cu ft)	0.01094	Specific Gravity	2.72
Vol. Before Consol. (cc)	309.9	Assumed?	Yes
Change in Vol. (cc)	13.7		
Cell Exp. (cc)	0.0	Init. Saturation	69.7
Vol. After Consol. (cc)	296.2	Init. Void Ratio	0.727
Vol. After Consol. (cu ft)	0.0105	Final Saturation	100.0
Effective Porosity %	42.11	Final Void Ratio	0.651
Pressure Difference (psi):	1.90		
C =	0.06862	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	52.5	1.4	51.1	184.7	
242.0	52.0	1.7	50.3	183.9	8.9E-09
1086.0	50.2	2.7	47.5	181.1	7.0E-09
416.0	49.6	3.4	46.2	179.8	8.6E-09
993.0	48.1	4.4	43.7	177.3	7.0E-09
1476.0	46.4	5.4	41.0	174.6	5.2E-09
2935.0	42.2	7.7	34.5	168.1	6.4E-09
			Avg.of Last 4 Rdgs.		**6.8E-09**
			Max.Hyd.Gradient:	24.7	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 98.4 pcf @ 19.4% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP02-7	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/06/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	581.50	630.30
Wt. Wet Soil & Pan (g)	581.56	825.60
Wt. Dry Soil & Pan (g)	496.90	692.20
Wt. Moisture Lost (g)	84.66	133.40
Wt. of Pan Only (g)	0.00	195.30
Wt. of Dry Soil (g)	496.90	496.90
Moisture Content %	17.0	26.8
Wet Density (pcf)	118.2	126.9
Dry Density (pcf)	101.0	100.1

Init. Diameter (in)	2.873	(cm)	7.297
Init. Area (sq in)	6.483	(sq cm)	41.824
Init. Height (in)	2.890	(cm)	7.341
Height Change (in)	-0.106	(cm)	-0.269
Consol. Height (in)	2.996	(cm)	7.610
Area After Consol. (sq in)	6.314	(sq cm)	40.739

Vol. Before Consol. (cu ft)	0.01084	Specific Gravity	2.72
Vol. Before Consol. (cc)	307.0	Assumed?	Yes
Change in Vol. (cc)	-3.0		
Cell Exp. (cc)	0.0	Init. Saturation	68.0
Vol. After Consol. (cc)	310.0	Init. Void Ratio	0.681
Vol. After Consol. (cu ft)	0.0109	Final Saturation	100.0
Effective Porosity %	40.50	Final Void Ratio	0.697
Pressure Difference (psi):	0.00		
C =	0.06794	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	47.8	3.3	44.5	44.5	
23.0	46.5	4.8	41.7	41.7	1.4E-06
10.0	45.9	5.3	40.6	40.6	1.3E-06
18.0	45.1	6.3	38.8	38.8	1.2E-06
17.0	44.3	7.1	37.2	37.2	1.2E-06
20.0	43.5	8.0	35.5	35.5	1.2E-06
46.0	41.4	10.0	31.4	31.4	1.3E-06
			Avg.of Last 4 Rdgs.		**1.2E-06**
			Max.Hyd.Gradient:	5.7	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 101.5 pcf @ 16.3% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP02-7	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/06/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	581.50	620.30
Wt. Wet Soil & Pan (g)	581.56	815.60
Wt. Dry Soil & Pan (g)	496.90	692.20
Wt. Moisture Lost (g)	84.66	123.40
Wt. of Pan Only (g)	0.00	195.30
Wt. of Dry Soil (g)	496.90	496.90
Moisture Content %	17.0	24.8
Wet Density (pcf)	118.2	129.1
Dry Density (pcf)	101.0	103.4

Init. Diameter (in)	2.873	(cm)	7.297
Init. Area (sq in)	6.483	(sq cm)	41.824
Init. Height (in)	2.890	(cm)	7.341
Height Change (in)	-0.054	(cm)	-0.137
Consol. Height (in)	2.944	(cm)	7.478
Area After Consol. (sq in)	6.218	(sq cm)	40.121

Vol. Before Consol. (cu ft)	0.01084	Specific Gravity	2.72
Vol. Before Consol. (cc)	307.0	Assumed?	Yes
Change in Vol. (cc)	7.0		
Cell Exp. (cc)	0.0	Init. Saturation	68.0
Vol. After Consol. (cc)	300.0	Init. Void Ratio	0.681
Vol. After Consol. (cu ft)	0.0106	Final Saturation	100.0
Effective Porosity %	40.50	Final Void Ratio	0.642
Pressure Difference (psi):	2.30		
C =	0.06779	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	53.7	2.9	50.8	212.5	
198.0	53.0	4.1	48.9	210.6	2.2E-08
1049.0	49.1	8.2	40.9	202.6	1.8E-08
112.0	48.7	8.7	40.0	201.7	2.0E-08
123.0	48.3	9.1	39.2	200.9	1.6E-08
1170.0	44.2	13.0	31.2	192.9	1.7E-08
			Avg.of Last 4 Rdgs.		**1.8E-08**
			Max.Hyd.Gradient:	28.3	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 101.5 pcf @ 16.3% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP03-7	LAB NO. :	
DEPTH	7'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/19/08
SAMPLE TYPE	Remolded	TEST FINISHED :	01/06/09
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	558.93	603.20
Wt. Wet Soil & Pan (g)	558.93	755.10
Wt. Dry Soil & Pan (g)	453.30	605.20
Wt. Moisture Lost (g)	105.63	149.90
Wt. of Pan Only (g)	0.00	151.90
Wt. of Dry Soil (g)	453.30	453.30
Moisture Content %	23.3	33.1
Wet Density (pcf)	113.9	119.7
Dry Density (pcf)	92.4	90.0

Init. Diameter (in)	2.874	(cm)	7.300
Init. Area (sq in)	6.487	(sq cm)	41.853
Init. Height (in)	2.882	(cm)	7.320
Height Change (in)	-0.024	(cm)	-0.061
Consol. Height (in)	2.906	(cm)	7.381
Area After Consol. (sq in)	6.605	(sq cm)	42.619

Vol. Before Consol. (cu ft)	0.01082	Specific Gravity	2.72
Vol. Before Consol. (cc)	306.4	Assumed?	Yes
Change in Vol. (cc)	-8.2		
Cell Exp. (cc)	0.0	Init. Saturation	75.6
Vol. After Consol. (cc)	314.6	Init. Void Ratio	0.838
Vol. After Consol. (cu ft)	0.0111	Final Saturation	100.0
Effective Porosity %	45.61	Final Void Ratio	0.888
Pressure Difference (psi):	2.20		
C =	0.06299	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	72.9	2.8	70.1	224.8	
262.0	72.7	3.0	69.7	224.4	3.1E-09
1085.0	70.9	3.7	67.2	221.9	4.7E-09
416.0	70.4	4.0	66.4	221.1	4.0E-09
993.0	69.2	4.7	64.6	219.3	3.9E-09
1478.0	67.2	5.4	61.8	216.5	3.9E-09
2933.0	64.8	7.3	57.5	212.2	3.1E-09
			Avg.of Last 4 Rdgs.		**3.7E-09**
			Max.Hyd.Gradient:	30.4	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 92.3 pcf @ 24.0% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Constant Volume

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP03-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	01/05/09
SAMPLE TYPE	Remolded	TEST FINISHED :	01/14/09
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	560.60	595.70
Wt. Wet Soil & Pan (g)	560.60	790.50
Wt. Dry Soil & Pan (g)	469.40	664.20
Wt. Moisture Lost (g)	91.20	126.30
Wt. of Pan Only (g)	0.00	194.80
Wt. of Dry Soil (g)	469.40	469.40
Moisture Content %	19.4	26.9
Wet Density (pcf)	113.8	123.9
Dry Density (pcf)	95.3	97.6

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.900	(cm)	7.366
Height Change (in)	-0.013	(cm)	-0.033
Consol. Height (in)	2.913	(cm)	7.399
Area After Consol. (sq in)	6.287	(sq cm)	40.564

Vol. Before Consol. (cu ft)	0.01086	Specific Gravity	2.70
Vol. Before Consol. (cc)	307.4	Assumed?	Yes
Change in Vol. (cc)	7.3		
Cell Exp. (cc)	0.0	Init. Saturation	68.3
Vol. After Consol. (cc)	300.1	Init. Void Ratio	0.768
Vol. After Consol. (cu ft)	0.0106	Final Saturation	100.0
Effective Porosity %	43.45	Final Void Ratio	0.726
Pressure Difference (psi):	0.00		
Gradient			

Permeability Flow Trials

Time min.	Pipette Elevation cm	Annulus Elevation cm	Z1 cm	D zp cm	Permeability k cm/sec
0.0	16.25	0.90	15.4		
0.5	16.15	0.90	15.3	0.1	1.0E-07
0.5	16.05	0.90	15.2	0.1	1.0E-07
1.0	15.90	0.95	15.0	0.2	7.6E-08
2.0	15.55	1.00	14.6	0.4	9.2E-08
10.0	13.90	1.10	12.8	1.7	1.0E-07
39.0	12.80	1.20	11.6	1.1	1.9E-08
			Avg.of Last 4 Rdgs.		**7.3E-08**

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Constant Volume

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP03-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	01/05/09
SAMPLE TYPE	Remolded	TEST FINISHED :	01/14/09
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	560.60	590.70
Wt. Wet Soil & Pan (g)	560.60	785.50
Wt. Dry Soil & Pan (g)	469.40	664.20
Wt. Moisture Lost (g)	91.20	121.30
Wt. of Pan Only (g)	0.00	194.80
Wt. of Dry Soil (g)	469.40	469.40
Moisture Content %	19.4	25.8
Wet Density (pcf)	113.8	124.9
Dry Density (pcf)	95.3	99.3

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.900	(cm)	7.366
Height Change (in)	-0.003	(cm)	-0.008
Consol. Height (in)	2.903	(cm)	7.374
Area After Consol. (sq in)	6.204	(sq cm)	40.026

Vol. Before Consol. (cu ft)	0.01086	Specific Gravity	2.70
Vol. Before Consol. (cc)	307.4	Assumed?	Yes
Change in Vol. (cc)	12.3		
Cell Exp. (cc)	0.0	Init. Saturation	68.3
Vol. After Consol. (cc)	295.1	Init. Void Ratio	0.768
Vol. After Consol. (cu ft)	0.0104	Final Saturation	100.0
Effective Porosity %	43.45	Final Void Ratio	0.698
Pressure Difference (psi):	0.00		
Gradient			

Permeability Flow Trials

Time min.	Pipette Elevation cm	Annulus Elevation cm	Z1 cm	D zp cm	Permeability k cm/sec
0.0	18.20	0.55	17.7		
1.0	18.10	0.60	17.5	0.1	4.4E-08
2.0	17.90	0.65	17.3	0.2	4.5E-08
4.0	17.60	0.70	16.9	0.3	3.4E-08
12.0	17.10	0.75	16.4	0.5	2.0E-08
15.0	16.40	0.80	15.6	0.7	2.3E-08
19.0	15.70	0.90	14.8	0.7	2.0E-08
29.0	14.70	1.00	13.7	1.0	2.0E-08
			Avg.of Last 4 Rdgs.		**2.1E-08**

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP08-2	LAB NO. :	
DEPTH	2'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/05/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/29/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	575.85	632.29
Wt. Wet Soil & Pan (g)	575.85	742.40
Wt. Dry Soil & Pan (g)	492.19	602.30
Wt. Moisture Lost (g)	83.66	140.10
Wt. of Pan Only (g)	0.00	110.11
Wt. of Dry Soil (g)	492.19	492.19
Moisture Content %	17.0	28.5
Wet Density (pcf)	118.2	123.3
Dry Density (pcf)	101.0	95.9

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.870	(cm)	7.290
Height Change (in)	-0.113	(cm)	-0.287
Consol. Height (in)	2.983	(cm)	7.577
Area After Consol. (sq in)	6.551	(sq cm)	42.268

Vol. Before Consol. (cu ft)	0.01074	Specific Gravity	2.72
Vol. Before Consol. (cc)	304.3	Assumed?	Yes
Change in Vol. (cc)	-16.0		
Cell Exp. (cc)	0.0	Init. Saturation	67.8
Vol. After Consol. (cc)	320.3	Init. Void Ratio	0.681
Vol. After Consol. (cu ft)	0.0113	Final Saturation	100.0
Effective Porosity %	40.53	Final Void Ratio	0.770
Pressure Difference (psi):	0.00		
C =	0.06520	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	49.8	0.8	49.0	49.0	
82.0	43.9	6.8	37.1	37.1	1.6E-06
25.0	42.4	8.2	34.2	34.2	1.5E-06
37.0	40.7	10.0	30.7	30.7	1.4E-06
40.0	39.1	11.6	27.5	27.5	1.3E-06
84.0	36.3	14.6	21.7	21.7	1.3E-06
			Avg.of Last 4 Rdgs.		**1.4E-06**
			Max.Hyd.Gradient:	5.7	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 99.1 pcf @ 18.7% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP08-2	LAB NO. :	
DEPTH	2'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/05/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/29/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	575.85	618.29
Wt. Wet Soil & Pan (g)	575.85	728.40
Wt. Dry Soil & Pan (g)	492.19	602.30
Wt. Moisture Lost (g)	83.66	126.10
Wt. of Pan Only (g)	0.00	110.11
Wt. of Dry Soil (g)	492.19	492.19
Moisture Content %	17.0	25.6
Wet Density (pcf)	118.2	126.0
Dry Density (pcf)	101.0	100.3

Init. Diameter (in)	2.870	(cm)	7.290
Init. Area (sq in)	6.469	(sq cm)	41.737
Init. Height (in)	2.870	(cm)	7.290
Height Change (in)	-0.070	(cm)	-0.178
Consol. Height (in)	2.940	(cm)	7.468
Area After Consol. (sq in)	6.356	(sq cm)	41.011

Vol. Before Consol. (cu ft)	0.01074	Specific Gravity	2.72
Vol. Before Consol. (cc)	304.3	Assumed?	Yes
Change in Vol. (cc)	-2.0		
Cell Exp. (cc)	0.0	Init. Saturation	67.8
Vol. After Consol. (cc)	306.3	Init. Void Ratio	0.681
Vol. After Consol. (cu ft)	0.0108	Final Saturation	100.0
Effective Porosity %	40.53	Final Void Ratio	0.692
Pressure Difference (psi):	0.00		
C =	0.06623	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	66.0	1.6	64.4	64.4	
58.0	65.8	1.8	64.0	64.0	5.1E-08
1212.0	61.4	6.5	54.9	54.9	6.1E-08
338.0	60.5	7.6	52.9	52.9	5.3E-08
1122.0	57.3	10.7	46.6	46.6	5.4E-08
1272.0	53.5	13.1	40.4	40.4	5.4E-08
1620.0	50.0	16.0	34.0	34.0	5.1E-08
			Avg.of Last 4 Rdgs.		**5.3E-08**
			Max.Hyd.Gradient:	8.6	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 99.1 pcf @ 18.7% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP08-6	LAB NO. :	
DEPTH	6'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/15/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	608.80	644.30
Wt. Wet Soil & Pan (g)	608.80	789.50
Wt. Dry Soil & Pan (g)	538.60	683.80
Wt. Moisture Lost (g)	70.20	105.70
Wt. of Pan Only (g)	0.00	145.20
Wt. of Dry Soil (g)	538.60	538.60
Moisture Content %	13.0	19.6
Wet Density (pcf)	123.8	132.5
Dry Density (pcf)	109.6	110.8

Init. Diameter (in)	2.875	(cm)	7.303
Init. Area (sq in)	6.492	(sq cm)	41.883
Init. Height (in)	2.885	(cm)	7.328
Height Change (in)	0.027	(cm)	0.069
Consol. Height (in)	2.858	(cm)	7.259
Area After Consol. (sq in)	6.480	(sq cm)	41.810

Vol. Before Consol. (cu ft)	0.01084	Specific Gravity	2.72
Vol. Before Consol. (cc)	306.9	Assumed?	Yes
Change in Vol. (cc)	3.4		
Cell Exp. (cc)	0.0	Init. Saturation	64.5
Vol. After Consol. (cc)	303.5	Init. Void Ratio	0.550
Vol. After Consol. (cu ft)	0.0107	Final Saturation	100.0
Effective Porosity %	35.48	Final Void Ratio	0.533
Pressure Difference (psi):	0.00		
C =	0.06315	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	25.5	0.5	25.0	25.0	
0.5	24.4	1.9	22.5	22.5	9.6E-05
0.5	23.2	3.0	20.2	20.2	9.9E-05
0.5	22.2	3.9	18.3	18.3	9.0E-05
0.5	21.2	4.7	16.5	16.5	9.5E-05
0.5	20.4	5.4	15.0	15.0	8.7E-05
			Avg.of Last 4 Rdgs.		**9.3E-05**
			Max.Hyd.Gradient:	3.3	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 110.5 pcf @ 12.3% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP08-6	LAB NO. :	
DEPTH	6'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/15/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	608.80	638.30
Wt. Wet Soil & Pan (g)	608.80	783.50
Wt. Dry Soil & Pan (g)	538.60	683.80
Wt. Moisture Lost (g)	70.20	99.70
Wt. of Pan Only (g)	0.00	145.20
Wt. of Dry Soil (g)	538.60	538.60
Moisture Content %	13.0	18.5
Wet Density (pcf)	123.8	133.9
Dry Density (pcf)	109.6	113.0

Init. Diameter (in)	2.875	(cm)	7.303
Init. Area (sq in)	6.492	(sq cm)	41.883
Init. Height (in)	2.885	(cm)	7.328
Height Change (in)	0.065	(cm)	0.165
Consol. Height (in)	2.820	(cm)	7.163
Area After Consol. (sq in)	6.438	(sq cm)	41.536

Vol. Before Consol. (cu ft)	0.01084	Specific Gravity	2.72
Vol. Before Consol. (cc)	306.9	Assumed?	Yes
Change in Vol. (cc)	9.4		
Cell Exp. (cc)	0.0	Init. Saturation	64.5
Vol. After Consol. (cc)	297.5	Init. Void Ratio	0.550
Vol. After Consol. (cu ft)	0.0105	Final Saturation	100.0
Effective Porosity %	35.48	Final Void Ratio	0.502
Pressure Difference (psi):	0.00		
C =	0.06272	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	44.9	3.2	41.7	41.7	
0.5	43.6	4.4	39.2	39.2	5.6E-05
0.5	42.6	5.3	37.3	37.3	4.5E-05
0.5	41.5	6.4	35.1	35.1	5.5E-05
0.5	40.6	7.1	33.5	33.5	4.2E-05
1.0	38.9	8.7	30.2	30.2	4.7E-05
3.0	34.7	12.4	22.3	22.3	4.6E-05
			Avg.of Last 4 Rdgs.		**4.8E-05**
			Max.Hyd.Gradient:	5.6	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 110.5 pcf @ 12.3% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP09-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/05/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/29/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	594.17	624.30
Wt. Wet Soil & Pan (g)	594.17	819.90
Wt. Dry Soil & Pan (g)	504.10	699.70
Wt. Moisture Lost (g)	90.07	120.20
Wt. of Pan Only (g)	0.00	195.60
Wt. of Dry Soil (g)	504.10	504.10
Moisture Content %	17.9	23.8
Wet Density (pcf)	122.6	127.6
Dry Density (pcf)	104.0	103.0

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.840	(cm)	7.214
Height Change (in)	-0.063	(cm)	-0.160
Consol. Height (in)	2.903	(cm)	7.374
Area After Consol. (sq in)	6.422	(sq cm)	41.437

Vol. Before Consol. (cu ft)	0.01068	Specific Gravity	2.72
Vol. Before Consol. (cc)	302.5	Assumed?	Yes
Change in Vol. (cc)	-3.0		
Cell Exp. (cc)	0.0	Init. Saturation	76.8
Vol. After Consol. (cc)	305.5	Init. Void Ratio	0.632
Vol. After Consol. (cu ft)	0.0108	Final Saturation	100.0
Effective Porosity %	38.74	Final Void Ratio	0.649
Pressure Difference (psi):	2.15		
C =	0.06472	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	66.3	4.7	61.6	212.8	
30.0	66.0	4.9	61.1	212.3	3.7E-08
109.0	65.1	5.8	59.3	210.5	3.7E-08
1387.0	55.6	13.7	41.9	193.1	2.9E-08
262.0	53.6	15.6	38.0	189.2	3.6E-08
			Avg.of Last 4 Rdgs.		**3.5E-08**
			Max.Hyd.Gradient:	28.8	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 102.8 pcf @ 17.5% moisture.

FLEXIBLE WALL PERMEABILITY TEST

ASTM D 5084-03

Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP09-1	LAB NO. :	
DEPTH	1'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	12/05/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/29/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	594.17	614.10
Wt. Wet Soil & Pan (g)	594.17	809.70
Wt. Dry Soil & Pan (g)	504.10	699.70
Wt. Moisture Lost (g)	90.07	110.00
Wt. of Pan Only (g)	0.00	195.60
Wt. of Dry Soil (g)	504.10	504.10
Moisture Content %	17.9	21.8
Wet Density (pcf)	122.6	129.8
Dry Density (pcf)	104.0	106.6

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.840	(cm)	7.214
Height Change (in)	-0.022	(cm)	-0.056
Consol. Height (in)	2.862	(cm)	7.269
Area After Consol. (sq in)	6.297	(sq cm)	40.628

Vol. Before Consol. (cu ft)	0.01068	Specific Gravity	2.72
Vol. Before Consol. (cc)	302.5	Assumed?	Yes
Change in Vol. (cc)	7.2		
Cell Exp. (cc)	0.0	Init. Saturation	76.8
Vol. After Consol. (cc)	295.3	Init. Void Ratio	0.632
Vol. After Consol. (cu ft)	0.0104	Final Saturation	100.0
Effective Porosity %	38.74	Final Void Ratio	0.594
Pressure Difference (psi):	4.00		
C =	0.06508	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	61.8	7.2	54.6	335.9	
1006.0	58.3	9.1	49.2	330.5	7.6E-09
401.0	57.1	10.3	46.8	328.1	8.6E-09
1041.0	53.9	12.7	41.2	322.5	7.8E-09
2893.0	45.8	19.8	26.0	307.3	7.9E-09
1430.0	41.6	22.4	19.2	300.5	7.4E-09
			Avg.of Last 4 Rdgs.		**7.9E-09**
			Max.Hyd.Gradient:	45.8	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 102.8 pcf @ 17.5% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP09-4	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/14/08
CONF. PRESSURE. (psi)	3	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	589.70	621.20
Wt. Wet Soil & Pan (g)	589.70	737.50
Wt. Dry Soil & Pan (g)	510.00	626.30
Wt. Moisture Lost (g)	79.70	111.20
Wt. of Pan Only (g)	0.00	116.30
Wt. of Dry Soil (g)	510.00	510.00
Moisture Content %	15.6	21.8
Wet Density (pcf)	120.8	130.0
Dry Density (pcf)	104.5	106.7

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.860	(cm)	7.264
Height Change (in)	0.011	(cm)	0.028
Consol. Height (in)	2.849	(cm)	7.236
Area After Consol. (sq in)	6.388	(sq cm)	41.218

Vol. Before Consol. (cu ft)	0.01076	Specific Gravity	2.72
Vol. Before Consol. (cc)	304.7	Assumed?	Yes
Change in Vol. (cc)	6.4		
Cell Exp. (cc)	0.0	Init. Saturation	68.0
Vol. After Consol. (cc)	298.3	Init. Void Ratio	0.625
Vol. After Consol. (cu ft)	0.0105	Final Saturation	100.0
Effective Porosity %	38.46	Final Void Ratio	0.591
Pressure Difference (psi):	0.00		
C =	0.06386	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	42.8	9.5	33.3	33.3	
25.0	37.3	15.1	22.2	22.2	7.5E-06
9.0	35.9	16.5	19.4	19.4	6.9E-06
11.0	34.3	18.0	16.3	16.3	7.3E-06
6.0	33.7	18.7	15.0	15.0	6.4E-06
18.0	31.9	20.5	11.4	11.4	7.0E-06
			Avg.of Last 4 Rdgs.		**7.0E-06**
			Max.Hyd.Gradient:	3.8	

General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 104.7 pcf @ 14.6% moisture.

FLEXIBLE WALL PERMEABILITY TEST
ASTM D 5084-03
Falling Head / Increasing Tailwater Pressure

CLIENT:	POWERTECH		
PROJECT:	Dewey Burdock	PROJECT NO. :	DV102-279.2
BORING NO.	TP09-4	LAB NO. :	
DEPTH	4'	SAMPLE ID:	
SAMPLE NO.	1	TEST STARTED :	11/20/08
SAMPLE TYPE	Remolded	TEST FINISHED :	12/14/08
CONF. PRESSURE. (psi)	10	SATURATED TEST:	YES

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	589.70	611.20
Wt. Wet Soil & Pan (g)	589.70	727.50
Wt. Dry Soil & Pan (g)	510.00	626.30
Wt. Moisture Lost (g)	79.70	101.20
Wt. of Pan Only (g)	0.00	116.30
Wt. of Dry Soil (g)	510.00	510.00
Moisture Content %	15.6	19.8
Wet Density (pcf)	120.8	132.4
Dry Density (pcf)	104.5	110.4

Init. Diameter (in)	2.877	(cm)	7.308
Init. Area (sq in)	6.501	(sq cm)	41.941
Init. Height (in)	2.860	(cm)	7.264
Height Change (in)	0.032	(cm)	0.081
Consol. Height (in)	2.828	(cm)	7.183
Area After Consol. (sq in)	6.220	(sq cm)	40.132

Vol. Before Consol. (cu ft)	0.01076	Specific Gravity	2.72
Vol. Before Consol. (cc)	304.7	Assumed?	Yes
Change in Vol. (cc)	16.4		
Cell Exp. (cc)	0.0	Init. Saturation	68.0
Vol. After Consol. (cc)	288.3	Init. Void Ratio	0.625
Vol. After Consol. (cu ft)	0.0102	Final Saturation	100.0
Effective Porosity %	38.46	Final Void Ratio	0.537
Pressure Difference (psi):	0.00		
C =	0.06510	Buret Constant, a	0.316
k, cm/s = C/t*log(h1/h2)			

Permeability Test Trials

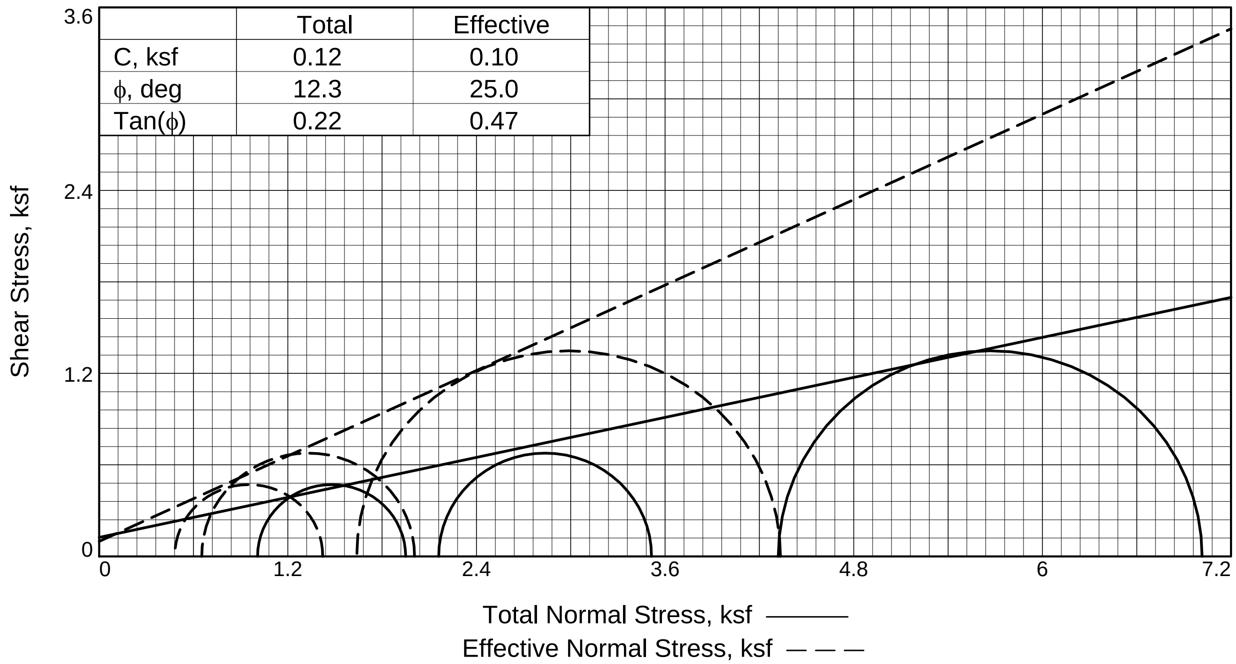
Time min.	Cap Elevation cm	Pedestal Elevation cm	Elevation Head cm	Total Head cm	Permeability k cm/sec
0.0	59.4	1.8	57.6	57.6	
198.0	58.3	2.9	55.4	55.4	9.3E-08
1049.0	52.2	8.4	43.8	43.8	1.1E-07
112.0	51.6	9.0	42.6	42.6	1.2E-07
123.0	51.0	9.6	41.4	41.4	1.1E-07
			Avg.of Last 4 Rdgs.		**1.1E-07**
			Max.Hyd.Gradient:	7.9	

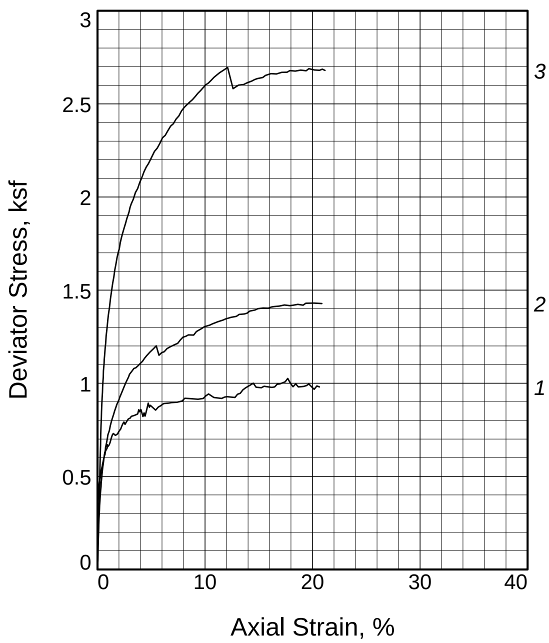
General Test Notes:
1) Tap water was used as the permeant.
2) Back pressure saturation continued until 'B' parameter a minimum of 0.95.
3) Target remolding parameters: 104.7 pcf @ 14.6% moisture.

Appendix C-5

Triaxial Test Results

	Total	Effective
C, ksf	0.12	0.10
ϕ, deg	12.3	25.0
Tan(ϕ)	0.22	0.47





Sample No.		1	2	3
Initial	Water Content, %	16.8	17.9	17.7
	Dry Density, pcf	102.6	101.9	101.8
	Saturation, %	69.7	73.1	72.2
	Void Ratio	0.6543	0.6660	0.6687
	Diameter, in.	2.43	2.43	2.43
	Height, in.	4.90	4.90	4.90
At Test	Water Content, %	27.3	25.7	23.2
	Dry Density, pcf	97.5	100.0	104.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7413	0.6987	0.6301
	Diameter, in.	2.47	2.44	2.41
	Height, in.	4.99	4.93	4.86
Strain rate, %/min.		0.03	0.03	0.03
Eff. Cell Pressure, psi		7.00	15.00	30.00
Fail. Stress, ksf		0.94	1.35	2.70
Excess Pore Pr., ksf		0.53	1.51	2.68
Strain, %		10.3	12.4	12.1
Ult. Stress, ksf				
Excess Pore Pr., ksf				
Strain, %				
$\bar{\sigma}_1$ Failure, ksf		1.42	2.01	4.33
$\bar{\sigma}_3$ Failure, ksf		0.48	0.65	1.64

Type of Test:
CU with Pore Pressures

Sample Type: Remolded, 95%MDD @ OMC

Description: lean clay with sand

LL= 43 **PL=** 11 **PI=** 32

Specific Gravity= 2.72

Remarks: Failure tangents drawn at approximately 15% strain.

Fig. _______

Client:

Project: Powertech

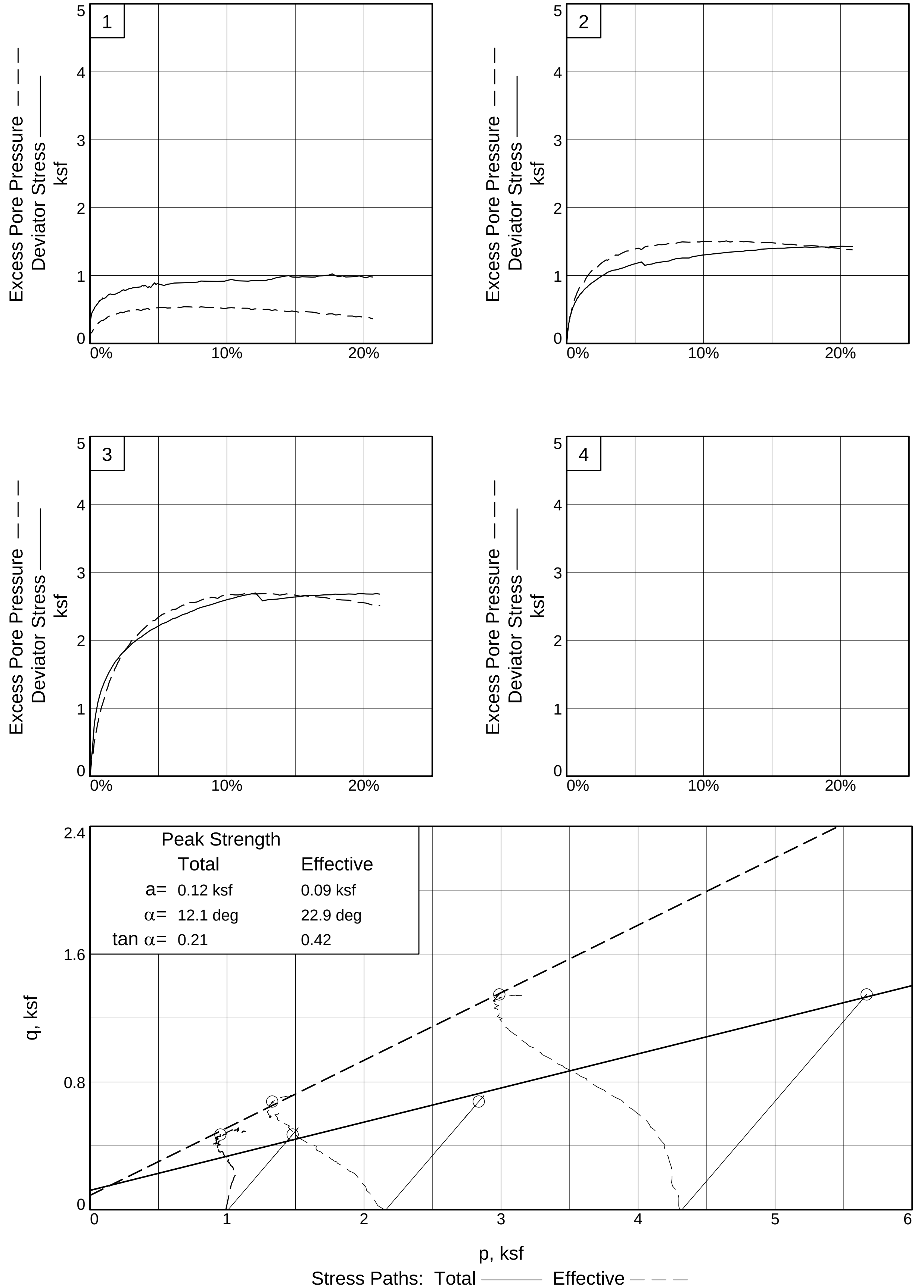
Location: TP02

Depth: 7'

Proj. No.: DV102-279.02 **Date Sampled:** 7/21/08

Knight Piésold CONSULTING

Tested By: jdb **Checked By:** spb



Client:

Project: Powertech

Location: TP02 **Depth:** 7'

Project No.: DV102-279.02 **Fig.** 15%

Knight Piesold Geotechnical Lab.

Tested By: jdb **Checked By:** spb

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

9/6/2008
2:23 PM

Date: 7/21/08
Client:
Project: Powertech
Project No.: DV102-279.02
Location: TP02
Depth: 7'
Description: lean clay with sand
Remarks: Failure tangents drawn at approximately 15% strain.
Type of Sample: Remolded, 95%MDD @ OMC
Specific Gravity=2.72 **LL=**43 **PL=**11 **PI=**32
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	715.000			920.700
Moisture content: Dry soil+tare, gms.	612.300			755.400
Moisture content: Tare, gms.	0.000			145.070
Moisture, %	16.8	24.1	27.3	27.1
Moist specimen weight, gms.	715.0			
Diameter, in.	2.43	2.43	2.47	
Area, in.²	4.64	4.64	4.80	
Height, in.	4.90	4.90	4.99	
Net decrease in height, in.		0.00	-0.09	
Wet Density, pcf	119.9	127.3	124.1	
Dry density, pcf	102.6	102.6	97.5	
Void ratio	0.6543	0.6543	0.7413	
Saturation, %	69.7	100.0	100.0	

Test Readings for Specimen No. 1

Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.064 cm
Consolidation cell pressure = 47.00 psi (6.77 ksf)
Consolidation back pressure = 40.00 psi (5.76 ksf)
Consolidation effective confining stress = 1.01 ksf
Strain rate, %/min. = 0.03
Fail. Stress = 0.94 ksf **at reading no.** 67

Test Readings for Specimen No. 1												
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-5.3826	3.016	0.0	0.0	0.00	0.99	0.99	1.00	40.11	0.99	0.00
1	-5.3813	13.875	10.9	0.0	0.33	0.87	1.20	1.37	40.96	1.03	0.16
2	-5.3801	15.018	12.0	0.0	0.36	0.86	1.22	1.42	41.01	1.04	0.18
3	-5.3789	15.732	12.7	0.1	0.38	0.86	1.24	1.45	41.06	1.05	0.19
4	-5.3777	16.862	13.8	0.1	0.42	0.85	1.26	1.49	41.12	1.05	0.21
5	-5.3764	17.667	14.7	0.1	0.44	0.84	1.28	1.52	41.13	1.06	0.22
6	-5.3740	18.603	15.6	0.2	0.47	0.83	1.30	1.56	41.23	1.07	0.23
7	-5.3715	19.146	16.1	0.2	0.48	0.81	1.30	1.59	41.36	1.05	0.24
8	-5.3691	19.614	16.6	0.3	0.50	0.80	1.29	1.62	41.47	1.05	0.25
9	-5.3679	20.083	17.1	0.3	0.51	0.79	1.30	1.64	41.49	1.05	0.26
10	-5.3654	20.737	17.7	0.3	0.53	0.78	1.31	1.68	41.60	1.04	0.26
11	-5.3642	21.050	18.0	0.4	0.54	0.77	1.31	1.70	41.66	1.04	0.27
12	-5.3605	21.607	18.6	0.4	0.56	0.75	1.30	1.74	41.81	1.02	0.28
13	-5.3593	21.905	18.9	0.5	0.56	0.74	1.31	1.76	41.83	1.03	0.28
14	-5.3556	22.518	19.5	0.5	0.58	0.72	1.31	1.80	41.97	1.01	0.29
15	-5.3544	22.841	19.8	0.6	0.59	0.72	1.31	1.82	42.01	1.01	0.30
16	-5.3519	23.135	20.1	0.6	0.60	0.70	1.30	1.85	42.11	1.00	0.30
17	-5.3507	23.430	20.4	0.6	0.61	0.70	1.31	1.87	42.13	1.01	0.30
18	-5.3495	24.026	21.0	0.7	0.63	0.70	1.33	1.90	42.14	1.01	0.31
19	-5.3482	23.680	20.7	0.7	0.62	0.70	1.31	1.88	42.16	1.00	0.31
20	-5.3458	24.338	21.3	0.7	0.64	0.69	1.32	1.93	42.23	1.00	0.32
21	-5.3384	24.896	21.9	0.9	0.65	0.67	1.32	1.98	42.38	0.99	0.33
22	-5.3372	25.534	22.5	0.9	0.67	0.67	1.34	2.00	42.35	1.01	0.33
23	-5.3348	25.186	22.2	1.0	0.66	0.67	1.33	1.99	42.36	1.00	0.33
24	-5.3286	25.563	22.5	1.1	0.67	0.65	1.32	2.03	42.48	0.99	0.33
25	-5.3237	26.047	23.0	1.2	0.68	0.64	1.32	2.07	42.57	0.98	0.34
26	-5.3188	26.818	23.8	1.3	0.71	0.62	1.33	2.14	42.69	0.97	0.35
27	-5.3139	27.441	24.4	1.4	0.72	0.61	1.33	2.19	42.78	0.97	0.36
28	-5.3090	27.720	24.7	1.5	0.73	0.60	1.33	2.22	42.83	0.97	0.37
29	-5.2992	27.415	24.4	1.7	0.72	0.59	1.31	2.22	42.90	0.95	0.36
30	-5.2894	27.753	24.7	1.9	0.73	0.58	1.31	2.26	43.00	0.94	0.36
31	-5.2845	28.149	25.1	2.0	0.74	0.57	1.31	2.30	43.04	0.94	0.37
32	-5.2747	28.703	25.7	2.2	0.75	0.56	1.31	2.36	43.14	0.93	0.38
33	-5.2698	29.284	26.3	2.3	0.77	0.54	1.32	2.41	43.22	0.93	0.39
34	-5.2649	29.753	26.7	2.4	0.78	0.56	1.34	2.41	43.14	0.95	0.39
35	-5.2600	30.070	27.1	2.5	0.79	0.55	1.34	2.44	43.18	0.95	0.40
36	-5.2551	29.664	26.6	2.6	0.78	0.54	1.32	2.44	43.24	0.93	0.39
37	-5.2502	30.011	27.0	2.7	0.79	0.53	1.32	2.47	43.29	0.93	0.39
38	-5.2404	30.704	27.7	2.9	0.81	0.53	1.33	2.53	43.35	0.93	0.40
39	-5.2306	30.975	28.0	3.0	0.81	0.54	1.36	2.50	43.23	0.95	0.41
40	-5.2257	31.284	28.3	3.1	0.82	0.53	1.35	2.55	43.32	0.94	0.41
41	-5.2110	31.561	28.5	3.4	0.83	0.51	1.34	2.62	43.46	0.92	0.41
42	-5.1963	31.909	28.9	3.7	0.83	0.52	1.35	2.61	43.39	0.94	0.42
43	-5.1914	32.763	29.7	3.8	0.86	0.51	1.37	2.67	43.44	0.94	0.43
44	-5.1865	32.350	29.3	3.9	0.85	0.50	1.35	2.68	43.51	0.92	0.42
45	-5.1816	32.834	29.8	4.0	0.86	0.50	1.36	2.71	43.52	0.93	0.43
46	-5.1718	33.152	30.1	4.2	0.82	0.49	1.31	2.67	43.59	0.90	0.41

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	-5.1669	33.894	30.9	4.3	0.84	0.51	1.35	2.66	43.49	0.93	0.42
48	-5.1620	33.321	30.3	4.4	0.82	0.51	1.33	2.62	43.48	0.92	0.41
49	-5.1571	34.180	31.2	4.5	0.85	0.50	1.35	2.69	43.53	0.92	0.42
50	-5.1522	35.167	32.2	4.6	0.87	0.49	1.36	2.78	43.61	0.92	0.44
51	-5.1473	36.004	33.0	4.7	0.89	0.49	1.38	2.83	43.61	0.93	0.45
52	-5.1424	35.286	32.3	4.8	0.87	0.48	1.35	2.80	43.64	0.92	0.44
53	-5.1375	35.708	32.7	4.9	0.88	0.48	1.36	2.83	43.65	0.92	0.44
54	-5.1130	35.163	32.1	5.4	0.86	0.48	1.33	2.79	43.69	0.90	0.43
55	-5.1007	35.934	32.9	5.7	0.87	0.48	1.36	2.80	43.63	0.92	0.44
56	-5.0884	36.377	33.4	5.9	0.88	0.48	1.36	2.82	43.64	0.92	0.44
57	-5.0762	36.938	33.9	6.1	0.89	0.47	1.36	2.90	43.74	0.91	0.45
58	-5.0517	37.397	34.4	6.6	0.89	0.47	1.37	2.88	43.70	0.92	0.45
59	-5.0394	37.682	34.7	6.9	0.90	0.47	1.36	2.92	43.76	0.91	0.45
60	-5.0149	38.122	35.1	7.4	0.90	0.47	1.37	2.91	43.74	0.92	0.45
61	-4.9904	38.731	35.7	7.9	0.90	0.48	1.38	2.89	43.67	0.93	0.45
62	-4.9782	39.455	36.4	8.1	0.92	0.47	1.39	2.96	43.75	0.93	0.46
63	-4.9537	39.763	36.7	8.6	0.92	0.48	1.39	2.93	43.69	0.93	0.46
64	-4.9169	40.230	37.2	9.3	0.91	0.48	1.39	2.91	43.67	0.94	0.46
65	-4.8924	40.779	37.8	9.8	0.92	0.49	1.41	2.86	43.57	0.95	0.46
66	-4.8801	41.487	38.5	10.1	0.93	0.48	1.42	2.93	43.64	0.95	0.47
67	-4.8679	42.073	39.1	10.3	0.94	0.48	1.42	2.96	43.66	0.95	0.47
68	-4.8434	41.778	38.8	10.8	0.92	0.49	1.41	2.90	43.62	0.95	0.46
69	-4.8066	42.224	39.2	11.6	0.92	0.49	1.41	2.88	43.61	0.95	0.46
70	-4.7944	42.686	39.7	11.8	0.93	0.51	1.43	2.82	43.47	0.97	0.46
71	-4.7821	42.983	40.0	12.0	0.93	0.50	1.43	2.86	43.54	0.96	0.46
72	-4.7453	43.450	40.4	12.8	0.92	0.51	1.43	2.82	43.48	0.97	0.46
73	-4.7331	44.342	41.3	13.0	0.94	0.50	1.44	2.87	43.50	0.97	0.47
74	-4.7208	44.758	41.7	13.3	0.95	0.52	1.47	2.82	43.39	0.99	0.47
75	-4.7086	45.653	42.6	13.5	0.96	0.51	1.47	2.88	43.45	0.99	0.48
76	-4.6963	46.311	43.3	13.8	0.97	0.52	1.49	2.88	43.39	1.01	0.49
77	-4.6596	47.974	45.0	14.5	1.00	0.54	1.54	2.86	43.26	1.04	0.50
78	-4.6473	47.361	44.3	14.7	0.98	0.53	1.51	2.85	43.32	1.02	0.49
79	-4.6228	47.702	44.7	15.2	0.98	0.55	1.52	2.79	43.22	1.03	0.49
80	-4.6105	48.262	45.2	15.5	0.98	0.54	1.52	2.83	43.27	1.03	0.49
81	-4.5738	48.728	45.7	16.2	0.98	0.55	1.52	2.79	43.21	1.03	0.49
82	-4.5615	49.063	46.0	16.5	0.98	0.55	1.53	2.77	43.15	1.04	0.49
83	-4.5493	49.869	46.9	16.7	0.99	0.56	1.56	2.77	43.09	1.06	0.50
84	-4.5370	50.203	47.2	17.0	1.00	0.56	1.55	2.79	43.13	1.06	0.50
85	-4.5248	50.651	47.6	17.2	1.00	0.58	1.58	2.72	42.96	1.08	0.50
86	-4.5125	51.133	48.1	17.5	1.01	0.57	1.58	2.76	43.03	1.08	0.50
87	-4.5003	52.099	49.1	17.7	1.03	0.57	1.59	2.80	43.05	1.08	0.51
88	-4.4880	51.276	48.3	17.9	1.00	0.59	1.59	2.70	42.92	1.09	0.50
89	-4.4758	50.792	47.8	18.2	0.98	0.58	1.56	2.68	42.95	1.07	0.49
90	-4.4635	51.698	48.7	18.4	1.00	0.59	1.58	2.70	42.92	1.09	0.50
91	-4.4512	51.281	48.3	18.7	0.98	0.60	1.58	2.62	42.81	1.09	0.49
92	-4.4267	51.881	48.9	19.2	0.98	0.60	1.59	2.63	42.81	1.09	0.49
93	-4.4145	52.327	49.3	19.4	0.99	0.62	1.60	2.61	42.73	1.11	0.49

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
94	-4.4022	52.931	49.9	19.7	1.00	0.61	1.61	2.63	42.76	1.11	0.50
95	-4.3777	52.270	49.3	20.2	0.97	0.63	1.59	2.55	42.66	1.11	0.48
96	-4.3655	53.278	50.3	20.4	0.98	0.63	1.61	2.57	42.64	1.12	0.49
97	-4.3535	53.343	50.3	20.6	0.98	0.64	1.62	2.52	42.53	1.13	0.49

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	715.600			880.700
Moisture content: Dry soil+tare, gms.	607.000			725.000
Moisture content: Tare, gms.	0.000			118.000
Moisture, %	17.9	24.5	25.7	25.7
Moist specimen weight, gms.	715.6			
Diameter, in.	2.43	2.43	2.44	
Area, in.²	4.63	4.63	4.69	
Height, in.	4.90	4.90	4.93	
Net decrease in height, in.		0.00	-0.03	
Wet Density, pcf	120.2	126.9	125.6	
Dry density, pcf	101.9	101.9	100.0	
Void ratio	0.6660	0.6660	0.6987	
Saturation, %	73.1	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.064 cm

Consolidation cell pressure = 55.00 psi (7.92 ksf)

Consolidation back pressure = 40.00 psi (5.76 ksf)

Consolidation effective confining stress = 2.16 ksf

Strain rate, %/min. = 0.03

Fail. Stress = 1.35 ksf **at reading no.** 80

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0241	2.626	0.0	0.0	0.00	2.15	2.15	1.00	40.08	2.15	0.00
1	0.0253	4.268	1.6	0.0	0.05	2.07	2.13	1.02	40.59	2.10	0.03
2	0.0265	6.300	3.7	0.0	0.11	2.02	2.13	1.06	40.96	2.08	0.06
3	0.0277	7.892	5.3	0.1	0.16	1.98	2.14	1.08	41.25	2.06	0.08
4	0.0290	9.322	6.7	0.1	0.21	1.94	2.14	1.11	41.53	2.04	0.10
5	0.0302	10.493	7.9	0.1	0.24	1.90	2.14	1.13	41.82	2.02	0.12
6	0.0314	12.103	9.5	0.1	0.29	1.87	2.16	1.16	42.03	2.01	0.15
7	0.0326	12.927	10.3	0.2	0.32	1.84	2.15	1.17	42.24	1.99	0.16
8	0.0339	13.800	11.2	0.2	0.34	1.81	2.15	1.19	42.42	1.98	0.17
9	0.0351	14.605	12.0	0.2	0.37	1.79	2.16	1.21	42.58	1.97	0.18
10	0.0363	15.561	12.9	0.2	0.40	1.77	2.16	1.22	42.73	1.96	0.20
11	0.0376	15.921	13.3	0.3	0.41	1.75	2.16	1.23	42.85	1.95	0.20
12	0.0388	16.634	14.0	0.3	0.43	1.73	2.16	1.25	42.98	1.94	0.21
13	0.0400	17.148	14.5	0.3	0.44	1.71	2.16	1.26	43.09	1.94	0.22
14	0.0412	17.868	15.2	0.3	0.47	1.68	2.15	1.28	43.30	1.92	0.23
15	0.0425	18.338	15.7	0.4	0.48	1.65	2.14	1.29	43.51	1.89	0.24
16	0.0437	18.945	16.3	0.4	0.50	1.63	2.13	1.31	43.65	1.88	0.25

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
17	0.0449	19.337	16.7	0.4	0.51	1.62	2.13	1.32	43.77	1.87	0.26
18	0.0461	19.859	17.2	0.4	0.53	1.60	2.12	1.33	43.91	1.86	0.26
19	0.0486	20.669	18.0	0.5	0.55	1.56	2.11	1.35	44.14	1.84	0.28
20	0.0498	21.028	18.4	0.5	0.56	1.55	2.11	1.36	44.26	1.83	0.28
21	0.0523	21.657	19.0	0.6	0.58	1.52	2.10	1.38	44.48	1.81	0.29
22	0.0535	22.241	19.6	0.6	0.60	1.50	2.10	1.40	44.58	1.80	0.30
23	0.0560	22.718	20.1	0.6	0.61	1.47	2.08	1.42	44.78	1.78	0.31
24	0.0572	23.102	20.5	0.7	0.62	1.46	2.08	1.43	44.86	1.77	0.31
25	0.0596	23.630	21.0	0.7	0.64	1.43	2.07	1.45	45.04	1.75	0.32
26	0.0609	24.114	21.5	0.7	0.65	1.42	2.07	1.46	45.14	1.75	0.33
27	0.0633	24.609	22.0	0.8	0.67	1.40	2.07	1.48	45.29	1.73	0.33
28	0.0658	25.020	22.4	0.8	0.68	1.38	2.06	1.50	45.45	1.72	0.34
29	0.0695	25.833	23.2	0.9	0.71	1.34	2.05	1.53	45.68	1.70	0.35
30	0.0719	26.403	23.8	1.0	0.72	1.32	2.05	1.55	45.81	1.68	0.36
31	0.0780	27.185	24.6	1.1	0.75	1.28	2.03	1.58	46.11	1.65	0.37
32	0.0829	28.094	25.5	1.2	0.77	1.26	2.03	1.61	46.23	1.65	0.39
33	0.0878	28.877	26.3	1.3	0.80	1.25	2.05	1.63	46.29	1.65	0.40
34	0.0927	29.563	26.9	1.4	0.82	1.20	2.02	1.68	46.63	1.61	0.41
35	0.0976	30.076	27.4	1.5	0.83	1.17	2.00	1.71	46.84	1.59	0.42
36	0.1025	30.811	28.2	1.6	0.85	1.15	2.00	1.74	47.04	1.57	0.43
37	0.1075	31.404	28.8	1.7	0.87	1.12	1.99	1.77	47.21	1.56	0.43
38	0.1124	31.936	29.3	1.8	0.88	1.10	1.98	1.80	47.37	1.54	0.44
39	0.1173	32.444	29.8	1.9	0.90	1.08	1.98	1.83	47.51	1.53	0.45
40	0.1222	32.919	30.3	2.0	0.91	1.06	1.97	1.86	47.64	1.52	0.46
41	0.1271	33.455	30.8	2.1	0.93	1.04	1.97	1.89	47.77	1.50	0.46
42	0.1320	33.954	31.3	2.2	0.94	1.05	1.99	1.90	47.72	1.52	0.47
43	0.1418	34.933	32.3	2.4	0.97	1.00	1.97	1.97	48.04	1.49	0.48
44	0.1516	35.982	33.4	2.6	1.00	0.97	1.97	2.03	48.27	1.47	0.50
45	0.1565	36.377	33.8	2.7	1.01	0.96	1.96	2.06	48.36	1.46	0.50
46	0.1663	37.275	34.6	2.9	1.03	0.93	1.96	2.11	48.55	1.45	0.52
47	0.1712	37.797	35.2	3.0	1.05	0.93	1.98	2.12	48.52	1.46	0.52
48	0.1810	38.407	35.8	3.2	1.06	0.91	1.97	2.18	48.71	1.44	0.53
49	0.1908	38.992	36.4	3.4	1.08	0.88	1.96	2.23	48.89	1.42	0.54
50	0.2006	39.219	36.6	3.6	1.08	0.86	1.94	2.26	49.05	1.40	0.54
51	0.2104	39.659	37.0	3.8	1.09	0.86	1.95	2.27	49.04	1.41	0.55
52	0.2202	40.137	37.5	4.0	1.11	0.84	1.94	2.32	49.20	1.39	0.55
53	0.2300	40.606	38.0	4.2	1.12	0.82	1.93	2.37	49.33	1.37	0.56
54	0.2398	41.248	38.6	4.4	1.13	0.80	1.93	2.42	49.45	1.37	0.57
55	0.2496	41.796	39.2	4.6	1.15	0.80	1.94	2.44	49.47	1.37	0.57
56	0.2643	42.582	40.0	4.9	1.17	0.78	1.94	2.50	49.61	1.36	0.58
57	0.2814	43.391	40.8	5.2	1.19	0.75	1.94	2.57	49.76	1.35	0.59
58	0.2937	44.015	41.4	5.5	1.20	0.78	1.98	2.55	49.60	1.38	0.60
59	0.3059	44.467	41.8	5.7	1.15	0.74	1.89	2.56	49.88	1.31	0.57
60	0.3182	45.141	42.5	6.0	1.16	0.73	1.89	2.60	49.96	1.31	0.58
61	0.3305	45.541	42.9	6.2	1.17	0.74	1.91	2.58	49.87	1.32	0.58
62	0.3427	46.303	43.7	6.5	1.19	0.72	1.90	2.65	50.02	1.31	0.59
63	0.3550	46.814	44.2	6.7	1.19	0.70	1.90	2.70	50.11	1.30	0.60

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
64	0.3672	47.271	44.6	7.0	1.20	0.71	1.91	2.70	50.10	1.31	0.60
65	0.3795	47.713	45.1	7.2	1.21	0.70	1.91	2.72	50.13	1.31	0.60
66	0.3917	48.157	45.5	7.5	1.21	0.69	1.90	2.76	50.22	1.30	0.61
67	0.4040	49.044	46.4	7.7	1.23	0.68	1.91	2.81	50.28	1.30	0.62
68	0.4162	49.768	47.1	8.0	1.25	0.69	1.93	2.82	50.24	1.31	0.62
69	0.4285	50.144	47.5	8.2	1.25	0.67	1.92	2.86	50.33	1.30	0.63
70	0.4407	50.655	48.0	8.4	1.26	0.66	1.92	2.90	50.38	1.29	0.63
71	0.4652	51.063	48.4	8.9	1.26	0.67	1.93	2.88	50.35	1.30	0.63
72	0.4775	51.983	49.4	9.2	1.28	0.66	1.94	2.93	50.40	1.30	0.64
73	0.5020	53.032	50.4	9.7	1.29	0.67	1.96	2.95	50.38	1.31	0.65
74	0.5142	53.593	51.0	9.9	1.30	0.66	1.96	2.98	50.44	1.31	0.65
75	0.5387	54.399	51.8	10.4	1.31	0.66	1.97	2.98	50.41	1.32	0.66
76	0.5510	54.881	52.3	10.7	1.32	0.65	1.97	3.02	50.46	1.31	0.66
77	0.5755	55.785	53.2	11.2	1.33	0.66	1.99	3.00	50.39	1.33	0.66
78	0.6000	56.633	54.0	11.7	1.34	0.65	1.99	3.06	50.49	1.32	0.67
79	0.6122	57.097	54.5	11.9	1.35	0.67	2.01	3.02	50.38	1.34	0.67
80	0.6367	57.924	55.3	12.4	1.35	0.65	2.01	3.08	50.47	1.33	0.68
81	0.6612	58.636	56.0	12.9	1.36	0.66	2.02	3.05	50.40	1.34	0.68
82	0.6735	59.258	56.6	13.2	1.37	0.66	2.03	3.08	50.43	1.34	0.68
83	0.6980	59.894	57.3	13.7	1.37	0.67	2.04	3.05	50.36	1.35	0.69
84	0.7103	60.316	57.7	13.9	1.38	0.67	2.04	3.07	50.38	1.35	0.69
85	0.7225	61.012	58.4	14.2	1.39	0.68	2.06	3.05	50.30	1.37	0.69
86	0.7470	61.787	59.2	14.7	1.39	0.67	2.07	3.07	50.33	1.37	0.70
87	0.7593	62.328	59.7	14.9	1.40	0.68	2.08	3.07	50.31	1.38	0.70
88	0.7838	63.017	60.4	15.4	1.40	0.69	2.09	3.05	50.24	1.39	0.70
89	0.8083	63.545	60.9	15.9	1.40	0.70	2.10	3.01	50.15	1.40	0.70
90	0.8205	64.048	61.4	16.1	1.41	0.70	2.11	3.02	50.15	1.40	0.70
91	0.8328	64.441	61.8	16.4	1.41	0.70	2.11	3.02	50.16	1.40	0.71
92	0.8573	65.136	62.5	16.9	1.41	0.71	2.13	2.98	50.05	1.42	0.71
93	0.8818	65.948	63.3	17.4	1.42	0.72	2.14	2.96	49.98	1.43	0.71
94	0.9063	66.397	63.8	17.9	1.42	0.72	2.14	2.97	50.00	1.43	0.71
95	0.9185	66.782	64.2	18.1	1.42	0.72	2.14	2.97	49.99	1.43	0.71
96	0.9430	67.570	64.9	18.6	1.42	0.73	2.16	2.94	49.92	1.44	0.71
97	0.9675	68.032	65.4	19.1	1.42	0.75	2.17	2.89	49.78	1.46	0.71
98	0.9798	68.758	66.1	19.4	1.43	0.75	2.18	2.91	49.81	1.46	0.71
99	1.0165	69.738	67.1	20.1	1.43	0.77	2.20	2.87	49.69	1.48	0.72
100	1.0531	70.587	68.0	20.9	1.43	0.78	2.21	2.83	49.57	1.50	0.71

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	714.700			863.000
Moisture content: Dry soil+tare, gms.	607.000			725.400
Moisture content: Tare, gms.	0.000			118.400
Moisture, %	17.7	24.6	23.2	22.7
Moist specimen weight, gms.	714.7			
Diameter, in.	2.43	2.43	2.41	
Area, in.²	4.64	4.64	4.57	
Height, in.	4.90	4.90	4.86	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	119.8	126.8	128.3	
Dry density, pcf	101.8	101.8	104.2	
Void ratio	0.6687	0.6687	0.6301	
Saturation, %	72.2	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.064 cm

Consolidation cell pressure = 70.00 psi (10.08 ksf)

Consolidation back pressure = 40.00 psi (5.76 ksf)

Consolidation effective confining stress = 4.32 ksf

Strain rate, %/min. = 0.03

Fail. Stress = 2.70 ksf **at reading no.** 86

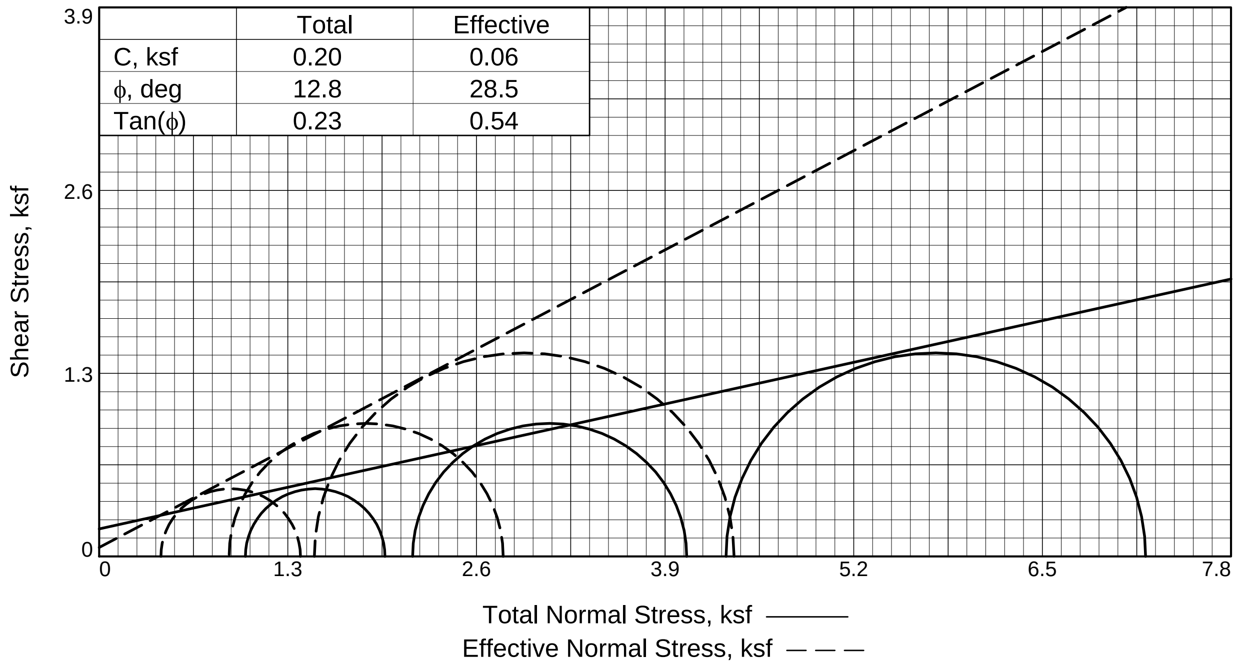
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0616	2.926	0.0	0.0	0.00	4.30	4.30	1.00	40.12	4.30	0.00
1	0.0628	4.362	1.4	0.0	0.05	4.27	4.32	1.01	40.32	4.30	0.02
2	0.0640	7.571	4.6	0.1	0.15	4.22	4.37	1.03	40.67	4.30	0.07
3	0.0652	9.582	6.7	0.1	0.21	4.19	4.40	1.05	40.93	4.29	0.10
4	0.0665	11.271	8.3	0.1	0.26	4.14	4.40	1.06	41.27	4.27	0.13
5	0.0677	12.274	9.3	0.1	0.29	4.10	4.40	1.07	41.50	4.25	0.15
6	0.0689	13.711	10.8	0.2	0.34	4.07	4.41	1.08	41.71	4.24	0.17
7	0.0702	15.179	12.3	0.2	0.39	4.05	4.44	1.10	41.85	4.25	0.19
8	0.0714	17.840	14.9	0.2	0.47	4.01	4.48	1.12	42.13	4.25	0.23
9	0.0726	19.893	17.0	0.2	0.53	3.97	4.51	1.13	42.40	4.24	0.27
10	0.0738	22.324	19.4	0.3	0.61	3.92	4.53	1.16	42.76	4.23	0.31
11	0.0751	24.021	21.1	0.3	0.66	3.89	4.55	1.17	43.00	4.22	0.33
12	0.0763	25.897	23.0	0.3	0.72	3.84	4.56	1.19	43.34	4.20	0.36
13	0.0775	27.536	24.6	0.3	0.77	3.81	4.58	1.20	43.57	4.19	0.39
14	0.0787	28.841	25.9	0.4	0.81	3.79	4.60	1.21	43.69	4.20	0.41
15	0.0800	29.902	27.0	0.4	0.85	3.75	4.60	1.23	43.94	4.18	0.42
16	0.0812	31.249	28.3	0.4	0.89	3.71	4.60	1.24	44.23	4.16	0.44
17	0.0824	32.367	29.4	0.4	0.92	3.68	4.61	1.25	44.43	4.14	0.46
18	0.0837	33.218	30.3	0.5	0.95	3.67	4.62	1.26	44.53	4.14	0.48
19	0.0849	34.148	31.2	0.5	0.98	3.64	4.62	1.27	44.73	4.13	0.49
20	0.0861	35.092	32.2	0.5	1.01	3.61	4.62	1.28	44.95	4.11	0.50
21	0.0873	35.846	32.9	0.5	1.03	3.57	4.61	1.29	45.17	4.09	0.52
22	0.0886	36.942	34.0	0.6	1.07	3.55	4.62	1.30	45.36	4.08	0.53
23	0.0910	38.204	35.3	0.6	1.11	3.51	4.62	1.31	45.60	4.07	0.55
24	0.0922	38.901	36.0	0.6	1.13	3.49	4.62	1.32	45.78	4.05	0.56

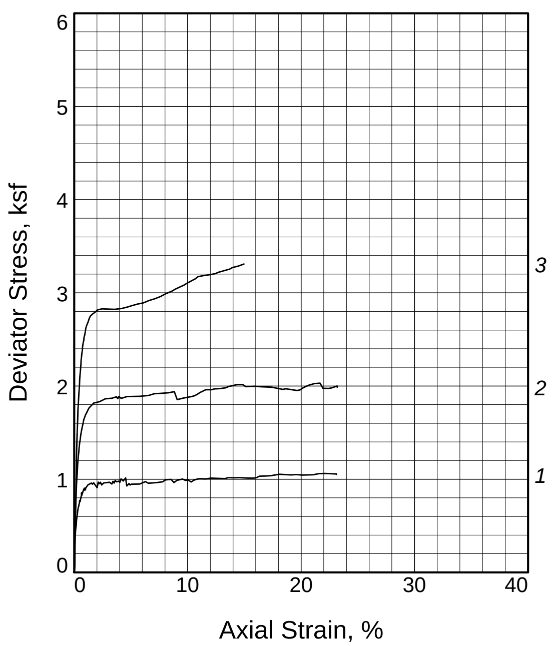
Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
25	0.0935	39.502	36.6	0.7	1.15	3.46	4.61	1.33	45.98	4.03	0.57
26	0.0959	40.951	38.0	0.7	1.19	3.41	4.60	1.35	46.30	4.01	0.60
27	0.0984	41.719	38.8	0.8	1.21	3.38	4.60	1.36	46.52	3.99	0.61
28	0.1008	43.038	40.1	0.8	1.25	3.33	4.59	1.38	46.85	3.96	0.63
29	0.1033	43.985	41.1	0.9	1.28	3.29	4.57	1.39	47.15	3.93	0.64
30	0.1057	44.822	41.9	0.9	1.31	3.27	4.58	1.40	47.31	3.92	0.65
31	0.1082	45.724	42.8	1.0	1.34	3.23	4.57	1.41	47.57	3.90	0.67
32	0.1106	46.737	43.8	1.0	1.37	3.20	4.56	1.43	47.80	3.88	0.68
33	0.1155	48.083	45.2	1.1	1.41	3.13	4.54	1.45	48.28	3.83	0.70
34	0.1205	49.605	46.7	1.2	1.45	3.06	4.51	1.48	48.78	3.78	0.73
35	0.1254	51.001	48.1	1.3	1.50	3.00	4.50	1.50	49.15	3.75	0.75
36	0.1303	52.384	49.5	1.4	1.54	2.93	4.47	1.52	49.65	3.70	0.77
37	0.1352	53.468	50.5	1.5	1.57	2.89	4.46	1.54	49.94	3.67	0.78
38	0.1401	54.739	51.8	1.6	1.61	2.82	4.43	1.57	50.38	3.63	0.80
39	0.1450	55.808	52.9	1.7	1.64	2.80	4.44	1.58	50.53	3.62	0.82
40	0.1499	56.994	54.1	1.8	1.67	2.74	4.41	1.61	50.99	3.58	0.84
41	0.1548	57.907	55.0	1.9	1.70	2.71	4.41	1.63	51.21	3.56	0.85
42	0.1597	58.625	55.7	2.0	1.72	2.65	4.37	1.65	51.57	3.51	0.86
43	0.1646	59.712	56.8	2.1	1.75	2.62	4.37	1.67	51.80	3.50	0.88
44	0.1695	60.639	57.7	2.2	1.78	2.57	4.35	1.69	52.15	3.46	0.89
45	0.1744	61.431	58.5	2.3	1.80	2.55	4.35	1.71	52.31	3.45	0.90
46	0.1793	62.175	59.2	2.4	1.82	2.50	4.33	1.73	52.62	3.41	0.91
47	0.1891	63.506	60.6	2.6	1.86	2.45	4.31	1.76	52.99	3.38	0.93
48	0.1940	64.300	61.4	2.7	1.88	2.43	4.31	1.78	53.15	3.37	0.94
49	0.2038	65.605	62.7	2.9	1.92	2.37	4.29	1.81	53.56	3.33	0.96
50	0.2087	66.473	63.5	3.0	1.94	2.33	4.27	1.84	53.85	3.30	0.97
51	0.2136	67.120	64.2	3.1	1.96	2.31	4.27	1.85	53.94	3.29	0.98
52	0.2234	68.144	65.2	3.3	1.99	2.27	4.26	1.87	54.21	3.27	0.99
53	0.2332	69.442	66.5	3.5	2.02	2.23	4.25	1.91	54.51	3.24	1.01
54	0.2430	70.290	67.4	3.7	2.05	2.19	4.23	1.94	54.82	3.21	1.02
55	0.2528	71.513	68.6	3.9	2.08	2.15	4.23	1.97	55.08	3.19	1.04
56	0.2626	72.607	69.7	4.1	2.11	2.11	4.22	2.00	55.34	3.16	1.05
57	0.2724	73.748	70.8	4.3	2.14	2.07	4.20	2.03	55.64	3.14	1.07
58	0.2822	74.703	71.8	4.5	2.16	2.04	4.20	2.06	55.85	3.12	1.08
59	0.2920	75.431	72.5	4.7	2.18	2.03	4.21	2.07	55.92	3.12	1.09
60	0.3018	76.403	73.5	4.9	2.20	1.99	4.19	2.11	56.18	3.09	1.10
61	0.3189	78.077	75.2	5.3	2.24	1.94	4.18	2.16	56.54	3.06	1.12
62	0.3312	78.852	75.9	5.5	2.26	1.92	4.19	2.18	56.64	3.05	1.13
63	0.3435	79.959	77.0	5.8	2.29	1.89	4.18	2.21	56.90	3.03	1.14
64	0.3557	81.144	78.2	6.0	2.32	1.87	4.19	2.24	57.02	3.03	1.16
65	0.3680	81.794	78.9	6.3	2.33	1.86	4.19	2.25	57.09	3.02	1.17
66	0.3802	82.875	79.9	6.6	2.36	1.83	4.18	2.29	57.30	3.01	1.18
67	0.3925	83.929	81.0	6.8	2.38	1.80	4.18	2.32	57.50	2.99	1.19
68	0.4047	84.568	81.6	7.1	2.39	1.81	4.20	2.32	57.43	3.01	1.20
69	0.4170	85.653	82.7	7.3	2.42	1.76	4.18	2.37	57.77	2.97	1.21
70	0.4292	86.446	83.5	7.6	2.43	1.77	4.20	2.38	57.74	2.98	1.22
71	0.4415	87.606	84.7	7.8	2.46	1.76	4.22	2.40	57.80	2.99	1.23

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
72	0.4537	88.494	85.6	8.1	2.48	1.73	4.22	2.43	57.96	2.97	1.24
73	0.4660	89.245	86.3	8.3	2.50	1.71	4.21	2.46	58.11	2.96	1.25
74	0.4782	89.963	87.0	8.6	2.51	1.72	4.23	2.46	58.04	2.98	1.25
75	0.4905	90.644	87.7	8.8	2.52	1.69	4.21	2.49	58.28	2.95	1.26
76	0.5027	91.459	88.5	9.1	2.54	1.69	4.23	2.50	58.25	2.96	1.27
77	0.5150	92.332	89.4	9.3	2.56	1.70	4.26	2.50	58.17	2.98	1.28
78	0.5272	93.103	90.2	9.6	2.57	1.67	4.24	2.54	58.41	2.96	1.29
79	0.5395	93.894	91.0	9.8	2.59	1.66	4.25	2.56	58.48	2.95	1.29
80	0.5517	94.681	91.8	10.1	2.60	1.66	4.26	2.57	58.51	2.96	1.30
81	0.5640	95.311	92.4	10.3	2.61	1.65	4.26	2.59	58.57	2.95	1.31
82	0.5762	96.097	93.2	10.6	2.63	1.65	4.28	2.59	58.53	2.97	1.31
83	0.5885	96.889	94.0	10.8	2.64	1.65	4.29	2.60	58.53	2.97	1.32
84	0.6130	98.282	95.4	11.3	2.67	1.63	4.30	2.63	58.66	2.97	1.33
85	0.6375	99.522	96.6	11.8	2.69	1.64	4.32	2.64	58.64	2.98	1.34
86	0.6497	100.160	97.2	12.1	2.70	1.64	4.33	2.65	58.62	2.99	1.35
87	0.6742	101.546	98.6	12.6	2.58	1.63	4.21	2.58	58.66	2.92	1.29
88	0.6987	102.981	100.1	13.1	2.60	1.63	4.23	2.59	58.66	2.93	1.30
89	0.7232	103.892	101.0	13.6	2.60	1.64	4.25	2.59	58.59	2.94	1.30
90	0.7355	104.580	101.7	13.9	2.61	1.66	4.27	2.58	58.50	2.96	1.31
91	0.7600	105.799	102.9	14.4	2.62	1.64	4.26	2.60	58.63	2.95	1.31
92	0.7723	106.503	103.6	14.6	2.63	1.65	4.28	2.60	58.55	2.96	1.32
93	0.7845	107.103	104.2	14.9	2.64	1.65	4.29	2.60	58.53	2.97	1.32
94	0.8090	108.157	105.2	15.4	2.64	1.67	4.31	2.58	58.39	2.99	1.32
95	0.8213	108.979	106.1	15.6	2.65	1.66	4.31	2.60	58.47	2.99	1.33
96	0.8458	110.183	107.3	16.1	2.66	1.68	4.34	2.59	58.35	3.01	1.33
97	0.8703	110.982	108.1	16.6	2.66	1.68	4.34	2.58	58.31	3.01	1.33
98	0.8948	112.167	109.2	17.1	2.67	1.69	4.36	2.58	58.25	3.03	1.33
99	0.9193	113.081	110.2	17.6	2.67	1.71	4.38	2.56	58.13	3.04	1.34
100	0.9315	113.861	110.9	17.9	2.68	1.72	4.40	2.56	58.07	3.06	1.34
101	0.9560	114.659	111.7	18.4	2.68	1.73	4.40	2.55	58.01	3.07	1.34
102	0.9805	115.769	112.8	18.9	2.68	1.73	4.41	2.55	57.98	3.07	1.34
103	1.0050	116.558	113.6	19.4	2.68	1.76	4.44	2.52	57.78	3.10	1.34
104	1.0173	117.449	114.5	19.7	2.69	1.76	4.45	2.53	57.77	3.11	1.34
105	1.0418	118.107	115.2	20.2	2.68	1.77	4.45	2.51	57.70	3.11	1.34
106	1.0663	119.001	116.1	20.7	2.68	1.80	4.48	2.49	57.48	3.14	1.34
107	1.0786	119.725	116.8	20.9	2.69	1.80	4.49	2.49	57.47	3.15	1.34
108	1.0907	119.925	117.0	21.2	2.68	1.81	4.49	2.48	57.44	3.15	1.34





Sample No.		1	2	3
Initial	Water Content, %	12.8	12.5	12.5
	Dry Density, pcf	110.5	110.8	109.7
	Saturation, %	64.7	63.9	62.1
	Void Ratio	0.5366	0.5328	0.5478
	Diameter, in.	2.42	2.42	2.43
	Height, in.	4.97	4.97	4.98
At Test	Water Content, %	19.0	18.4	17.8
	Dry Density, pcf	111.9	113.2	114.4
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5181	0.5006	0.4841
	Diameter, in.	2.41	2.40	2.40
	Height, in.	4.95	4.93	4.91
Strain rate, %/min.		0.05	0.05	0.05
Eff. Cell Pressure, psi		7.00	15.00	30.00
Fail. Stress, ksf		0.96	1.89	2.89
Excess Pore Pr., ksf		0.58	1.26	2.84
Strain, %		6.0	5.8	6.1
Ult. Stress, ksf				
Excess Pore Pr., ksf				
Strain, %				
$\bar{\sigma}_1$ Failure, ksf		1.39	2.78	4.37
$\bar{\sigma}_3$ Failure, ksf		0.43	0.90	1.48

Type of Test:
CU with Pore Pressures

Sample Type: Remolded, 95%MDD @ OMC

Description: sandy lean clay

LL= 21 **PL=** 12 **PI=** 9

Specific Gravity= 2.72

Remarks: Failure tangents drawn at approximately 6% strain.

Fig. _______

Client:

Project: Powertech

Location: TP08

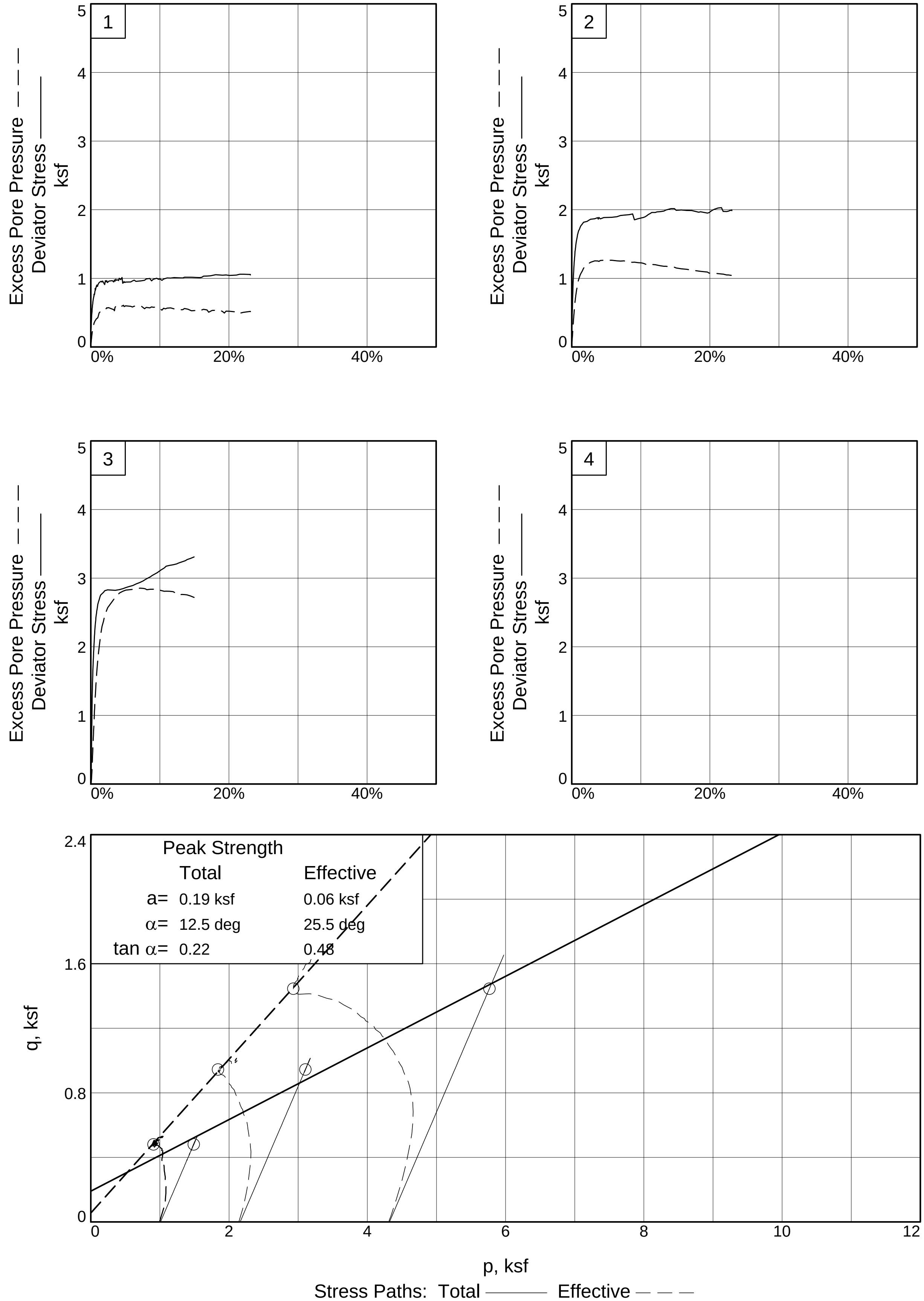
Depth: 6'

Proj. No.: DV102-279.02 **Date Sampled:** 7/21/08

Knight Piésold CONSULTING

Tested By: jdb **Checked By:** spb

Cursory interpretations provided require review by a professional engineer. Knight Piesold accepts no responsibility in subsequent analyses.



Client:
Project: Powertech
Location: TP08 **Depth:** 6'
Project No.: DV102-279.02 **Fig.** 6%

Knight Piesold Geotechnical Lab.

Tested By: jdb **Checked By:** spb

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

Date: 7/21/08
Client:
Project: Powertech
Project No.: DV102-279.02
Location: TP08
Depth: 6'
Description: sandy lean clay
Remarks: Failure tangents drawn at approximately 6% strain.
Type of Sample: Remolded, 95%MDD @ OMC
Specific Gravity=2.72 **LL=**21 **PL=**12 **PI=**9
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	747.800			905.900
Moisture content: Dry soil+tare, gms.	663.100			781.400
Moisture content: Tare, gms.	0.000			118.300
Moisture, %	12.8	19.7	19.0	18.8
Moist specimen weight, gms.	747.8			
Diameter, in.	2.42	2.42	2.41	
Area, in.^{2}	4.60	4.60	4.56	
Height, in.	4.97	4.97	4.95	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	124.6	132.3	133.2	
Dry density, pcf	110.5	110.5	111.9	
Void ratio	0.5366	0.5366	0.5181	
Saturation, %	64.7	100.0	100.0	

Test Readings for Specimen No. 1

Membrane modulus = 0.124105 kN/cm^2
Membrane thickness = 0.064 cm
Consolidation cell pressure = 47.00 psi (6.77 ksf)
Consolidation back pressure = 40.00 psi (5.76 ksf)
Consolidation effective confining stress = 1.01 ksf
Strain rate, %/min. = 0.05
Fail. Stress = 0.96 ksf **at reading no.** 63

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-0.0292	1.913	0.0	0.0	0.00	0.99	0.99	1.00	40.10	0.99	0.00
1	-0.0279	9.185	7.3	0.0	0.23	0.96	1.19	1.24	40.32	1.08	0.11
2	-0.0267	11.033	9.1	0.1	0.29	0.94	1.22	1.31	40.51	1.08	0.14
3	-0.0254	13.266	11.4	0.1	0.36	0.91	1.27	1.39	40.69	1.09	0.18
4	-0.0242	14.894	13.0	0.1	0.41	0.88	1.29	1.46	40.88	1.09	0.20
5	-0.0229	16.603	14.7	0.1	0.46	0.86	1.32	1.54	41.03	1.09	0.23
6	-0.0204	18.155	16.2	0.2	0.51	0.82	1.33	1.62	41.31	1.08	0.26
7	-0.0192	19.526	17.6	0.2	0.55	0.80	1.36	1.69	41.44	1.08	0.28
8	-0.0179	20.377	18.5	0.2	0.58	0.78	1.36	1.74	41.57	1.07	0.29
9	-0.0167	21.238	19.3	0.3	0.61	0.77	1.37	1.79	41.69	1.07	0.30
10	-0.0154	21.881	20.0	0.3	0.63	0.75	1.38	1.84	41.80	1.06	0.31
11	-0.0142	22.638	20.7	0.3	0.65	0.74	1.39	1.89	41.89	1.06	0.33
12	-0.0117	23.972	22.1	0.4	0.69	0.71	1.41	1.97	42.05	1.06	0.35
13	-0.0105	24.370	22.5	0.4	0.71	0.70	1.41	2.01	42.13	1.05	0.35
14	-0.0092	24.699	22.8	0.4	0.72	0.69	1.40	2.04	42.22	1.05	0.36
15	-0.0080	25.197	23.3	0.4	0.73	0.68	1.41	2.08	42.28	1.05	0.37
16	-0.0067	25.483	23.6	0.5	0.74	0.67	1.41	2.11	42.35	1.04	0.37
17	-0.0055	26.456	24.5	0.5	0.77	0.66	1.43	2.17	42.42	1.04	0.39
18	-0.0030	26.156	24.2	0.5	0.76	0.65	1.41	2.17	42.50	1.03	0.38
19	-0.0017	26.790	24.9	0.6	0.78	0.64	1.42	2.22	42.56	1.03	0.39
20	-0.0005	27.247	25.3	0.6	0.79	0.64	1.43	2.25	42.58	1.03	0.40
21	0.0008	27.779	25.9	0.6	0.81	0.63	1.44	2.28	42.61	1.04	0.41
22	0.0020	28.120	26.2	0.6	0.82	0.63	1.45	2.31	42.65	1.04	0.41
23	0.0033	29.184	27.3	0.7	0.86	0.62	1.48	2.37	42.68	1.05	0.43
24	0.0045	28.393	26.5	0.7	0.83	0.62	1.45	2.34	42.70	1.03	0.42
25	0.0057	28.786	26.9	0.7	0.84	0.62	1.46	2.37	42.72	1.04	0.42
26	0.0082	29.517	27.6	0.8	0.86	0.61	1.47	2.43	42.79	1.04	0.43
27	0.0120	30.323	28.4	0.8	0.89	0.60	1.49	2.49	42.86	1.04	0.44
28	0.0132	30.019	28.1	0.9	0.88	0.59	1.47	2.48	42.88	1.03	0.44
29	0.0145	30.742	28.8	0.9	0.90	0.59	1.49	2.52	42.88	1.04	0.45
30	0.0157	30.462	28.5	0.9	0.89	0.59	1.48	2.51	42.90	1.04	0.45
31	0.0170	30.784	28.9	0.9	0.90	0.59	1.49	2.53	42.91	1.04	0.45
32	0.0195	30.196	28.3	1.0	0.88	0.58	1.47	2.52	42.96	1.02	0.44
33	0.0207	30.817	28.9	1.0	0.90	0.58	1.48	2.55	42.96	1.03	0.45
34	0.0307	32.035	30.1	1.2	0.94	0.51	1.45	2.83	43.45	0.98	0.47
35	0.0456	32.740	30.8	1.5	0.96	0.48	1.44	3.00	43.68	0.96	0.48
36	0.0505	32.390	30.5	1.6	0.95	0.47	1.42	3.00	43.71	0.95	0.47
37	0.0555	32.931	31.0	1.7	0.96	0.47	1.43	3.05	43.74	0.95	0.48
38	0.0704	31.293	29.4	2.0	0.91	0.45	1.36	3.02	43.88	0.90	0.45
39	0.0754	33.245	31.3	2.1	0.97	0.45	1.42	3.16	43.88	0.93	0.48
40	0.0804	32.766	30.9	2.2	0.95	0.45	1.40	3.11	43.87	0.93	0.48
41	0.0854	33.283	31.4	2.3	0.97	0.44	1.40	3.22	43.97	0.92	0.48
42	0.0903	32.376	30.5	2.4	0.94	0.44	1.38	3.13	43.94	0.91	0.47
43	0.0953	32.795	30.9	2.5	0.95	0.43	1.38	3.19	43.99	0.91	0.48
44	0.1003	33.141	31.2	2.6	0.96	0.44	1.40	3.20	43.97	0.92	0.48
45	0.1252	33.530	31.6	3.1	0.97	0.46	1.42	3.12	43.84	0.94	0.48
46	0.1351	32.961	31.0	3.3	0.95	0.46	1.41	3.05	43.79	0.94	0.47

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	0.1401	33.961	32.0	3.4	0.98	0.48	1.46	3.04	43.67	0.97	0.49
48	0.1451	33.387	31.5	3.5	0.96	0.43	1.39	3.24	44.02	0.91	0.48
49	0.1500	34.336	32.4	3.6	0.99	0.42	1.40	3.36	44.09	0.91	0.49
50	0.1550	33.896	32.0	3.7	0.97	0.43	1.40	3.28	44.03	0.91	0.49
51	0.1650	34.216	32.3	3.9	0.98	0.42	1.40	3.32	44.07	0.91	0.49
52	0.1699	33.828	31.9	4.0	0.97	0.41	1.38	3.34	44.13	0.90	0.48
53	0.1749	35.039	33.1	4.1	1.00	0.42	1.42	3.39	44.09	0.92	0.50
54	0.1799	34.691	32.8	4.2	0.99	0.41	1.40	3.43	44.17	0.90	0.50
55	0.1849	34.383	32.5	4.3	0.98	0.42	1.40	3.36	44.11	0.91	0.49
56	0.1948	35.541	33.6	4.5	1.01	0.41	1.42	3.46	44.14	0.92	0.51
57	0.1998	34.414	32.5	4.6	0.93	0.41	1.34	3.28	44.17	0.87	0.46
58	0.2047	34.860	32.9	4.7	0.94	0.40	1.34	3.35	44.22	0.87	0.47
59	0.2097	35.366	33.5	4.8	0.95	0.42	1.37	3.27	44.09	0.90	0.48
60	0.2147	34.969	33.1	4.9	0.94	0.42	1.35	3.26	44.12	0.88	0.47
61	0.2197	35.306	33.4	5.0	0.95	0.41	1.36	3.32	44.16	0.88	0.47
62	0.2570	35.890	34.0	5.8	0.95	0.42	1.36	3.28	44.11	0.89	0.47
63	0.2694	36.538	34.6	6.0	0.96	0.43	1.39	3.26	44.05	0.91	0.48
64	0.2818	37.145	35.2	6.3	0.97	0.41	1.39	3.35	44.13	0.90	0.49
65	0.2943	36.733	34.8	6.5	0.96	0.41	1.37	3.33	44.15	0.89	0.48
66	0.3315	37.560	35.6	7.3	0.96	0.41	1.37	3.35	44.15	0.89	0.48
67	0.3564	38.235	36.3	7.8	0.97	0.45	1.42	3.16	43.87	0.94	0.49
68	0.3688	39.104	37.2	8.0	0.99	0.43	1.42	3.30	44.01	0.93	0.50
69	0.3937	39.716	37.8	8.5	1.00	0.44	1.44	3.28	43.96	0.94	0.50
70	0.4061	38.722	36.8	8.8	0.96	0.42	1.39	3.27	44.05	0.91	0.48
71	0.4185	39.707	37.8	9.0	0.99	0.43	1.42	3.30	44.01	0.92	0.49
72	0.4434	40.636	38.7	9.5	1.00	0.43	1.43	3.36	44.05	0.93	0.50
73	0.4558	40.317	38.4	9.8	0.99	0.43	1.42	3.27	43.98	0.93	0.49
74	0.4683	40.652	38.7	10.0	0.99	0.45	1.44	3.19	43.85	0.95	0.50
75	0.4807	40.119	38.2	10.3	0.97	0.47	1.44	3.06	43.72	0.96	0.48
76	0.4931	41.018	39.1	10.6	0.99	0.44	1.43	3.23	43.92	0.94	0.49
77	0.5055	41.554	39.6	10.8	1.00	0.45	1.45	3.21	43.86	0.95	0.50
78	0.5180	42.037	40.1	11.1	1.01	0.44	1.45	3.28	43.93	0.94	0.50
79	0.5428	42.357	40.4	11.6	1.00	0.44	1.44	3.29	43.96	0.94	0.50
80	0.5677	43.076	41.2	12.1	1.01	0.45	1.46	3.24	43.86	0.96	0.51
81	0.6050	43.570	41.7	12.8	1.01	0.47	1.47	3.16	43.76	0.97	0.50
82	0.6298	43.963	42.0	13.3	1.01	0.46	1.47	3.17	43.78	0.97	0.50
83	0.6423	44.589	42.7	13.6	1.02	0.45	1.46	3.28	43.90	0.96	0.51
84	0.6671	44.979	43.1	14.1	1.02	0.46	1.47	3.22	43.83	0.96	0.51
85	0.6920	45.466	43.6	14.6	1.02	0.48	1.50	3.11	43.66	0.99	0.51
86	0.7292	46.005	44.1	15.3	1.01	0.48	1.49	3.13	43.70	0.98	0.51
87	0.7541	46.422	44.5	15.8	1.01	0.46	1.47	3.20	43.81	0.97	0.51
88	0.7665	46.881	45.0	16.1	1.02	0.47	1.48	3.18	43.75	0.98	0.51
89	0.7790	47.684	45.8	16.3	1.03	0.46	1.49	3.24	43.81	0.98	0.52
90	0.8038	48.260	46.3	16.8	1.03	0.47	1.50	3.21	43.75	0.98	0.52
91	0.8162	48.542	46.6	17.1	1.04	0.50	1.54	3.07	43.52	1.02	0.52
92	0.8287	48.852	46.9	17.3	1.04	0.49	1.52	3.13	43.61	1.01	0.52
93	0.8411	49.306	47.4	17.6	1.04	0.48	1.52	3.19	43.70	1.00	0.52

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
94	0.8660	50.208	48.3	18.1	1.05	0.47	1.53	3.22	43.71	1.00	0.53
95	0.8908	50.603	48.7	18.6	1.05	0.47	1.52	3.24	43.75	0.99	0.52
96	0.9157	50.969	49.1	19.1	1.05	0.49	1.54	3.13	43.59	1.01	0.52
97	0.9281	51.313	49.4	19.3	1.05	0.51	1.56	3.04	43.43	1.04	0.52
98	0.9405	51.618	49.7	19.6	1.05	0.49	1.53	3.16	43.63	1.01	0.52
99	0.9654	51.925	50.0	20.1	1.04	0.49	1.53	3.15	43.62	1.01	0.52
100	1.0151	53.184	51.3	21.1	1.05	0.50	1.55	3.11	43.55	1.02	0.52
101	1.0275	53.707	51.8	21.3	1.05	0.49	1.55	3.14	43.58	1.02	0.53
102	1.0399	54.192	52.3	21.6	1.06	0.52	1.58	3.05	43.42	1.05	0.53
103	1.0648	54.805	52.9	22.1	1.06	0.50	1.56	3.11	43.51	1.03	0.53
104	1.1145	55.773	53.9	23.1	1.06	0.49	1.55	3.16	43.61	1.02	0.53
105	1.1150	55.522	53.6	23.1	1.05	0.49	1.54	3.13	43.58	1.02	0.53

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	747.900			979.400
Moisture content: Dry soil+tare, gms.	664.740			859.160
Moisture content: Tare, gms.	0.000			194.860
Moisture, %	12.5	19.6	18.4	18.1
Moist specimen weight, gms.	747.9			
Diameter, in.	2.42	2.42	2.40	
Area, in.²	4.60	4.60	4.53	
Height, in.	4.97	4.97	4.93	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	124.6	132.5	134.0	
Dry density, pcf	110.8	110.8	113.2	
Void ratio	0.5328	0.5328	0.5006	
Saturation, %	63.9	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.064 cm

Consolidation cell pressure = 55.00 psi (7.92 ksf)

Consolidation back pressure = 40.00 psi (5.76 ksf)

Consolidation effective confining stress = 2.16 ksf

Strain rate, %/min. = 0.05

Fail. Stress = 1.89 ksf **at reading no.** 46

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-5.3590	4.235	0.0	0.0	0.00	2.14	2.14	1.00	40.13	2.14	0.00
1	-5.3577	10.437	6.2	0.0	0.20	2.11	2.31	1.09	40.35	2.21	0.10
2	-5.3565	15.347	11.1	0.1	0.35	2.07	2.42	1.17	40.61	2.25	0.18
3	-5.3553	19.530	15.3	0.1	0.49	2.03	2.52	1.24	40.88	2.28	0.24
4	-5.3540	22.651	18.4	0.1	0.58	2.00	2.58	1.29	41.12	2.29	0.29
5	-5.3527	26.240	22.0	0.1	0.70	1.96	2.65	1.36	41.41	2.31	0.35
6	-5.3515	29.103	24.9	0.2	0.79	1.92	2.71	1.41	41.67	2.31	0.39
7	-5.3503	31.708	27.5	0.2	0.87	1.88	2.75	1.46	41.93	2.32	0.44
8	-5.3490	33.699	29.5	0.2	0.93	1.84	2.78	1.51	42.21	2.31	0.47

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
9	-5.3478	35.785	31.6	0.2	1.00	1.81	2.81	1.55	42.46	2.31	0.50
10	-5.3465	37.335	33.1	0.3	1.05	1.77	2.82	1.59	42.72	2.29	0.52
11	-5.3453	38.988	34.8	0.3	1.10	1.73	2.83	1.64	42.97	2.28	0.55
12	-5.3440	40.445	36.2	0.3	1.15	1.70	2.85	1.67	43.19	2.27	0.57
13	-5.3428	42.024	37.8	0.3	1.20	1.67	2.87	1.72	43.41	2.27	0.60
14	-5.3415	43.302	39.1	0.4	1.24	1.64	2.88	1.75	43.61	2.26	0.62
15	-5.3403	44.286	40.1	0.4	1.27	1.60	2.87	1.79	43.86	2.24	0.63
16	-5.3390	45.384	41.1	0.4	1.30	1.58	2.88	1.82	44.03	2.23	0.65
17	-5.3378	46.241	42.0	0.4	1.33	1.55	2.88	1.86	44.24	2.21	0.66
18	-5.3365	47.229	43.0	0.5	1.36	1.52	2.88	1.89	44.41	2.20	0.68
19	-5.3353	48.292	44.1	0.5	1.39	1.50	2.89	1.93	44.58	2.20	0.70
20	-5.3340	48.863	44.6	0.5	1.41	1.48	2.89	1.95	44.74	2.18	0.70
21	-5.3328	49.601	45.4	0.5	1.43	1.45	2.89	1.99	44.92	2.17	0.72
22	-5.3315	50.218	46.0	0.6	1.45	1.43	2.89	2.01	45.04	2.16	0.73
23	-5.3303	51.018	46.8	0.6	1.48	1.41	2.89	2.04	45.18	2.15	0.74
24	-5.3278	52.324	48.1	0.6	1.52	1.38	2.90	2.10	45.43	2.14	0.76
25	-5.3241	53.707	49.5	0.7	1.56	1.33	2.89	2.17	45.78	2.11	0.78
26	-5.3228	54.212	50.0	0.7	1.58	1.31	2.89	2.20	45.89	2.10	0.79
27	-5.3203	55.148	50.9	0.8	1.60	1.28	2.89	2.25	46.08	2.09	0.80
28	-5.3178	56.143	51.9	0.8	1.63	1.26	2.89	2.30	46.27	2.07	0.82
29	-5.3153	56.772	52.5	0.9	1.65	1.23	2.88	2.35	46.47	2.06	0.83
30	-5.3128	57.282	53.0	0.9	1.67	1.20	2.87	2.39	46.63	2.04	0.83
31	-5.3103	57.959	53.7	1.0	1.69	1.18	2.87	2.43	46.78	2.03	0.84
32	-5.3041	58.921	54.7	1.1	1.72	1.14	2.86	2.51	47.08	2.00	0.86
33	-5.2991	59.792	55.6	1.2	1.74	1.11	2.86	2.57	47.27	1.98	0.87
34	-5.2942	60.564	56.3	1.3	1.77	1.09	2.86	2.62	47.42	1.97	0.88
35	-5.2842	61.487	57.3	1.5	1.79	1.05	2.84	2.70	47.68	1.95	0.90
36	-5.2743	62.489	58.3	1.7	1.82	1.01	2.83	2.80	47.98	1.92	0.91
37	-5.2494	63.192	59.0	2.2	1.83	0.96	2.79	2.91	48.34	1.87	0.92
38	-5.2394	63.744	59.5	2.4	1.84	0.95	2.79	2.95	48.43	1.87	0.92
39	-5.2245	64.522	60.3	2.7	1.86	0.93	2.79	3.01	48.57	1.86	0.93
40	-5.1946	65.113	60.9	3.3	1.87	0.91	2.77	3.06	48.71	1.84	0.93
41	-5.1747	65.888	61.7	3.7	1.88	0.91	2.79	3.08	48.70	1.85	0.94
42	-5.1698	65.271	61.0	3.8	1.86	0.91	2.77	3.05	48.69	1.84	0.93
43	-5.1648	66.103	61.9	3.9	1.89	0.91	2.80	3.06	48.65	1.86	0.94
44	-5.1548	65.580	61.3	4.1	1.87	0.90	2.77	3.08	48.75	1.83	0.93
45	-5.1300	66.544	62.3	4.6	1.89	0.90	2.78	3.11	48.78	1.84	0.94
46	-5.0728	67.387	63.2	5.8	1.89	0.90	2.78	3.11	48.78	1.84	0.94
47	-5.0355	68.190	64.0	6.6	1.90	0.91	2.80	3.10	48.71	1.85	0.95
48	-5.0106	69.171	64.9	7.1	1.92	0.91	2.82	3.11	48.69	1.87	0.96
49	-4.9858	69.673	65.4	7.6	1.92	0.90	2.83	3.12	48.72	1.86	0.96
50	-4.9485	70.443	66.2	8.3	1.93	0.92	2.85	3.09	48.58	1.89	0.96
51	-4.9236	71.203	67.0	8.8	1.94	0.93	2.86	3.09	48.57	1.90	0.97
52	-4.9112	71.825	67.6	9.1	1.85	0.92	2.78	3.00	48.58	1.85	0.93
53	-4.8863	72.970	68.7	9.6	1.87	0.93	2.80	3.01	48.53	1.87	0.93
54	-4.8615	73.925	69.7	10.1	1.88	0.94	2.82	3.01	48.50	1.88	0.94
55	-4.8491	74.419	70.2	10.3	1.89	0.94	2.83	3.01	48.48	1.88	0.94

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
56	-4.8366	75.044	70.8	10.6	1.90	0.95	2.84	3.00	48.41	1.90	0.95
57	-4.8242	75.875	71.6	10.8	1.91	0.96	2.87	2.99	48.32	1.92	0.96
58	-4.8118	76.868	72.6	11.1	1.93	0.95	2.88	3.03	48.39	1.92	0.97
59	-4.7993	77.698	73.5	11.3	1.94	0.95	2.90	3.04	48.37	1.93	0.97
60	-4.7869	78.538	74.3	11.6	1.96	0.96	2.92	3.05	48.35	1.94	0.98
61	-4.7620	79.176	74.9	12.1	1.96	0.96	2.92	3.04	48.33	1.94	0.98
62	-4.7496	79.800	75.6	12.3	1.97	0.97	2.93	3.04	48.29	1.95	0.98
63	-4.7247	80.538	76.3	12.9	1.97	0.98	2.95	3.02	48.21	1.96	0.99
64	-4.6999	81.496	77.3	13.4	1.98	0.98	2.96	3.01	48.17	1.97	0.99
65	-4.6875	82.353	78.1	13.6	2.00	0.98	2.98	3.03	48.17	1.98	1.00
66	-4.6502	84.094	79.9	14.4	2.02	0.99	3.01	3.03	48.10	2.00	1.01
67	-4.6253	84.775	80.5	14.9	2.02	1.00	3.01	3.02	48.07	2.01	1.01
68	-4.6129	84.236	80.0	15.1	1.99	1.01	3.00	2.98	48.00	2.00	1.00
69	-4.5756	85.426	81.2	15.9	2.00	1.02	3.02	2.96	47.92	2.02	1.00
70	-4.5383	86.242	82.0	16.6	1.99	1.03	3.02	2.94	47.86	2.02	1.00
71	-4.5010	87.196	83.0	17.4	1.99	1.04	3.03	2.91	47.78	2.03	0.99
72	-4.4512	87.703	83.5	18.4	1.96	1.05	3.02	2.86	47.68	2.04	0.98
73	-4.4388	88.355	84.1	18.6	1.97	1.06	3.03	2.86	47.65	2.04	0.99
74	-4.3891	89.117	84.9	19.7	1.95	1.07	3.02	2.83	47.59	2.04	0.98
75	-4.3767	89.769	85.5	19.9	1.96	1.08	3.04	2.81	47.47	2.06	0.98
76	-4.3642	90.967	86.7	20.2	1.98	1.08	3.06	2.83	47.49	2.07	0.99
77	-4.3518	91.937	87.7	20.4	1.99	1.08	3.08	2.84	47.47	2.08	1.00
78	-4.3394	92.846	88.6	20.7	2.01	1.09	3.09	2.85	47.46	2.09	1.00
79	-4.3145	94.345	90.1	21.2	2.03	1.09	3.12	2.86	47.43	2.10	1.01
80	-4.2896	95.335	91.1	21.7	2.03	1.10	3.13	2.85	47.39	2.11	1.02
81	-4.2772	93.522	89.3	21.9	1.98	1.10	3.07	2.80	47.38	2.08	0.99
82	-4.2524	94.271	90.0	22.4	1.97	1.11	3.08	2.78	47.29	2.10	0.99
83	-4.2399	94.868	90.6	22.7	1.98	1.11	3.09	2.78	47.30	2.10	0.99
84	-4.2151	96.509	92.3	23.2	2.00	1.12	3.12	2.79	47.24	2.12	1.00
85	-4.2149	96.033	91.8	23.2	1.99	1.11	3.10	2.79	47.28	2.11	0.99

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	747.700			888.500
Moisture content: Dry soil+tare, gms.	664.550			776.400
Moisture content: Tare, gms.	0.000			111.850
Moisture, %	12.5	20.1	17.8	16.9
Moist specimen weight, gms.	747.7			
Diameter, in.	2.43	2.43	2.40	
Area, in.²	4.63	4.63	4.51	
Height, in.	4.98	4.98	4.91	
Net decrease in height, in.		0.00	0.07	
Wet Density, pcf	123.4	131.8	134.8	
Dry density, pcf	109.7	109.7	114.4	
Void ratio	0.5478	0.5478	0.4841	
Saturation, %	62.1	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.064 cm

Consolidation cell pressure = 70.00 psi (10.08 ksf)

Consolidation back pressure = 40.00 psi (5.76 ksf)

Consolidation effective confining stress = 4.32 ksf

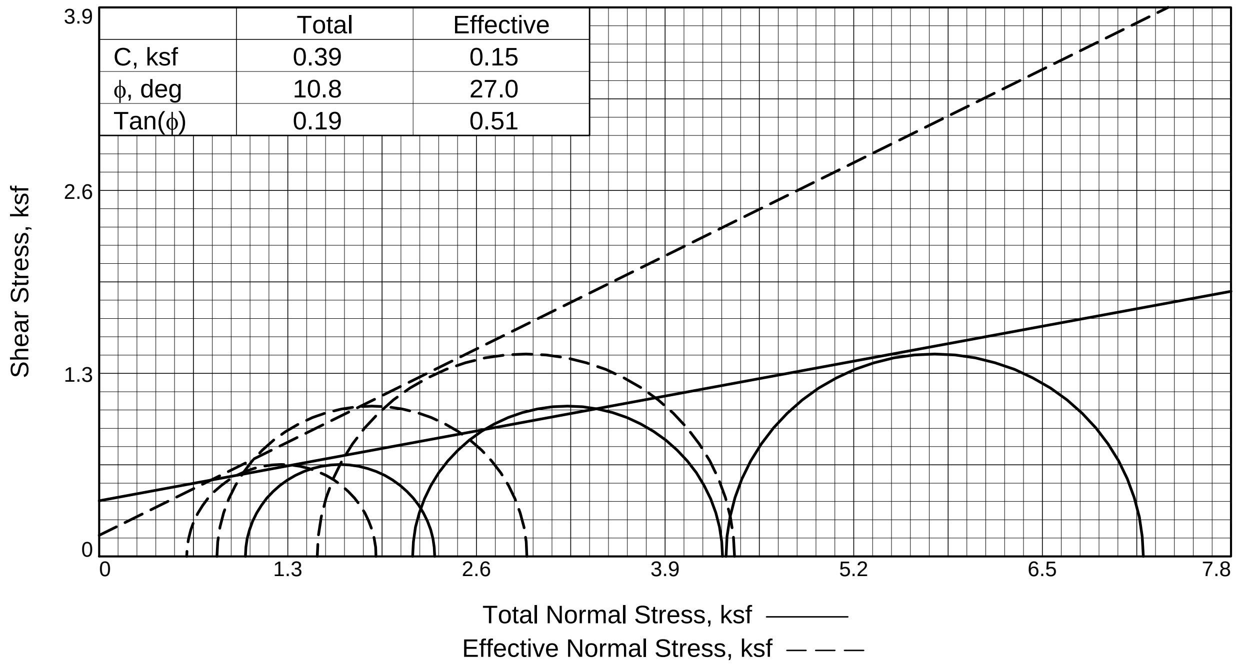
Strain rate, %/min. = 0.05

Fail. Stress = 2.89 ksf **at reading no.** 48

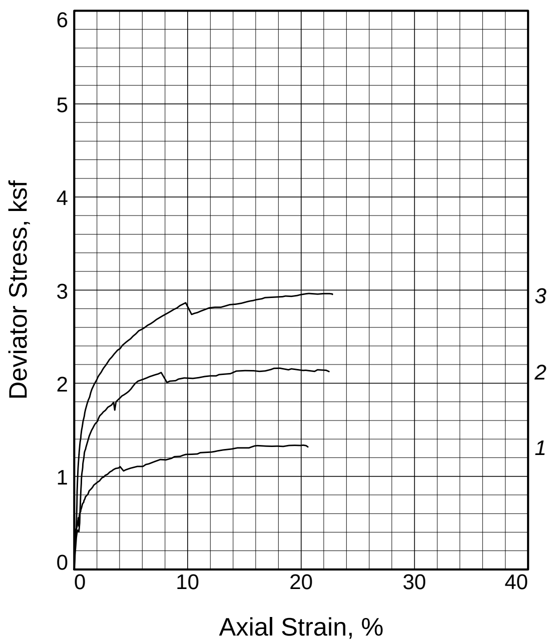
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-5.4065	2.888	0.0	0.0	0.00	4.31	4.31	1.00	40.04	4.31	0.00
1	-5.4053	3.588	0.7	0.0	0.02	4.31	4.33	1.01	40.09	4.32	0.01
2	-5.4040	5.074	2.2	0.1	0.07	4.31	4.38	1.02	40.10	4.34	0.03
3	-5.4028	11.866	9.0	0.1	0.29	4.28	4.57	1.07	40.28	4.42	0.14
4	-5.4015	19.212	16.3	0.1	0.52	4.24	4.77	1.12	40.53	4.50	0.26
5	-5.4003	25.541	22.7	0.1	0.72	4.20	4.92	1.17	40.83	4.56	0.36
6	-5.3990	31.365	28.5	0.2	0.91	4.15	5.06	1.22	41.17	4.61	0.45
7	-5.3978	36.944	34.1	0.2	1.09	4.10	5.19	1.27	41.53	4.64	0.54
8	-5.3965	41.838	38.9	0.2	1.24	4.04	5.28	1.31	41.96	4.66	0.62
9	-5.3953	45.732	42.8	0.2	1.37	3.98	5.35	1.34	42.36	4.66	0.68
10	-5.3940	49.310	46.4	0.3	1.48	3.92	5.40	1.38	42.80	4.66	0.74
11	-5.3928	52.112	49.2	0.3	1.57	3.85	5.42	1.41	43.26	4.64	0.78
12	-5.3915	54.969	52.1	0.3	1.66	3.79	5.45	1.44	43.70	4.62	0.83
13	-5.3903	57.356	54.5	0.3	1.74	3.72	5.46	1.47	44.14	4.59	0.87
14	-5.3890	59.187	56.3	0.4	1.79	3.66	5.45	1.49	44.58	4.56	0.90
15	-5.3878	61.109	58.2	0.4	1.85	3.60	5.45	1.51	45.00	4.53	0.93
16	-5.3865	63.143	60.3	0.4	1.92	3.54	5.46	1.54	45.40	4.50	0.96
17	-5.3853	64.611	61.7	0.4	1.96	3.48	5.45	1.56	45.80	4.47	0.98
18	-5.3840	66.212	63.3	0.5	2.01	3.43	5.44	1.59	46.19	4.44	1.01
19	-5.3827	67.939	65.1	0.5	2.07	3.37	5.44	1.61	46.60	4.40	1.03
20	-5.3815	69.401	66.5	0.5	2.11	3.32	5.43	1.64	46.96	4.37	1.06
21	-5.3803	70.627	67.7	0.5	2.15	3.26	5.41	1.66	47.35	4.34	1.08
22	-5.3790	71.890	69.0	0.6	2.19	3.21	5.40	1.68	47.70	4.31	1.10
23	-5.3777	73.216	70.3	0.6	2.23	3.16	5.40	1.71	48.05	4.28	1.12
24	-5.3765	74.659	71.8	0.6	2.28	3.11	5.39	1.73	48.39	4.25	1.14

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
25	-5.3753	75.392	72.5	0.6	2.30	3.06	5.37	1.75	48.72	4.22	1.15
26	-5.3740	76.648	73.8	0.7	2.34	3.02	5.36	1.78	49.05	4.19	1.17
27	-5.3715	78.097	75.2	0.7	2.39	2.92	5.31	1.82	49.70	4.12	1.19
28	-5.3702	79.201	76.3	0.7	2.42	2.88	5.31	1.84	49.97	4.10	1.21
29	-5.3678	80.576	77.7	0.8	2.46	2.81	5.27	1.88	50.51	4.04	1.23
30	-5.3653	81.571	78.7	0.8	2.49	2.73	5.22	1.91	51.05	3.98	1.25
31	-5.3640	82.439	79.6	0.9	2.52	2.70	5.22	1.93	51.27	3.96	1.26
32	-5.3615	83.236	80.3	0.9	2.54	2.63	5.18	1.97	51.72	3.91	1.27
33	-5.3590	84.435	81.5	1.0	2.58	2.57	5.15	2.00	52.15	3.86	1.29
34	-5.3565	85.648	82.8	1.0	2.62	2.51	5.13	2.04	52.56	3.82	1.31
35	-5.3515	86.930	84.0	1.1	2.66	2.41	5.06	2.10	53.30	3.73	1.33
36	-5.3466	88.052	85.2	1.2	2.69	2.32	5.00	2.16	53.92	3.66	1.34
37	-5.3416	89.338	86.4	1.3	2.73	2.23	4.96	2.22	54.52	3.59	1.36
38	-5.3366	90.209	87.3	1.4	2.75	2.15	4.90	2.28	55.06	3.53	1.38
39	-5.3266	91.090	88.2	1.6	2.77	2.02	4.80	2.37	55.95	3.41	1.39
40	-5.3167	91.883	89.0	1.8	2.79	1.95	4.74	2.43	56.46	3.35	1.40
41	-5.3067	92.826	89.9	2.0	2.82	1.86	4.67	2.52	57.09	3.27	1.41
42	-5.2868	93.602	90.7	2.4	2.83	1.75	4.58	2.62	57.84	3.17	1.41
43	-5.2320	94.440	91.6	3.6	2.82	1.60	4.42	2.76	58.89	3.01	1.41
44	-5.2020	95.345	92.5	4.2	2.83	1.54	4.37	2.84	59.33	2.95	1.42
45	-5.1771	96.343	93.5	4.7	2.85	1.51	4.36	2.89	59.52	2.93	1.42
46	-5.1572	97.249	94.4	5.1	2.86	1.49	4.36	2.92	59.63	2.92	1.43
47	-5.1323	98.297	95.4	5.6	2.88	1.49	4.37	2.93	59.66	2.93	1.44
48	-5.1074	99.231	96.3	6.1	2.89	1.48	4.37	2.95	59.70	2.93	1.45
49	-5.0825	100.626	97.7	6.6	2.92	1.47	4.39	2.98	59.76	2.93	1.46
50	-5.0576	101.800	98.9	7.1	2.94	1.47	4.40	3.00	59.82	2.93	1.47
51	-5.0327	103.142	100.3	7.6	2.96	1.47	4.43	3.01	59.79	2.95	1.48
52	-5.0202	104.024	101.1	7.9	2.98	1.48	4.45	3.02	59.75	2.96	1.49
53	-5.0078	104.797	101.9	8.1	2.99	1.49	4.48	3.01	59.66	2.98	1.50
54	-4.9829	106.249	103.4	8.6	3.02	1.48	4.50	3.04	59.71	2.99	1.51
55	-4.9704	107.207	104.3	8.9	3.04	1.48	4.52	3.05	59.71	3.00	1.52
56	-4.9455	108.762	105.9	9.4	3.07	1.48	4.55	3.07	59.72	3.01	1.53
57	-4.9330	109.560	106.7	9.6	3.08	1.49	4.57	3.07	59.68	3.03	1.54
58	-4.9206	110.504	107.6	9.9	3.10	1.49	4.59	3.08	59.67	3.04	1.55
59	-4.9081	111.441	108.6	10.1	3.12	1.50	4.62	3.08	59.59	3.06	1.56
60	-4.8832	113.147	110.3	10.7	3.15	1.51	4.66	3.08	59.50	3.09	1.57
61	-4.8708	114.330	111.4	10.9	3.17	1.51	4.68	3.10	59.51	3.10	1.59
62	-4.8459	115.418	112.5	11.4	3.19	1.51	4.70	3.11	59.50	3.11	1.59
63	-4.8209	116.353	113.5	11.9	3.19	1.52	4.71	3.10	59.46	3.11	1.60
64	-4.7960	117.465	114.6	12.4	3.21	1.55	4.75	3.07	59.25	3.15	1.60
65	-4.7836	118.272	115.4	12.7	3.22	1.56	4.78	3.06	59.13	3.17	1.61
66	-4.7587	119.554	116.7	13.2	3.24	1.56	4.79	3.08	59.18	3.18	1.62
67	-4.7338	120.850	118.0	13.7	3.25	1.56	4.82	3.08	59.16	3.19	1.63
68	-4.7213	121.816	118.9	14.0	3.27	1.56	4.84	3.09	59.14	3.20	1.64
69	-4.6964	123.127	120.2	14.5	3.29	1.58	4.87	3.08	59.03	3.22	1.64
70	-4.6715	124.625	121.7	15.0	3.31	1.60	4.91	3.07	58.87	3.26	1.65



	Total	Effective
C, ksf	0.39	0.15
ϕ, deg	10.8	27.0
Tan(ϕ)	0.19	0.51



Sample No.		1	2	3
Initial	Water Content, %	17.3	17.8	17.0
	Dry Density, pcf	104.9	103.9	103.2
	Saturation, %	76.1	76.4	71.4
	Void Ratio	0.6192	0.6345	0.6462
	Diameter, in.	1.94	1.94	1.93
	Height, in.	3.90	3.92	3.99
At Test	Water Content, %	21.2	19.8	18.0
	Dry Density, pcf	107.7	110.4	114.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5771	0.5382	0.4888
	Diameter, in.	1.92	1.90	1.87
	Height, in.	3.87	3.84	3.86
Strain rate, %/min.		0.05	0.05	0.05
Eff. Cell Pressure, psi		7.00	15.00	30.00
Fail. Stress, ksf		1.30	2.14	2.88
Excess Pore Pr., ksf		0.40	1.35	2.82
Strain, %		14.9	15.1	15.3
Ult. Stress, ksf				
Excess Pore Pr., ksf				
Strain, %				
$\bar{\sigma}_1$ Failure, ksf		1.91	2.95	4.38
$\bar{\sigma}_3$ Failure, ksf		0.60	0.81	1.50

Type of Test:
CU with Pore Pressures

Sample Type: Remolded, 95%MDD @ OMC

Description: lean clay with sand

LL= 33 **PL=** 10 **PI=** 23

Specific Gravity= 2.72

Remarks: Failure tangents drawn at approximately 15% strain.

Fig. _______

Client:

Project: Powertech

Location: TP09

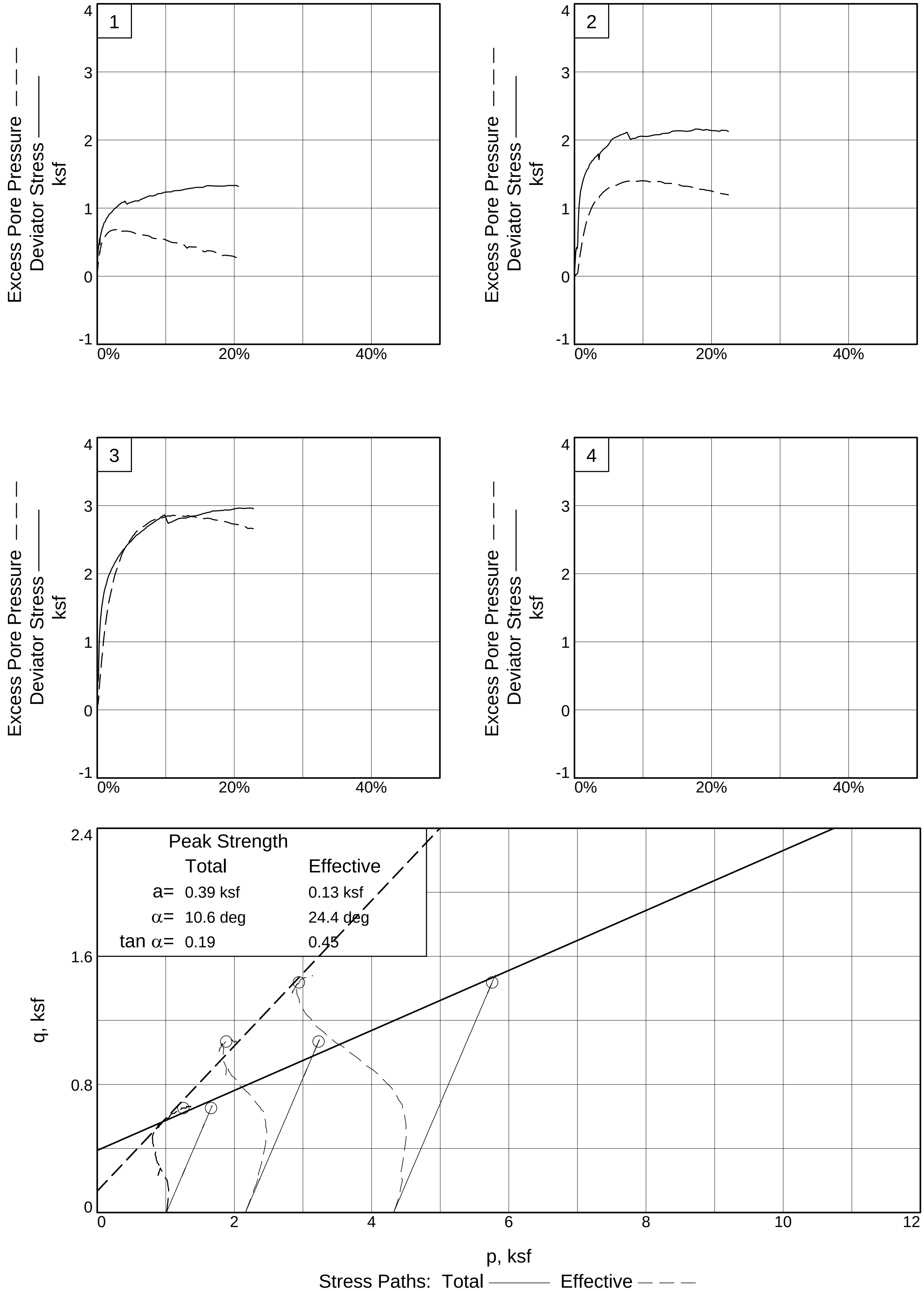
Depth: 4'

Proj. No.: DV102-279.02 **Date Sampled:** 7/21/08

Knight Piésold CONSULTING

Tested By: jdb **Checked By:** spb

Cursory interpretations provided require review by a professional engineer. Knight Piesold accepts no responsibility in subsequent analyses.



Client:

Project: Powertech

Location: TP09 **Depth:** 4'

Project No.: DV102-279.02 **Fig.** 15%

Knight Piesold Geotechnical Lab.

Tested By: jdb **Checked By:** spb

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

9/6/2008
2:23 PM

Date: 7/21/08
Client:
Project: Powertech
Project No.: DV102-279.02
Location: TP09
Depth: 4'
Description: lean clay with sand
Remarks: Failure tangents drawn at approximately 15% strain.
Type of Sample: Remolded, 95%MDD @ OMC
Specific Gravity=2.72 **LL=**33 **PL=**10 **PI=**23
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	370.420			528.640
Moisture content: Dry soil+tare, gms.	315.700			461.190
Moisture content: Tare, gms.	0.000			146.120
Moisture, %	17.3	22.8	21.2	21.4
Moist specimen weight, gms.	370.4			
Diameter, in.	1.94	1.93	1.92	
Area, in.²	2.94	2.94	2.89	
Height, in.	3.90	3.90	3.87	
Net decrease in height, in.		0.00	0.03	
Wet Density, pcf	123.0	128.7	130.5	
Dry density, pcf	104.9	104.9	107.7	
Void ratio	0.6192	0.6192	0.5771	
Saturation, %	76.1	100.0	100.0	

Test Readings for Specimen No. 1

Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.064 cm
Consolidation cell pressure = 47.00 psi (6.77 ksf)
Consolidation back pressure = 40.00 psi (5.76 ksf)
Consolidation effective confining stress = 1.01 ksf
Strain rate, %/min. = 0.05
Fail. Stress = 1.30 ksf **at reading no.** 76

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0479	3.797	0.0	0.0	0.00	1.01	1.01	1.00	39.97	1.01	0.00
1	0.0489	6.574	2.8	0.0	0.14	0.96	1.10	1.14	40.33	1.03	0.07
2	0.0499	8.438	4.6	0.1	0.23	0.93	1.16	1.25	40.58	1.04	0.12
3	0.0509	9.705	5.9	0.1	0.29	0.89	1.19	1.33	40.79	1.04	0.15
4	0.0518	10.327	6.5	0.1	0.33	0.87	1.19	1.37	40.96	1.03	0.16
5	0.0528	11.182	7.4	0.1	0.37	0.84	1.21	1.44	41.15	1.03	0.18
6	0.0538	11.885	8.1	0.2	0.40	0.82	1.22	1.49	41.32	1.02	0.20
7	0.0548	12.237	8.4	0.2	0.42	0.80	1.22	1.53	41.47	1.01	0.21
8	0.0558	12.591	8.8	0.2	0.44	0.77	1.21	1.57	41.64	0.99	0.22
9	0.0577	13.097	9.3	0.3	0.46	0.74	1.20	1.63	41.87	0.97	0.23
10	0.0587	13.569	9.8	0.3	0.49	0.72	1.20	1.68	42.02	0.96	0.24
11	0.0597	13.830	10.0	0.3	0.50	0.70	1.20	1.71	42.15	0.95	0.25
12	0.0607	14.358	10.6	0.3	0.52	0.68	1.20	1.77	42.28	0.94	0.26
13	0.0616	14.581	10.8	0.4	0.54	0.66	1.20	1.81	42.41	0.93	0.27
14	0.0626	15.006	11.2	0.4	0.56	0.64	1.20	1.87	42.54	0.92	0.28
15	0.0636	13.165	9.4	0.4	0.46	0.66	1.12	1.71	42.44	0.89	0.23
16	0.0646	14.985	11.2	0.4	0.56	0.63	1.19	1.88	42.62	0.91	0.28
17	0.0656	15.555	11.8	0.5	0.58	0.61	1.20	1.95	42.73	0.91	0.29
18	0.0675	16.079	12.3	0.5	0.61	0.59	1.20	2.04	42.93	0.89	0.30
19	0.0695	16.351	12.6	0.6	0.62	0.56	1.19	2.10	43.08	0.88	0.31
20	0.0705	16.704	12.9	0.6	0.64	0.55	1.19	2.16	43.17	0.87	0.32
21	0.0724	17.101	13.3	0.6	0.66	0.53	1.19	2.24	43.30	0.86	0.33
22	0.0734	17.349	13.6	0.7	0.67	0.52	1.20	2.28	43.36	0.86	0.34
23	0.0744	17.689	13.9	0.7	0.69	0.51	1.20	2.34	43.43	0.86	0.34
24	0.0764	18.061	14.3	0.7	0.71	0.50	1.21	2.41	43.52	0.85	0.35
25	0.0803	18.400	14.6	0.8	0.72	0.48	1.20	2.49	43.65	0.84	0.36
26	0.0812	18.784	15.0	0.9	0.74	0.48	1.22	2.54	43.67	0.85	0.37
27	0.0832	19.036	15.2	0.9	0.75	0.48	1.23	2.58	43.69	0.85	0.38
28	0.0852	19.327	15.5	1.0	0.77	0.47	1.24	2.62	43.72	0.86	0.38
29	0.0861	19.597	15.8	1.0	0.78	0.47	1.25	2.66	43.74	0.86	0.39
30	0.0949	20.222	16.4	1.2	0.81	0.41	1.22	2.96	44.13	0.82	0.40
31	0.0988	20.930	17.1	1.3	0.84	0.40	1.24	3.11	44.22	0.82	0.42
32	0.1066	21.495	17.7	1.5	0.87	0.37	1.24	3.32	44.40	0.81	0.43
33	0.1105	21.849	18.1	1.6	0.89	0.36	1.25	3.43	44.47	0.81	0.44
34	0.1144	22.265	18.5	1.7	0.90	0.36	1.26	3.53	44.52	0.81	0.45
35	0.1222	22.701	18.9	1.9	0.92	0.34	1.27	3.70	44.62	0.80	0.46
36	0.1262	22.933	19.1	2.0	0.93	0.34	1.27	3.75	44.64	0.81	0.47
37	0.1340	23.316	19.5	2.2	0.95	0.33	1.28	3.87	44.70	0.81	0.48
38	0.1379	23.646	19.8	2.3	0.97	0.33	1.30	3.93	44.71	0.81	0.48
39	0.1418	23.985	20.2	2.4	0.98	0.33	1.31	4.02	44.74	0.82	0.49
40	0.1496	24.305	20.5	2.6	1.00	0.33	1.32	4.06	44.74	0.82	0.50
41	0.1535	24.614	20.8	2.7	1.01	0.32	1.33	4.12	44.75	0.83	0.50
42	0.1613	24.922	21.1	2.9	1.02	0.33	1.35	4.14	44.74	0.84	0.51
43	0.1691	25.452	21.7	3.1	1.05	0.33	1.38	4.13	44.68	0.86	0.52
44	0.1769	25.778	22.0	3.3	1.06	0.36	1.42	3.96	44.51	0.89	0.53
45	0.1808	26.031	22.2	3.4	1.07	0.37	1.44	3.90	44.44	0.90	0.54
46	0.1886	26.354	22.6	3.6	1.08	0.35	1.43	4.14	44.60	0.89	0.54

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	0.2003	26.577	22.8	3.9	1.09	0.35	1.44	4.15	44.60	0.89	0.55
48	0.2042	26.879	23.1	4.0	1.10	0.34	1.45	4.20	44.60	0.90	0.55
49	0.2159	27.223	23.4	4.3	1.06	0.35	1.40	4.06	44.60	0.87	0.53
50	0.2237	27.596	23.8	4.5	1.07	0.35	1.42	4.08	44.59	0.88	0.54
51	0.2393	28.162	24.4	5.0	1.09	0.36	1.44	4.06	44.53	0.90	0.54
52	0.2627	28.915	25.1	5.6	1.11	0.38	1.48	3.92	44.37	0.93	0.55
53	0.2823	29.177	25.4	6.1	1.11	0.40	1.50	3.78	44.24	0.95	0.55
54	0.2920	29.777	26.0	6.3	1.13	0.40	1.53	3.82	44.22	0.96	0.56
55	0.3018	30.061	26.3	6.6	1.13	0.40	1.53	3.83	44.22	0.97	0.57
56	0.3115	30.474	26.7	6.8	1.15	0.40	1.55	3.84	44.19	0.98	0.57
57	0.3213	30.858	27.1	7.1	1.16	0.41	1.56	3.85	44.18	0.99	0.58
58	0.3408	31.649	27.9	7.6	1.18	0.42	1.60	3.83	44.11	1.01	0.59
59	0.3603	31.894	28.1	8.1	1.18	0.45	1.63	3.62	43.89	1.04	0.59
60	0.3798	32.580	28.8	8.6	1.19	0.45	1.65	3.63	43.84	1.05	0.60
61	0.3895	33.095	29.3	8.8	1.21	0.45	1.66	3.67	43.85	1.06	0.61
62	0.4090	33.490	29.7	9.3	1.21	0.46	1.67	3.64	43.81	1.07	0.61
63	0.4188	33.912	30.1	9.6	1.23	0.46	1.69	3.65	43.79	1.08	0.61
64	0.4286	34.263	30.5	9.8	1.23	0.47	1.70	3.63	43.75	1.09	0.62
65	0.4481	34.641	30.8	10.4	1.24	0.49	1.73	3.53	43.61	1.11	0.62
66	0.4676	35.031	31.2	10.9	1.24	0.51	1.75	3.43	43.46	1.13	0.62
67	0.4773	35.501	31.7	11.1	1.25	0.51	1.77	3.44	43.44	1.14	0.63
68	0.4968	35.921	32.1	11.6	1.26	0.52	1.78	3.42	43.40	1.15	0.63
69	0.5163	36.347	32.6	12.1	1.26	0.53	1.79	3.38	43.33	1.16	0.63
70	0.5261	36.633	32.8	12.4	1.27	0.53	1.80	3.37	43.29	1.17	0.63
71	0.5358	36.971	33.2	12.6	1.27	0.54	1.82	3.34	43.23	1.18	0.64
72	0.5553	37.557	33.8	13.1	1.28	0.60	1.88	3.15	42.86	1.24	0.64
73	0.5651	37.830	34.0	13.4	1.29	0.57	1.86	3.24	43.01	1.22	0.64
74	0.5846	38.357	34.6	13.9	1.29	0.58	1.87	3.24	42.99	1.23	0.65
75	0.6041	38.971	35.2	14.4	1.30	0.58	1.88	3.26	42.99	1.23	0.65
76	0.6236	39.338	35.5	14.9	1.30	0.60	1.91	3.16	42.81	1.26	0.65
77	0.6431	39.718	35.9	15.4	1.30	0.64	1.94	3.05	42.57	1.29	0.65
78	0.6529	40.151	36.4	15.6	1.32	0.65	1.97	3.02	42.48	1.31	0.66
79	0.6626	40.598	36.8	15.9	1.33	0.64	1.97	3.07	42.55	1.30	0.66
80	0.6724	40.890	37.1	16.2	1.33	0.63	1.96	3.11	42.62	1.30	0.67
81	0.7017	41.360	37.6	16.9	1.33	0.64	1.97	3.06	42.54	1.30	0.66
82	0.7212	41.704	37.9	17.4	1.32	0.67	1.99	2.99	42.38	1.33	0.66
83	0.7407	42.136	38.3	17.9	1.32	0.70	2.02	2.89	42.14	1.36	0.66
84	0.7602	42.469	38.7	18.4	1.32	0.70	2.03	2.88	42.11	1.36	0.66
85	0.7699	42.795	39.0	18.7	1.33	0.70	2.02	2.90	42.16	1.36	0.66
86	0.7797	43.114	39.3	18.9	1.33	0.70	2.03	2.89	42.12	1.37	0.67
87	0.7992	43.567	39.8	19.4	1.33	0.71	2.04	2.89	42.09	1.37	0.67
88	0.8187	43.946	40.1	19.9	1.33	0.72	2.05	2.85	42.02	1.38	0.67
89	0.8285	44.260	40.5	20.2	1.33	0.73	2.06	2.83	41.93	1.40	0.67
90	0.8382	44.359	40.6	20.4	1.33	0.74	2.07	2.80	41.86	1.40	0.66
91	0.8442	44.148	40.4	20.6	1.32	0.77	2.09	2.71	41.65	1.43	0.66

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	370.380			525.330
Moisture content: Dry soil+tare, gms.	314.360			463.040
Moisture content: Tare, gms.	0.000			148.680
Moisture, %	17.8	23.3	19.8	19.8
Moist specimen weight, gms.	370.4			
Diameter, in.	1.94	1.94	1.90	
Area, in.²	2.94	2.94	2.82	
Height, in.	3.92	3.92	3.84	
Net decrease in height, in.		0.00	0.08	
Wet Density, pcf	122.4	128.1	132.2	
Dry density, pcf	103.9	103.9	110.4	
Void ratio	0.6345	0.6345	0.5382	
Saturation, %	76.4	100.0	100.0	

Test Readings for Specimen No. 2

Membrane modulus = 0.124105 kN/cm²
Membrane thickness = 0.064 cm
Consolidation cell pressure = 55.00 psi (7.92 ksf)
Consolidation back pressure = 40.00 psi (5.76 ksf)
Consolidation effective confining stress = 2.16 ksf
Strain rate, %/min. = 0.05
Fail. Stress = 2.14 ksf **at reading no.** 80

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-5.4093	2.985	0.0	0.0	0.00	2.16	2.16	1.00	39.99	2.16	0.00
1	-5.4084	4.076	1.1	0.0	0.06	2.16	2.21	1.03	40.02	2.19	0.03
2	-5.4074	5.040	2.1	0.1	0.10	2.15	2.26	1.05	40.04	2.21	0.05
3	-5.4064	6.040	3.1	0.1	0.16	2.15	2.31	1.07	40.06	2.23	0.08
4	-5.4054	6.999	4.0	0.1	0.20	2.15	2.35	1.10	40.08	2.25	0.10
5	-5.4044	7.835	4.9	0.1	0.25	2.15	2.40	1.11	40.07	2.27	0.12
6	-5.4034	8.663	5.7	0.2	0.29	2.14	2.43	1.14	40.13	2.29	0.14
7	-5.4025	9.660	6.7	0.2	0.34	2.14	2.48	1.16	40.12	2.31	0.17
8	-5.4015	10.213	7.2	0.2	0.37	2.14	2.51	1.17	40.15	2.32	0.18
9	-5.3995	10.838	7.9	0.3	0.40	2.14	2.54	1.19	40.16	2.34	0.20
10	-5.3976	11.279	8.3	0.3	0.42	2.13	2.55	1.20	40.20	2.34	0.21
11	-5.3936	10.938	8.0	0.4	0.40	2.12	2.53	1.19	40.25	2.33	0.20
12	-5.3907	12.786	9.8	0.5	0.50	2.11	2.60	1.24	40.37	2.36	0.25
13	-5.3897	15.038	12.1	0.5	0.61	2.09	2.70	1.29	40.50	2.39	0.31
14	-5.3887	16.731	13.7	0.5	0.70	2.06	2.76	1.34	40.66	2.41	0.35
15	-5.3877	18.614	15.6	0.6	0.79	2.04	2.84	1.39	40.81	2.44	0.40
16	-5.3867	19.997	17.0	0.6	0.86	2.02	2.89	1.43	40.95	2.45	0.43
17	-5.3858	21.172	18.2	0.6	0.92	2.00	2.92	1.46	41.13	2.46	0.46
18	-5.3848	22.216	19.2	0.6	0.97	1.98	2.95	1.49	41.25	2.47	0.49
19	-5.3838	23.082	20.1	0.7	1.02	1.96	2.98	1.52	41.36	2.47	0.51
20	-5.3828	23.631	20.6	0.7	1.05	1.94	2.99	1.54	41.50	2.47	0.52
21	-5.3818	24.040	21.1	0.7	1.07	1.93	2.99	1.55	41.63	2.46	0.53
22	-5.3808	24.654	21.7	0.7	1.10	1.91	3.00	1.58	41.76	2.46	0.55
23	-5.3799	25.382	22.4	0.8	1.13	1.89	3.02	1.60	41.89	2.45	0.57
24	-5.3789	25.883	22.9	0.8	1.16	1.87	3.03	1.62	42.01	2.45	0.58

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
25	-5.3769	26.656	23.7	0.8	1.20	1.84	3.03	1.65	42.25	2.43	0.60
26	-5.3759	27.280	24.3	0.9	1.23	1.82	3.05	1.68	42.38	2.43	0.61
27	-5.3749	27.679	24.7	0.9	1.25	1.80	3.05	1.69	42.48	2.43	0.62
28	-5.3739	28.046	25.1	0.9	1.27	1.79	3.05	1.71	42.59	2.42	0.63
29	-5.3710	28.586	25.6	1.0	1.29	1.74	3.03	1.74	42.93	2.38	0.65
30	-5.3700	28.954	26.0	1.0	1.31	1.72	3.03	1.76	43.03	2.38	0.66
31	-5.3661	29.808	26.8	1.1	1.35	1.66	3.01	1.82	43.50	2.33	0.68
32	-5.3622	30.635	27.7	1.2	1.39	1.60	2.99	1.87	43.90	2.30	0.70
33	-5.3583	31.488	28.5	1.3	1.43	1.55	2.98	1.93	44.25	2.26	0.72
34	-5.3543	32.097	29.1	1.4	1.46	1.50	2.97	1.97	44.56	2.23	0.73
35	-5.3504	32.765	29.8	1.5	1.50	1.45	2.95	2.03	44.91	2.20	0.75
36	-5.3465	33.227	30.2	1.6	1.52	1.41	2.93	2.08	45.21	2.17	0.76
37	-5.3426	33.737	30.8	1.7	1.54	1.37	2.91	2.12	45.48	2.14	0.77
38	-5.3386	34.174	31.2	1.8	1.56	1.34	2.90	2.17	45.72	2.12	0.78
39	-5.3308	34.810	31.8	2.0	1.59	1.27	2.86	2.25	46.16	2.07	0.79
40	-5.3269	35.531	32.5	2.1	1.62	1.25	2.87	2.30	46.35	2.06	0.81
41	-5.3230	36.061	33.1	2.2	1.65	1.22	2.87	2.35	46.53	2.04	0.82
42	-5.3151	36.637	33.7	2.5	1.67	1.17	2.84	2.43	46.88	2.01	0.84
43	-5.3112	37.004	34.0	2.6	1.69	1.15	2.84	2.48	47.05	1.99	0.85
44	-5.3033	37.461	34.5	2.8	1.71	1.10	2.81	2.55	47.33	1.96	0.85
45	-5.2955	38.168	35.2	3.0	1.74	1.07	2.81	2.63	47.56	1.94	0.87
46	-5.2837	38.759	35.8	3.3	1.76	1.04	2.80	2.70	47.81	1.92	0.88
47	-5.2759	39.452	36.5	3.5	1.80	1.01	2.81	2.78	47.98	1.91	0.90
48	-5.2720	37.791	34.8	3.6	1.71	1.02	2.73	2.68	47.93	1.87	0.86
49	-5.2680	39.630	36.6	3.7	1.80	0.98	2.78	2.83	48.18	1.88	0.90
50	-5.2602	40.213	37.2	3.9	1.82	0.97	2.79	2.89	48.30	1.88	0.91
51	-5.2523	40.735	37.8	4.1	1.85	0.94	2.79	2.97	48.48	1.86	0.92
52	-5.2484	41.082	38.1	4.2	1.86	0.93	2.79	3.01	48.56	1.86	0.93
53	-5.2406	41.473	38.5	4.4	1.88	0.91	2.79	3.06	48.68	1.85	0.94
54	-5.2327	41.912	38.9	4.6	1.89	0.89	2.79	3.12	48.80	1.84	0.95
55	-5.2249	42.367	39.4	4.8	1.91	0.88	2.79	3.18	48.90	1.84	0.96
56	-5.2171	43.029	40.0	5.0	1.94	0.86	2.80	3.25	49.01	1.83	0.97
57	-5.2131	43.413	40.4	5.1	1.96	0.86	2.81	3.29	49.06	1.83	0.98
58	-5.2033	44.347	41.4	5.4	2.00	0.84	2.84	3.37	49.16	1.84	1.00
59	-5.1935	44.995	42.0	5.6	2.02	0.83	2.85	3.44	49.25	1.84	1.01
60	-5.1739	45.705	42.7	6.1	2.05	0.82	2.87	3.48	49.27	1.85	1.02
61	-5.1641	46.067	43.1	6.4	2.06	0.81	2.87	3.54	49.37	1.84	1.03
62	-5.1543	46.478	43.5	6.6	2.07	0.80	2.87	3.59	49.45	1.83	1.04
63	-5.1347	47.120	44.1	7.1	2.09	0.78	2.87	3.69	49.60	1.82	1.04
64	-5.1249	47.453	44.5	7.4	2.10	0.77	2.87	3.72	49.64	1.82	1.05
65	-5.1151	47.888	44.9	7.7	2.11	0.77	2.88	3.76	49.69	1.82	1.06
66	-5.0955	48.274	45.3	8.2	2.01	0.76	2.77	3.64	49.72	1.76	1.00
67	-5.0857	48.758	45.8	8.4	2.02	0.77	2.80	3.61	49.62	1.79	1.01
68	-5.0661	49.280	46.3	8.9	2.03	0.77	2.79	3.65	49.69	1.78	1.01
69	-5.0563	49.861	46.9	9.2	2.04	0.77	2.81	3.67	49.68	1.79	1.02
70	-5.0367	50.526	47.5	9.7	2.06	0.76	2.81	3.71	49.73	1.79	1.03
71	-5.0073	51.050	48.1	10.5	2.05	0.76	2.81	3.70	49.72	1.79	1.03

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
72	-4.9877	51.668	48.7	11.0	2.06	0.77	2.83	3.66	49.62	1.80	1.03
73	-4.9681	52.393	49.4	11.5	2.07	0.77	2.84	3.69	49.66	1.81	1.04
74	-4.9485	52.971	50.0	12.0	2.08	0.77	2.85	3.71	49.67	1.81	1.04
75	-4.9289	53.442	50.5	12.5	2.08	0.77	2.85	3.70	49.66	1.81	1.04
76	-4.9191	53.983	51.0	12.8	2.09	0.78	2.87	3.69	49.60	1.82	1.05
77	-4.8994	54.558	51.6	13.3	2.10	0.80	2.90	3.63	49.46	1.85	1.05
78	-4.8798	55.119	52.1	13.8	2.10	0.80	2.90	3.64	49.47	1.85	1.05
79	-4.8602	56.236	53.3	14.3	2.13	0.80	2.93	3.66	49.45	1.87	1.07
80	-4.8308	57.074	54.1	15.1	2.14	0.81	2.95	3.63	49.36	1.88	1.07
81	-4.8014	57.756	54.8	15.8	2.13	0.84	2.97	3.55	49.19	1.90	1.07
82	-4.7818	58.125	55.1	16.3	2.13	0.84	2.97	3.54	49.18	1.90	1.06
83	-4.7622	58.721	55.7	16.8	2.13	0.85	2.98	3.52	49.13	1.91	1.07
84	-4.7426	59.592	56.6	17.4	2.15	0.86	3.00	3.51	49.05	1.93	1.07
85	-4.7328	60.159	57.2	17.6	2.16	0.86	3.02	3.52	49.05	1.94	1.08
86	-4.7132	60.703	57.7	18.1	2.16	0.88	3.04	3.45	48.87	1.96	1.08
87	-4.6838	61.091	58.1	18.9	2.14	0.89	3.03	3.41	48.84	1.96	1.07
88	-4.6740	61.637	58.7	19.1	2.15	0.90	3.05	3.40	48.78	1.97	1.08
89	-4.6543	61.961	59.0	19.7	2.15	0.90	3.05	3.38	48.74	1.97	1.07
90	-4.6347	62.286	59.3	20.2	2.14	0.91	3.05	3.34	48.65	1.98	1.07
91	-4.6249	62.631	59.6	20.4	2.14	0.92	3.06	3.32	48.60	1.99	1.07
92	-4.5955	63.161	60.2	21.2	2.13	0.94	3.07	3.26	48.47	2.00	1.06
93	-4.5857	63.865	60.9	21.4	2.14	0.95	3.09	3.26	48.43	2.02	1.07
94	-4.5563	64.594	61.6	22.2	2.14	0.96	3.10	3.23	48.34	2.03	1.07
95	-4.5465	64.551	61.6	22.5	2.13	0.96	3.09	3.20	48.30	2.03	1.06

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	369.700			492.150
Moisture content: Dry soil+tare, gms.	316.060			434.320
Moisture content: Tare, gms.	0.000			118.260
Moisture, %	17.0	23.8	18.0	18.3
Moist specimen weight, gms.	369.7			
Diameter, in.	1.93	1.93	1.87	
Area, in.²	2.93	2.93	2.73	
Height, in.	3.99	3.99	3.86	
Net decrease in height, in.		0.00	0.13	
Wet Density, pcf	120.7	127.7	134.6	
Dry density, pcf	103.2	103.2	114.1	
Void ratio	0.6462	0.6462	0.4888	
Saturation, %	71.4	100.0	100.0	

Test Readings for Specimen No. 3

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.064 cm

Consolidation cell pressure = 70.00 psi (10.08 ksf)

Consolidation back pressure = 40.00 psi (5.76 ksf)

Consolidation effective confining stress = 4.32 ksf

Strain rate, %/min. = 0.05

Fail. Stress = 2.88 ksf **at reading no.** 81

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	-0.0563	2.755	0.0	0.0	0.00	4.32	4.32	1.00	39.98	4.32	0.00
1	-0.0553	6.866	4.1	0.0	0.22	4.30	4.52	1.05	40.14	4.41	0.11
2	-0.0543	8.497	5.7	0.1	0.30	4.27	4.57	1.07	40.34	4.42	0.15
3	-0.0533	10.283	7.5	0.1	0.40	4.25	4.65	1.09	40.49	4.45	0.20
4	-0.0523	10.747	8.0	0.1	0.42	4.23	4.65	1.10	40.60	4.44	0.21
5	-0.0493	11.168	8.4	0.2	0.44	4.19	4.63	1.11	40.89	4.41	0.22
6	-0.0483	13.676	10.9	0.2	0.57	4.16	4.73	1.14	41.14	4.44	0.29
7	-0.0473	16.387	13.6	0.2	0.72	4.11	4.83	1.17	41.44	4.47	0.36
8	-0.0462	18.723	16.0	0.3	0.84	4.07	4.91	1.21	41.74	4.49	0.42
9	-0.0452	20.574	17.8	0.3	0.94	4.04	4.97	1.23	41.98	4.50	0.47
10	-0.0442	22.123	19.4	0.3	1.02	3.99	5.01	1.25	42.28	4.50	0.51
11	-0.0432	23.535	20.8	0.3	1.09	3.96	5.05	1.28	42.52	4.50	0.55
12	-0.0422	24.551	21.8	0.4	1.14	3.92	5.06	1.29	42.77	4.49	0.57
13	-0.0412	25.493	22.7	0.4	1.19	3.89	5.08	1.31	43.00	4.48	0.60
14	-0.0402	26.303	23.5	0.4	1.23	3.86	5.09	1.32	43.22	4.47	0.62
15	-0.0392	26.826	24.1	0.4	1.26	3.83	5.09	1.33	43.38	4.46	0.63
16	-0.0382	27.560	24.8	0.5	1.30	3.80	5.10	1.34	43.63	4.45	0.65
17	-0.0372	28.314	25.6	0.5	1.34	3.78	5.12	1.35	43.74	4.45	0.67
18	-0.0362	28.952	26.2	0.5	1.37	3.74	5.11	1.37	44.03	4.43	0.69
19	-0.0342	29.748	27.0	0.6	1.41	3.68	5.10	1.38	44.41	4.39	0.71
20	-0.0332	30.302	27.5	0.6	1.44	3.65	5.10	1.39	44.63	4.37	0.72
21	-0.0312	31.346	28.6	0.6	1.50	3.60	5.09	1.42	45.01	4.35	0.75
22	-0.0292	32.062	29.3	0.7	1.53	3.54	5.07	1.43	45.41	4.31	0.77
23	-0.0282	32.495	29.7	0.7	1.55	3.52	5.07	1.44	45.58	4.29	0.78
24	-0.0262	33.196	30.4	0.8	1.59	3.46	5.05	1.46	45.97	4.26	0.80

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
25	-0.0242	33.739	31.0	0.8	1.62	3.41	5.03	1.47	46.34	4.22	0.81
26	-0.0222	34.315	31.6	0.9	1.65	3.36	5.01	1.49	46.64	4.19	0.82
27	-0.0202	35.024	32.3	0.9	1.68	3.30	4.99	1.51	47.06	4.15	0.84
28	-0.0182	35.634	32.9	1.0	1.71	3.26	4.97	1.53	47.39	4.11	0.86
29	-0.0122	37.014	34.3	1.1	1.78	3.13	4.91	1.57	48.30	4.02	0.89
30	-0.0082	37.740	35.0	1.2	1.82	3.04	4.86	1.60	48.87	3.95	0.91
31	-0.0042	38.390	35.6	1.3	1.85	2.96	4.81	1.62	49.42	3.89	0.93
32	-0.0002	39.327	36.6	1.5	1.90	2.89	4.79	1.66	49.93	3.84	0.95
33	0.0038	40.090	37.3	1.6	1.94	2.82	4.76	1.69	50.41	3.79	0.97
34	0.0078	40.679	37.9	1.7	1.96	2.76	4.72	1.71	50.84	3.74	0.98
35	0.0118	41.228	38.5	1.8	1.99	2.70	4.69	1.74	51.23	3.70	0.99
36	0.0198	42.164	39.4	2.0	2.03	2.61	4.64	1.78	51.88	3.63	1.02
37	0.0238	42.782	40.0	2.1	2.06	2.56	4.63	1.81	52.20	3.60	1.03
38	0.0277	43.214	40.5	2.2	2.08	2.52	4.60	1.83	52.51	3.56	1.04
39	0.0357	43.988	41.2	2.4	2.12	2.42	4.54	1.88	53.18	3.48	1.06
40	0.0397	44.469	41.7	2.5	2.14	2.38	4.52	1.90	53.48	3.45	1.07
41	0.0437	44.955	42.2	2.6	2.16	2.34	4.50	1.93	53.76	3.42	1.08
42	0.0517	45.669	42.9	2.8	2.20	2.27	4.47	1.97	54.22	3.37	1.10
43	0.0597	46.503	43.7	3.0	2.23	2.21	4.44	2.01	54.65	3.33	1.12
44	0.0637	46.921	44.2	3.1	2.25	2.18	4.43	2.04	54.88	3.30	1.13
45	0.0717	47.559	44.8	3.3	2.28	2.12	4.40	2.07	55.26	3.26	1.14
46	0.0796	48.264	45.5	3.5	2.31	2.05	4.37	2.13	55.73	3.21	1.16
47	0.0916	49.256	46.5	3.8	2.35	1.98	4.34	2.19	56.22	3.16	1.18
48	0.0996	49.677	46.9	4.0	2.37	1.95	4.32	2.22	56.46	3.13	1.19
49	0.1076	50.488	47.7	4.2	2.41	1.92	4.33	2.25	56.65	3.13	1.20
50	0.1196	51.315	48.6	4.6	2.44	1.87	4.31	2.30	57.00	3.09	1.22
51	0.1275	51.798	49.0	4.8	2.46	1.83	4.29	2.34	57.26	3.06	1.23
52	0.1355	52.270	49.5	5.0	2.48	1.81	4.28	2.37	57.45	3.05	1.24
53	0.1435	52.910	50.2	5.2	2.50	1.77	4.28	2.41	57.70	3.02	1.25
54	0.1535	53.578	50.8	5.4	2.53	1.74	4.27	2.45	57.90	3.01	1.27
55	0.1635	54.362	51.6	5.7	2.56	1.70	4.27	2.50	58.16	2.99	1.28
56	0.1735	54.815	52.1	6.0	2.58	1.68	4.26	2.53	58.31	2.97	1.29
57	0.1834	55.369	52.6	6.2	2.60	1.67	4.26	2.56	58.43	2.97	1.30
58	0.1934	55.999	53.2	6.5	2.62	1.64	4.26	2.60	58.64	2.95	1.31
59	0.2034	56.505	53.8	6.7	2.64	1.63	4.27	2.62	58.69	2.95	1.32
60	0.2134	57.047	54.3	7.0	2.66	1.61	4.27	2.65	58.78	2.94	1.33
61	0.2234	57.714	55.0	7.2	2.68	1.59	4.28	2.69	58.95	2.93	1.34
62	0.2433	58.786	56.0	7.8	2.72	1.55	4.27	2.75	59.22	2.91	1.36
63	0.2633	59.818	57.1	8.3	2.76	1.53	4.29	2.80	59.37	2.91	1.38
64	0.2733	60.359	57.6	8.5	2.77	1.52	4.30	2.82	59.42	2.91	1.39
65	0.2832	60.933	58.2	8.8	2.79	1.50	4.29	2.86	59.59	2.90	1.40
66	0.2932	61.370	58.6	9.1	2.81	1.51	4.32	2.86	59.53	2.91	1.40
67	0.3032	62.084	59.3	9.3	2.83	1.51	4.34	2.88	59.54	2.92	1.42
68	0.3231	63.089	60.3	9.8	2.86	1.49	4.35	2.93	59.67	2.92	1.43
69	0.3431	63.840	61.1	10.3	2.74	1.47	4.21	2.86	59.79	2.84	1.37
70	0.3531	64.341	61.6	10.6	2.75	1.48	4.23	2.86	59.75	2.85	1.38
71	0.3631	64.774	62.0	10.9	2.76	1.47	4.23	2.88	59.81	2.85	1.38

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
72	0.3730	65.339	62.6	11.1	2.77	1.46	4.24	2.90	59.84	2.85	1.39
73	0.3930	66.382	63.6	11.6	2.80	1.47	4.27	2.90	59.79	2.87	1.40
74	0.4030	66.903	64.1	11.9	2.81	1.48	4.28	2.90	59.75	2.88	1.40
75	0.4229	67.587	64.8	12.4	2.82	1.47	4.29	2.91	59.77	2.88	1.41
76	0.4429	68.134	65.4	12.9	2.82	1.48	4.30	2.90	59.71	2.89	1.41
77	0.4529	68.591	65.8	13.2	2.82	1.47	4.29	2.93	59.82	2.88	1.41
78	0.4728	69.559	66.8	13.7	2.84	1.48	4.32	2.92	59.71	2.90	1.42
79	0.4928	70.239	67.5	14.2	2.85	1.49	4.33	2.92	59.68	2.91	1.42
80	0.5127	71.034	68.3	14.7	2.86	1.50	4.36	2.90	59.56	2.93	1.43
81	0.5327	71.983	69.2	15.3	2.88	1.50	4.38	2.91	59.56	2.94	1.44
82	0.5427	72.452	69.7	15.5	2.88	1.51	4.39	2.91	59.51	2.95	1.44
83	0.5527	72.878	70.1	15.8	2.89	1.51	4.40	2.91	59.51	2.96	1.44
84	0.5626	73.363	70.6	16.0	2.90	1.51	4.40	2.92	59.54	2.95	1.45
85	0.5826	74.187	71.4	16.6	2.91	1.51	4.42	2.92	59.51	2.96	1.45
86	0.5926	74.779	72.0	16.8	2.92	1.52	4.44	2.92	59.42	2.98	1.46
87	0.6125	75.455	72.7	17.3	2.92	1.53	4.46	2.90	59.35	3.00	1.46
88	0.6325	76.150	73.4	17.8	2.93	1.54	4.46	2.90	59.31	3.00	1.46
89	0.6524	76.877	74.1	18.4	2.93	1.55	4.48	2.89	59.24	3.01	1.46
90	0.6624	77.361	74.6	18.6	2.94	1.55	4.49	2.89	59.21	3.02	1.47
91	0.6824	77.929	75.2	19.1	2.93	1.57	4.50	2.87	59.11	3.04	1.47
92	0.7023	78.772	76.0	19.7	2.94	1.59	4.53	2.85	58.97	3.06	1.47
93	0.7123	79.309	76.6	19.9	2.95	1.59	4.54	2.85	58.95	3.07	1.47
94	0.7323	80.225	77.5	20.4	2.96	1.60	4.56	2.85	58.90	3.08	1.48
95	0.7423	80.656	77.9	20.7	2.96	1.60	4.57	2.85	58.87	3.08	1.48
96	0.7722	81.537	78.8	21.5	2.96	1.62	4.58	2.83	58.75	3.10	1.48
97	0.7922	82.347	79.6	22.0	2.96	1.66	4.62	2.79	58.50	3.14	1.48
98	0.8121	83.055	80.3	22.5	2.96	1.65	4.62	2.79	58.52	3.13	1.48
99	0.8221	83.324	80.6	22.8	2.96	1.66	4.62	2.78	58.49	3.14	1.48
100	0.8223	83.191	80.4	22.8	2.95	1.66	4.61	2.78	58.48	3.14	1.48

Appendix C-6

Sodium Adsorption Ratio Test Results

Colorado Analytical Laboratories, Inc.

Analytical Results

Report To: Sam Bush
Company: Knight Piesold & Co.
5030 Nome St. Unit A
Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-01-03** **Lab Number:** 08072112-01
Sample Date/Time: 7/21/08 **Matrix:** Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.4 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**166.2 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**73.7 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**89.7 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**8.2 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

ASA = "Methods of Soil Analysis, Parts 1 and 2", Second Edition, American Society of Agronomy and Soil Science Society of America. Madison, WI, 1982.
SW-846 = "Test Methods for Evaluating Solid Waste"; USEPA; November 1986
AB-DTPA = "Soil Testing Methods Used at Colorado State University for the Evaluation of Fertlity, Salinity and Trace Element Toxicity"; Colorado State University Technical Bulletin LTB88-2; Jan 1998; SM Workman, PN Soltanpour and RH Follett.

Steve Nielson

DATA APPROVED FOR RELEASE BY

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Colorado Analytical Laboratories, Inc.

Analytical Results

Report To: Sam Bush
Company: Knight Piesold & Co.
5030 Nome St. Unit A
Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-03-1**
Sample Date/Time: 7/21/08

Lab Number: 08072112-02
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.5 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**8.1 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**4.1 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**24.8 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**10.0 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Colorado Analytical Laboratories, Inc.

Analytical Results

Report To: Sam Bush
Company: Knight Piesold & Co.
5030 Nome St. Unit A
Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID TP-03-7
Sample Date/Time: 7/21/08

Lab Number: 08072112-03
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.2 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**47.9 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**21.0 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**91.5 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**15.6 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-04-7**
Sample Date/Time: 7/21/08

Lab Number: 08072112-04
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.7 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**206.0 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**85.4 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**65.9 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**5.5 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-05-4**
Sample Date/Time: 7/21/08

Lab Number: 08072112-05
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.0 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**47.3 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**44.2 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**78.3 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**11.6 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-06-7**
Sample Date/Time: 7/21/08

Lab Number: 08072112-06
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**0.6 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**10.3 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**6.6 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**17.9 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**6.2 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-07-10**
Sample Date/Time: 7/21/08

Lab Number: 08072112-07
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.5 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**201.7 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**78.6 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**94.9 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**8.0 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Denver CO 80239

Task No: 08072112
Date Received 7/21/08
Reported: 8/4/08
Client PO: 8387
Client Project:

Customer Sample ID **TP-10-7**
Sample Date/Time: 7/21/08

Lab Number: 08072112-08
Matrix: Soil - Environmental

Test	Result	Reporting Limit	Method	Date Analyzed	Analyzed By
Dry Weight Basis					
Total Organic Carbon	**1.5 %**	0.1	ASA2 29-3.5.2	7/30/08	DAH
Soluble Nutrients - Dry Weight Basis					
Calcium	**190.8 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Magnesium	**91.1 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium	**38.7 meq/L**	0.1	USDA60 6 (20b)	7/31/08	BCT
Sodium Adsorption Ratio	**3.3 units**	0.1	USDA60 6 (20b)	7/31/08	BCT

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Appendix D

SPAW Model Results

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SPAW Model Results

1.0 SPAW Model Results

1.1 Overview

This appendix describes the modeling that was used in the design of the land application system and associated settling ponds. Bleed water from the process lixiviant circuit will be extracted following uranium removal in the ion-exchange (IX) columns. Bleed water will then flow through secondary IX columns to further remove uranium and other metals. This water will be discharged to lined settling ponds, where radium will be precipitated using barium sulfate. Water from these ponds will then be pumped to center pivot sprinklers and used to irrigate alfalfa or other suitable crops from March 29 to October 31 during each year of operation. Water from the ponds will be sampled before it is pumped to the sprinklers to ensure that it meets the applicable discharge standards for all constituents.

It is anticipated that several potential crops such as alfalfa, corn, sorghum and several species of salt tolerant wheatgrass could be irrigated. During the irrigation season, water application rates will be determined during operation to optimize both evaporation and crop production.

The design of the land application system was developed based on modeling using the SPAW model, which is described in the following sections. Two land application areas, one at the Dewey site and one at the Burdock site will be used. The total irrigated area at any given time at the Dewey site would be 315 acres, consisting of four 50-acre pivots, four 25-acre pivots, plus one 15-acre pivot. In addition, there would be one 50-acre pivot and one 15-acre pivot on standby (total pivots at Dewey is five 50-acre pivots, four 25-acre pivots, and two 15-acre pivots). Pumping at Dewey would occur for 24 hours every day from March 29 to May 10 at a rate of 297 gallons per minute (gpm); from May 11 to September 24 at a rate of 653 gallons per minute; and from September 25 to October 31 at a rate of 297 gallons per minute.

The total irrigated area at any given time at the Burdock site would also be 315 acres (six 50-acre pivots plus one 15-acre pivot). In addition, there would be two 25-acre pivots and one 15-acre pivot on standby. The total pivots at Burdock would be six 50-acre pivots, two 25-acre pivots, and two 15-acre pivots. Pumping at Burdock would also occur for 24 hours on every day from

March 29 to May 10 at 297 gallons per minute; from May 11 to September 24 at a rate of 653 gallons per minute; and from September 25 to October 31 at a rate of 297 gallons per minute.

Five single-lined impoundments (ponds) will be constructed at the Dewey site for the temporary storage of the irrigation water. Each pond will be 465 feet x 465 x 30 feet deep including 3 feet of freeboard, with an operating capacity of 61.8 acre-feet. Four of the ponds will be operational at any given time, with the remaining pond serving as a backup. In addition to the storage ponds, a double-lined radium settling pond with leak detection and a single-lined outlet pond will also be constructed at Dewey. The radium settling pond will be 880 feet x 200 feet x 22.5 feet deep, including 3 feet of freeboard, and will have an operational storage of 39.4 acre-ft. The outlet pond will be 280 feet x 162 feet x 14 feet deep including 3 feet of freeboard, and will have an operational storage of 4.9 acre-ft.

Four single-lined impoundments (ponds) will be constructed at the Burdock site for the temporary storage of the irrigation water. Each pond will be 465 feet x 465 feet x 30 feet deep including 3 feet of freeboard, with an operating capacity of 61.8 acre-feet. In addition to the storage ponds, double-lined radium settling, spare and central processing plant (CPP) ponds with leak detection, and a single-lined outlet pond will also be constructed at Burdock. The radium settling and spare ponds will be 880 feet x 200 feet x 25.5 feet deep, including 3 feet of freeboard, and will have an operational storage of 39.4 acre-ft. The CPP pond will be 362 feet x 362 feet x 25 feet including 3 feet of freeboard, and will have an operational storage capacity of 36.2 acre-feet. The outlet pond will be 280 feet x 162 feet x 14 feet deep including 3 feet of freeboard, and will have an operational storage of 4.9 acre-ft.

1.2 SPAW Model Description

The SPAW (Soil-Plant-Air-Water) Model was developed by the U.S. Department of Agriculture (Saxton and Willey, 2006) to simulate the daily hydrologic water budgets of agricultural landscapes by two connected routines, one for farm fields and one for impoundments such as irrigation ponds. The field hydrology simulation is represented by: 1) daily climatic descriptions of precipitation, temperature, and evaporation, 2) a soil profile of interacting layers each with unique water holding characteristics, and 3) annual crop growth with management options for rotations, irrigation, and fertilization. The model output for the field hydrology routine includes a daily vertical, one-dimensional water budget depth for all major hydrologic processes such as runoff, infiltration, evapotranspiration, soil water profiles, and percolation.

Water volumes for each component of the water balance are estimated by multiplying the water budget depth times the associated field area.

Pond hydrology simulations provide water budgets by multiple input and depletion processes for impoundments whose water source is runoff from agricultural fields and/or water produced by wells or other sources. Model outputs for the pond hydrology routine include daily values of depth, volume, precipitation, evaporation, and change in storage for the period of simulation. The version of the SPAW model used was Version 6.02.75. The model has been extensively tested by the developers using research data and real-world applications.

1.2.1 Model Input Parameters

1.2.1.1 Meteorological Parameters

The local climate at the project site is continental, with hot summers, cold winters, and an average annual precipitation of 16.4 inches. The wettest months are from April to September. May and June are the months of highest average precipitation, with occasional thunderstorms that can be severe. Typical daytime temperatures range from 35 degrees Fahrenheit (^{o}F) in January to 85 ^{o}F in July, with nighttime temperatures dropping by approximately 15 to 30 ^{o}F.

Because of limited on-site climatic data, twenty-eight years of daily precipitation and temperature values (from 1980 to 2007) from the nearest available meteorological station at Edgemont, South Dakota were downloaded from the National Climatic Data Center and used as input data for the SPAW Model. The Edgemont station is approximately 13 miles southeast of the site at an elevation of 3460 feet above mean sea level (amsl). The project plant site is at 3720 feet amsl. Table 1.2-1 shows the average monthly air temperature data at the Edgemont station for the 28-year period of record.

Table 1.2-1: Average Monthly and Annual Air Temperature at Edgemont, SD Station (°F)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
22.6	26.8	36.6	46.7	56.9	66.4	74.3	72.5	61.3	47.8	33.0	22.6	47.3

1.2.1.1.1 Precipitation

Daily precipitation values for the 28-year period of record from the Edgemont station were used as input data for the SPAW Model. Where daily data were absent in the record, the daily average for that month from the 28-yr record was used. No adjustments were made to the precipitation values for the 260-foot elevation difference between the Edgemont station and the project site. Table 1.2-2 shows the average monthly precipitation at the Edgemont station for the 28-yr period of record.

Table 1.2-2: Average Monthly and Annual Precipitation at Edgemont, SD Station (inches)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.33	0.50	1.09	1.87	2.48	2.60	2.17	1.59	1.38	1.31	0.69	0.43	16.44

1.2.1.1.2 Potential Evapotranspiration

The SPAW model requires daily potential evapotranspiration (PET) data. Lake evaporation is a close estimate of PET, and is similar to PET values estimated using the Penman method. The mean annual lake evaporation (PET equivalent) at the site was determined to be 44 inches using the Evaporation Atlas for the Contiguous 48 United States (Farnsworth and Thompson, 1982). The monthly PET was calculated by applying the values for the monthly distribution of evaporation for the north central United States that are contained in the SPAW model. The daily PET for each month was then calculated by dividing the monthly PET by the number of days in the month. Table 1.2-3 shows the estimated average monthly and annual potential evapotranspiration at the site that was calculated using this method.

Table 1.2-3: Average Monthly and Annual Potential Evapotranspiration at Project Site (inches)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.92	1.23	1.98	3.30	4.40	5.76	7.08	6.95	5.50	3.74	2.02	1.10	44.0

1.2.1.2 Material Properties

To characterize the soils at the site, eleven test pits were excavated on July 11 and 12, 2008. Samples were collected at various depths and analyzed for particle size distribution, dry bulk density, permeability, and other geotechnical parameters. Test pits 1 through 5 were excavated at the Dewey land application area, and test pits 6 through 11 were excavated at the Burdock land application area. Table 1.2-4 shows the USDA soil texture and dry bulk density for the test pit samples. These are the parameters that are used as input to the SPAW model.

Natural Resources Conservation Service (NRCS) soil survey maps for the land application area were downloaded from the NRCS Web Soil Survey. The particle size distributions for the

NRCS soil mapping units were compared to the laboratory particle size distributions for the test pit soil samples. This comparison showed that the laboratory results for the test pit samples generally fell within the range of particle size distributions for the NRCS survey soil mapping units.

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Table 1.2-4: Summary of Test Pit Soil Properties

USDA Soil Texture Class, Dry Bulk Density and Permeability

Sample No.	Depth	Gravel	Sand	Silt	Clay	Dry Bulk Density	Permeability (cm/sec)
Units:	(ft)	% by wt	% by wt	% by wt	% by wt	(lb/ft^3)	
TP01-1	1	0.20	26.20	38.00	35.60	N/A	
TP01-3	3	0.10	25.70	27.20	47.00	101.20	5.10E-05
TP01-7	7	0.90	8.10	57.20	33.80	86.30	
TP02-1	1	0.00	19.90	40.70	39.40	94.50	
TP02-4	4	0.00	16.70	34.60	48.70	101.50	
TP02-7	7	0.20	26.70	34.80	38.30	92.50	
TP03-1	1	0.00	24.30	24.80	50.90	90.00	8.30E-05
TP03-7	7	0.00	2.40	25.10	72.50	104.60	
TP03-11	11	60.00	25.00	8.90	6.10		
TP04-1	1	2.20	47.80	18.20	31.80	98.10	
TP04-7	7	1.30	27.50	28.00	43.20	113.30	
TP05-1	1	1.50	24.00	31.60	42.90	97.00	
TP05-4	4	2.00	30.00	23.40	44.60	94.80	3.20E-05
TP05-8	8	0.80	22.10	57.60	19.50	106.30	
TP06-1	1	0.30	17.90	30.80	51.00	N/A	
TP06-7	7	0.00	42.00	31.80	26.20	N/A	
TP06-10	10	0.00	40.00	31.20	28.80	N/A	
TP07-1	1	0.60	17.40	27.30	54.70	105.30	
TP07-5	5	0.1	22.1	25.9	51.9	103.90	
TP07-10	10	0.3	19.7	6.9	73.1	105.40	
TP08-2	2	0.1	11.9	35.7	52.3	95.20	5.70E-04
TP08-6	6	0.4	56.6	25.4	17.6	103.40	
TP09-1	1	0.3	15.2	39	45.5	94.90	
TP09-4	4	0.1	35.9	37.8	26.2	109.60	5.50E-06
TP10-1	1	1.8	21.1	34.8	42.3	99.10	
TP10-7	7	0.4	11.1	30.3	58.2	105.80	1.60E-07

Notes: N/A = Results for these samples were not available.

1.2.2 Modeling Approach

The general assumptions for the SPAW model include the following:

1. The model is a one-dimensional vertical model.

2. The model assumes that the modeled area is spatially uniform in soil, crop and climate characteristics.

3. Model inputs and outputs are based on daily values.

4. The model does not does not include flow routing or channel descriptors.

5. Daily runoff is estimated as an equivalent depth over the simulation field by the USDA/SCS Curve Number method.

6. The field budget utilizes a one-dimensional vertical system beginning above the plant canopy and proceeding downward through the soil profile to a depth sufficient to represent the complete root penetration and subsurface hydrologic processes (lateral soil water flow is not simulated).

Specific assumptions related to this project are as follows:

1. Daily precipitation and temperature data used in the model are based on 28 years of record from the Edgemont, South Dakota station.

2. SPAW modeling was done for two land application and pond areas, the Dewey site and the Burdock site.

3. Soils data used in the modeling of the Dewey site was based on a composite of soils data from Test Pits 1, 2 and 5.

4. Soils data used in the modeling of the Burdock site was based on a composite of soils data from Test Pits 8, 9 and 10.

5. The 24/7 year-round inflow rate from process water and bleed water at each site is 310 gpm.

6. The irrigation season is from March 29 to October 31 each year (217 days).

7. Model runs were conducted assuming no crop (bare soil). This assumption ensures that the results will be conservative in terms of the resulting evapotranspiration and runoff, since it is difficult to model the response of alfalfa or other crops to the quality of the applied irrigation water and to the soil conditions present at the site.

8. The irrigation water will be applied at a rate that balances the total annual amount of process inflow water. The modeled application rate is 297 gpm from March 29 to May 10, 653 gpm from May 11 to September 24, and 297 gpm from September 25 to October 31.

9. Irrigation tailwater and rainfall runoff from the land application areas will be conveyed to collection areas at the edges of the land application areas and allowed to evaporate and seep into the soil.

10. The storage impoundments are designed to contain the one percent exceedance probability event (100-year event) plus 3 feet of freeboard.

11. All storage impoundments have side slopes of 3 to 1 and are 30 feet deep.

The objective of the SPAW modeling was to help design a land application system that: (1) maximizes evapotranspiration; (2) minimizes surface runoff; (3) minimizes percolation below the rooting zone; (4) minimizes the irrigated acreage required; and (5) minimizes the required volume of the storage ponds while maintaining a one percent probability that the design pond volume will be exceeded during the operating life of the facility.

SPAW modeling was performed at both the Dewey and Burdock sites. A composite of the soil properties at each site was created for use in the model using analytical data from three test pits from each site. Test pits 1, 2 and 5 were used for the Dewey site and test pits 8, 9 and 10 were used for the Burdock site. The composites were created by taking the averages of the gravel, sand and clay fractions and the dry bulk densities for each depth interval for the three test pits at each site.

The SPAW modeling assumed that the facility will operate on a year-round basis for 15 years. Twenty-eight years of daily precipitation, temperature and evaporation data from January 1, 1980 to December 31, 2007 were used to create 28 unique and equally likely simulations of the process water balance. Each simulation used 15 years of sequential climatic data corresponding to the 15 years of operation of the facility. The climatic data intervals used for each of the 28 simulations are shown in Table 1.2-5.

Field simulations using the SPAW model were run using each of the 28 climatic data intervals shown in Table 1.2-5. The results of these field simulations were used as the input to pond simulations for the same 28 climatic intervals. The result was a daily pond volume for each day of the year for each of the 28 15-year simulations.

The pond volume with a 1 percent exceedance probability during a 15-year operating period was estimated as follows. First, the average pond volume for each day during the 15-year operating period for the 28 simulations was calculated. Then, the pond volume for each day of the 15-year period with a 1 percent exceedance probability was calculated using the Gumbel Extreme Value distribution, which resulted in 5,475 possible values. The greatest of these 5,475 values was then selected as the maximum possible volume with a 1 percent exceedance probability during a 15-year period.

Table 1.2-5: Sequential Water Balance Simulations

Simulation No.	15-Year Climatic Data Interval
1	01/01/1980 to 12/31/1994
2	01/01/1981 to 12/31/1995
3	01/01/1982 to 12/31/1996
4	01/01/1983 to 12/31/1997
5	01/01/1984 to 12/31/1998
6	01/01/1985 to 12/31/1999
7	01/01/1986 to 12/31/2000
8	01/01/1987 to 12/31/2001
9	01/01/1988 to 12/31/2002
10	01/01/1989 to 12/31/2003
11	01/01/1990 to 12/31/2004
12	01/01/1991 to 12/31/2005
13	01/01/1992 to 12/31/2006
14	01/01/1993 to 12/31/2007
15	01/01/1994 to 12/31/1980
16	01/01/1995 to 12/31/1981
17	01/01/1996 to 12/31/1982
18	01/01/1997 to 12/31/1983
19	01/01/1998 to 12/31/1984
20	01/01/1999 to 12/31/1985
21	01/01/2000 to 12/31/1986
22	01/01/2001 to 12/31/1987
23	01/01/2002 to 12/31/1988
24	01/01/2003 to 12/31/1989
25	01/01/2004 to 12/31/1990
26	01/01/2005 to 12/31/1991
27	01/01/2006 to 12/31/1992
28	01/01/2007 to 12/31/1993

1.2.3 Model Results

Field Model Results

Based on the SPAW modeling, the irrigated area at the Dewey site would be 315 acres. Pumping at Dewey would occur for 24 hours every day from March 29 to May 10 at a rate of 297 gallons per minute (gpm); from May 11 to September 24 at a rate of 653 gpm; and from September 25 to October 31 at a rate of 297 gpm.

The irrigated area at the Burdock site would also be 315 acres. Pumping at Burdock would also occur for 24 hours on every day from March 29 to May 10 at a rate of 297 gpm; from May 11 to September 24 at a rate of 653 gpm; and from September 25 to October 31 at a rate of 297 gpm. The annual summaries of the SPAW field modeling results for the twenty-eight 15-year simulations at both the Dewey and Burdock sites are attached.

Pond Model Results

Based on the assumptions listed above (Section 1.2.2), the model results showed that the total irrigation storage pond volume having a 1-percent exceedance probability is 216 acre-feet at both the Dewey and Burdock sites. An additional 31 acre-feet of capacity was added to the ponds at each site, for a total pond capacity of 247 acre-feet. This additional capacity acts as contingency storage for days at the beginning of the irrigation season when weather conditions may limit pumping for land application. Four single-lined impoundments (ponds), each with dimensions of 465 feet x 465 x 30 feet deep and a capacity of 61.8 acre-feet, will be operational at any given time at both the Dewey and Burdock sites, providing a total capacity of 247.2 acre-feet at each site. This capacity includes the volume with a 1 percent exceedance probability, plus 3 feet of freeboard. A double-lined radium settling pond with leak detection will also be constructed at each site, with an operational storage of 39.2 acre-ft, which includes sufficient capacity for the settling of barium sulfate and radium, the total volume of which over the 15-year operating life is estimated to be 0.036 acre-feet. In addition, there will be a Central Processing Plant (CPP) pond at the Burdock site. The CPP pond will be 362 feet x 362 feet x 25 feet deep including 3 feet of freeboard, with a total capacity of 36.2 acre-feet.

The annual summaries of the SPAW pond modeling results for the twenty-eight 15-year simulations at the Burdock site are attached. The climatic conditions and pond inflow rates are the same for both sites, and therefore the SPAW pond modeling results are also the same.

Runoff Model Results

Runoff from irrigation return flows and from rainfall falling on the land application areas will be conveyed to collection areas at the edges of the land application areas and allowed to evaporate. The quantity of this runoff was calculated by the SPAW model and entered into a monthly water balance to determine the required volume of these collection areas. The following equation summarizes the monthly water balance:

$$S = RO + P - E - I$$

where:

S = storage required

RO = runoff from the 315-acre land application area due to irrigation and precipitation

P = precipitation falling directly on the runoff collection area

E = evaporation from the collection area

I = seepage from the collection area

The water balance was determined using a spreadsheet model that calculates the cumulative storage required at the end of each month during the 15-year operating life of the facility. Water balances for five potential 15-year operating periods were simulated for both the Dewey and Burdock sites, using five 15-year periods with the highest total annual precipitation amounts from the 28 years of available climatic data. The results showed that a 35-acre collection area at the Burdock site would have an average of 1.3 inches of standing water at month-end during each month of the 15-year operating life of the facility, and a maximum of 30.5 inches of standing water at month-end, which occurred during a single month over the 15 years. At the Dewey site, a 35-acre collection area would have an average of 0.13 inches of standing water at month-end during the 15-year operating life of the facility, and a maximum of 8.8 inches of standing water at month-end, which also occurred during a single month over 15 years. The difference in storage required at the two sites is due to the higher permeability of the soils at the Dewey site. The soil permeabilities used in the water balance were based on permeability values determined from laboratory testing of the soils from the on-site test pits.

1.3 References

Farnsworth, R.K. and Thompson, E.S., 1982. "*Evaporation Atlas for the Contiguous 48 United States. NOAA Technical Report NWS 33*", National Weather Service. Washington, DC.

Masch, F.D., 1986, Hydrology, "*Hydraulic Engineering Circular No. 19, FHWA-IP-84-15*", U.S. Department of Transportation, Federal Highway Administration.

Saxton, K.E. and P.H Willey, 2006, "*The SPAW Model for Agricultural Field and Pond Hydrologic Simulation*", Chapter 17 in Mathematical Modeling of Watershed Hydrology, V.P. Singh and D. Frevert, Editors; CRC Press, pp 401-435.

Saxton, K.E., 2006, "*SPAW (Soil-Plant-Air-Water) Field and Pond Hydrology Computer Model*", Version 6.02.75. U.S.D.A. Agricultural Research Service.

Withers, B. and S. Vipond, 1980, "*Irrigation: Design and Practice*", Ithaca, NY: Cornell University Press, 306 p.

Knight Piésold
CONSULTING

SPAW Model Results

Dewey Field

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 80-94\XD 80-94.spw
File Creation Date      : Jul 13, 2009 09:07:29
File Last Modified Date : Jul 13, 2009 09:07:30
Description             : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94
Simulation Start Date   : Jan 01, 1980
Simulation End Date     : Dec 31, 1994
Simulation Run Date     : Jul 13, 2009 09:07
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

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Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 80-94\XD 80-94.fld (Jul 13, 200900:00)
Climate                : Dewey Burdock 81-94 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.clm (Sep 16, 2008 00:00)
   Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
   Precipitation       : SD8094 - Jan 01, 1980 to Dec 31, 1994
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
   Air Temperature     : SD8094 - Jan 01, 1980 to Dec 31, 1994
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
   Crop ( 1)           : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1980	44.04	27.07	15.07	0.00	12.01	16.33	19.07	4.21	19.18	0.10	0.00	4.02	0.00	0.00
1981	44.00	27.29	15.98	0.00	11.31	13.46	19.07	4.21	17.01	0.48	0.00	0.55	0.00	0.00
1982	44.00	31.32	19.47	0.00	11.85	21.88	19.07	8.47	20.63	0.29	0.00	0.87	0.00	0.00
1983	44.00	29.19	17.40	0.00	11.78	16.16	19.07	5.30	18.15	0.15	0.00	0.59	0.00	0.00
1984	44.04	31.36	19.32	0.00	12.04	16.89	19.07	4.49	19.43	0.16	0.00	-0.05	0.00	0.00
1985	44.00	28.09	16.47	0.00	11.63	11.75	19.07	2.59	16.60	0.01	0.00	0.12	0.00	0.00
1986	44.00	33.26	21.34	0.00	11.93	23.59	19.07	8.67	22.07	0.09	0.00	0.64	0.00	0.00
1987	44.00	29.80	17.92	0.00	11.87	12.36	19.07	2.37	17.18	-0.01	0.00	-0.72	0.00	0.00
1988	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
1989	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
1990	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
1991	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.83	18.02	0.00	11.81	16.29	19.07	5.03	18.52	0.08	0.00	0.42	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
     File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 81-95\XD 81-95.spw
     File Creation Date     : Jul 16, 2009 14:38:41
     File Last Modified Date : Jul 16, 2009 14:38:42
     Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95
     Simulation Start Date  : Jan 01, 1981
     Simulation End Date    : Dec 31, 1995
     Simulation Run Date    : Jul 16, 2009 14:38
     SPAW Interface Version : 6.02.75
     Field Model Version    : 6.02.71
     Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
     Field                : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 81-95\XD 81-95.fld (Jul 17, 200900:00)
     Climate              : Dewey Burdock 81-95 climatic data
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.clm (Sep 16, 2008 00:00)
       Evaporation Defaults: Dewey-Burdock Evap. Defaults
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
       Precipitation      : SD8195 - Jan 01, 1981 to Dec 31, 1995
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
       Air Temperature    : SD8195 - Jan 01, 1981 to Dec 31, 1995
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
     Management           : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
       Crop ( 1)          : Bare feedlot or fallow field
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
     Soil                 : Dewey TP1, TP2, TP5 Revised Soils Composite
                            G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1981	44.00	24.88	13.56	0.00	11.31	13.46	19.07	4.20	17.02	-0.04	0.00	3.50	0.00	0.00
1982	44.00	31.28	19.44	0.00	11.85	21.88	19.07	7.71	21.39	0.60	0.00	1.35	0.00	0.00
1983	44.00	28.91	17.13	0.00	11.78	16.16	19.07	5.30	18.15	0.25	0.00	0.77	0.00	0.00
1984	44.04	31.16	19.12	0.00	12.04	16.89	19.07	4.49	19.43	0.23	0.00	0.08	0.00	0.00
1985	44.00	27.95	16.33	0.00	11.63	11.75	19.07	2.59	16.60	0.06	0.00	0.22	0.00	0.00
1986	44.00	33.16	21.23	0.00	11.93	23.59	19.07	8.56	22.17	0.16	0.00	0.78	0.00	0.00
1987	44.00	29.73	17.86	0.00	11.87	12.36	19.07	2.37	17.18	0.00	0.00	-0.67	0.00	0.00
1988	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
1989	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
1990	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
1991	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.95	18.15	0.00	11.80	16.42	19.07	5.05	18.64	0.08	0.00	0.41	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 82-96\XD 82-96.spw
File Creation Date : Jul 16, 2009 14:40:12
File Last Modified Date : Jul 16, 2009 14:40:13
Description : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Jul 16, 2009 14:40
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 82-96\XD 82-96.fld (Jul 17, 200900:00)
Climate : Dewey Burdock 82-96 climatic data
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8296 - Jan 01, 1982 to Dec 31, 1996
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Air Temperature : SD8296 - Jan 01, 1982 to Dec 31, 1996
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Management : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1) : Bare feedlot or fallow field
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1982	44.00	30.50	18.69	0.00	11.81	21.83	19.07	6.36	22.73	0.05	0.00	4.00	0.00	0.00
1983	44.00	28.39	16.61	0.00	11.78	16.16	19.07	5.25	18.20	0.51	0.00	1.09	0.00	0.00
1984	44.04	30.99	18.95	0.00	12.04	16.89	19.07	4.29	19.63	0.35	0.00	0.32	0.00	0.00
1985	44.00	27.82	16.19	0.00	11.63	11.75	19.07	2.57	16.62	0.11	0.00	0.32	0.00	0.00
1986	44.00	33.08	21.15	0.00	11.93	23.59	19.07	8.56	22.17	0.19	0.00	0.83	0.00	0.00
1987	44.00	29.61	17.74	0.00	11.87	12.36	19.07	2.37	17.18	0.04	0.00	-0.59	0.00	0.00
1988	44.04	28.14	16.33	0.00	11.81	13.79	19.07	4.63	16.41	0.02	0.00	0.06	0.00	0.00
1989	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.02	0.00	0.39	0.00	0.00
1990	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
1991	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.24	18.42	0.00	11.83	16.70	19.07	4.99	18.95	0.09	0.00	0.45	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                     : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 83-97\XD 83-97.spw
File Creation Date       : Jul 16, 2009 14:41:29
File Last Modified Date  : Jul 16, 2009 14:42:28
Description              : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97
Simulation Start Date    : Jan 01, 1983
Simulation End Date      : Dec 31, 1997
Simulation Run Date      : Jul 16, 2009 14:42
SPAW Interface Version   : 6.02.75
Field Model Version      : 6.02.71
Soil Equations           : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                    : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 83-97\XD 83-97.fld (Jul 17, 200900:00)
Climate                  : Dewey Burdock 83-97 climatic data
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.clm (Sep 16, 2008 00:00)
   Evaporation Defaults: Dewey-Burdock Evap. Defaults
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
   Precipitation         : SD8397 - Jan 01, 1983 to Dec 31, 1997
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
   Air Temperature       : SD8397 - Jan 01, 1983 to Dec 31, 1997
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Management               : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
   Crop ( 1)             : Bare feedlot or fallow field
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                     : Dewey TP1, TP2, TP5 Revised Soils Composite
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1983	44.00	26.69	14.99	0.00	11.70	16.08	19.07	4.45	19.00	-0.05	0.00	4.06	0.00	0.00
1984	44.04	30.62	18.58	0.00	12.04	16.89	19.07	4.08	19.84	0.62	0.00	0.63	0.00	0.00
1985	44.00	27.41	15.78	0.00	11.63	11.75	19.07	2.57	16.62	0.24	0.00	0.60	0.00	0.00
1986	44.00	32.89	20.97	0.00	11.93	23.59	19.07	8.55	22.19	0.25	0.00	0.98	0.00	0.00
1987	44.00	29.55	17.68	0.00	11.87	12.36	19.07	2.26	17.29	0.10	0.00	-0.48	0.00	0.00
1988	44.04	27.82	16.01	0.00	11.81	13.79	19.07	4.95	16.09	0.03	0.00	0.05	0.00	0.00
1989	44.00	29.30	17.45	0.00	11.85	15.58	19.07	4.75	18.06	0.09	0.00	0.52	0.00	0.00
1990	44.00	31.43	19.77	0.00	11.65	19.14	19.07	6.89	19.67	0.01	0.00	-0.11	0.00	0.00
1991	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.08	18.28	0.00	11.80	16.42	19.07	4.91	18.78	0.09	0.00	0.42	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 84-98\XD 84-98.spw
File Creation Date     : Jul 14, 2009 12:55:47
File Last Modified Date : Jul 14, 2009 14:18:32
Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98
Simulation Start Date  : Jan 01, 1984
Simulation End Date    : Dec 31, 1998
Simulation Run Date    : Jul 14, 2009 14:18
SPAW Interface Version : 6.02.75
Field Model Version    : 6.02.71
Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 84-98\XD 84-98.fld (Jul 15, 200900:00)
Climate                : Dewey Burdock 84-98 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD8498 - Jan 01, 1984 to Dec 31, 1998
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD8498 - Jan 01, 1984 to Dec 31, 1998
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1984	44.04	27.85	16.04	0.00	11.81	15.65	19.07	3.14	19.76	0.02	0.00	3.71	0.00	0.00
1985	44.00	26.78	15.15	0.00	11.63	11.75	19.07	2.57	16.62	0.51	0.00	0.96	0.00	0.00
1986	44.00	32.56	20.63	0.00	11.93	23.59	19.07	8.55	22.19	0.35	0.00	1.20	0.00	0.00
1987	44.00	29.24	17.37	0.00	11.87	12.36	19.07	2.37	17.18	0.16	0.00	-0.35	0.00	0.00
1988	44.04	27.79	15.99	0.00	11.81	13.79	19.07	4.63	16.41	0.14	0.00	0.29	0.00	0.00
1989	44.00	29.27	17.42	0.00	11.85	15.58	19.07	4.75	18.06	0.10	0.00	0.54	0.00	0.00
1990	44.00	31.42	19.77	0.00	11.65	19.14	19.07	6.89	19.67	0.01	0.00	-0.11	0.00	0.00
1991	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.23	18.43	0.00	11.80	16.88	19.07	5.21	18.94	0.08	0.00	0.42	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 85-99\XD 85-99.spw
File Creation Date	: Jul 14, 2009 12:58:49
File Last Modified Date	: Jul 14, 2009 14:17:28
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99
Simulation Start Date	: Jan 01, 1985
Simulation End Date	: Dec 31, 1999
Simulation Run Date	: Jul 14, 2009 14:17
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 85-99\XD 85-99.fld (Jul 15, 200900:00)
Climate	: Dewey Burdock 85-99 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8599 - Jan 01, 1985 to Dec 31, 1999 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8599 - Jan 01, 1985 to Dec 31, 1999 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1985	44.00	24.76	13.13	0.00	11.63	11.75	19.07	2.57	16.62	-0.05	0.00	3.54	0.00	0.00
1986	44.00	31.84	19.91	0.00	11.93	23.59	19.07	8.51	22.22	0.61	0.00	1.70	0.00	0.00
1987	44.00	29.00	17.12	0.00	11.87	12.36	19.07	2.20	17.36	0.30	0.00	-0.07	0.00	0.00
1988	44.04	27.64	15.83	0.00	11.81	13.79	19.07	4.63	16.41	0.19	0.00	0.39	0.00	0.00
1989	44.00	29.09	17.24	0.00	11.85	15.58	19.07	4.75	18.06	0.16	0.00	0.66	0.00	0.00
1990	44.00	31.32	19.67	0.00	11.65	19.14	19.07	6.81	19.75	0.06	0.00	0.02	0.00	0.00
1991	44.00	29.23	17.31	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.17	18.36	0.00	11.81	16.98	19.07	5.42	18.82	0.08	0.00	0.38	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

```
SIMULATION BY:
     John Dwyer
     Project Engineer
     Knight Piesold

SIMULATION FOR:
     File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 86-00\XD 86-00.spw
     File Creation Date      : Jul 14, 2009 14:16:54
     File Last Modified Date : Jul 14, 2009 14:16:55
     Description             : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00
     Simulation Start Date   : Jan 01, 1986
     Simulation End Date     : Dec 31, 2000
     Simulation Run Date     : Jul 14, 2009 14:16
     SPAW Interface Version  : 6.02.75
     Field Model Version     : 6.02.71
     Soil Equations          : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
     Field                   : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 86-00\XD 86-00.fld (Jul 15, 200900:00)
     Climate                 : Dewey Burdock 86-00 climatic data
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.clm (Sep 16, 2008 00:00)
        Evaporation Defaults: Dewey-Burdock Evap. Defaults
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
        Precipitation        : SD8600 - Jan 01, 1986 to Dec 31, 2000
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.txt (Feb 13, 2009 00:00)
        Air Temperature      : SD8600 - Jan 01, 1986 to Dec 31, 2000
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.txt (Feb 13, 2009 00:00)
     Management              : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
        Crop (  1)           : Bare feedlot or fallow field
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
     Soil                    : Dewey TP1, TP2, TP5 Revised Soils Composite
                               G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS:          9
THICKNESS OF SOIL LAYERS: (IN)  1.00   5.00  11.00  11.00   4.00  12.00  24.00   4.00  23.00
```

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1986	44.00	28.79	17.04	0.00	11.76	22.03	19.07	7.94	21.40	0.05	0.00	4.32	0.00	0.00
1987	44.00	28.36	16.48	0.00	11.87	12.36	19.07	2.20	17.36	0.56	0.00	0.32	0.00	0.00
1988	44.04	27.40	15.59	0.00	11.81	13.79	19.07	4.63	16.41	0.27	0.00	0.55	0.00	0.00
1989	44.00	28.91	17.06	0.00	11.85	15.58	19.07	4.75	18.06	0.21	0.00	0.79	0.00	0.00
1990	44.00	30.99	19.33	0.00	11.65	19.14	19.07	6.80	19.76	0.18	0.00	0.24	0.00	0.00
1991	44.00	29.21	17.29	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.37	0.00	0.00
1992	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.17	18.34	0.00	11.83	17.06	19.07	5.47	18.83	0.08	0.00	0.41	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 87-01\XD 87-01.spw
File Creation Date	: Jul 17, 2009 08:50:43
File Last Modified Date	: Jul 17, 2009 08:50:43
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01
Simulation Start Date	: Jan 01, 1987
Simulation End Date	: Dec 31, 2001
Simulation Run Date	: Jul 17, 2009 08:50
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 87-01\XD 87-01.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 87-01climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8701 - Jan 01, 1987 to Dec 31, 2001 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8701 - Jan 01, 1987 to Dec 31, 2001 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1987	44.00	25.64	13.77	0.00	11.87	12.36	19.07	2.13	17.43	0.05	0.00	3.61	0.00	0.00
1988	44.04	26.87	15.06	0.00	11.81	13.79	19.07	4.63	16.41	0.49	0.00	0.86	0.00	0.00
1989	44.00	28.54	16.69	0.00	11.85	15.58	19.07	4.75	18.06	0.32	0.00	1.04	0.00	0.00
1990	44.00	30.71	19.06	0.00	11.65	19.14	19.07	6.79	19.76	0.28	0.00	0.43	0.00	0.00
1991	44.00	28.82	16.90	0.00	11.92	15.03	19.07	4.53	17.65	0.13	0.00	0.62	0.00	0.00
1992	44.04	29.25	17.62	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.43	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.97	18.14	0.00	11.83	16.80	19.07	5.39	18.65	0.08	0.00	0.42	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 88-02\XD 88-02.spw
File Creation Date	: Jul 14, 2009 13:01:22
File Last Modified Date	: Jul 14, 2009 14:18:57
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02
Simulation Start Date	: Jan 01, 1988
Simulation End Date	: Dec 31, 2002
Simulation Run Date	: Jul 14, 2009 14:18
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 88-02\XD 88-02.fld (Jul 15, 200900:00)
Climate	: Dewey Burdock 88-02 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8802 - Jan 01, 1988 to Dec 31, 2002 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8802 - Jan 01, 1988 to Dec 31, 2002 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1988	44.04	24.73	12.93	0.00	11.80	13.40	19.07	4.32	16.34	-0.02	0.00	3.43	0.00	0.00
1989	44.00	28.16	16.31	0.00	11.85	15.58	19.07	4.51	18.30	0.56	0.00	1.43	0.00	0.00
1990	44.00	30.50	18.84	0.00	11.65	19.14	19.07	6.67	19.88	0.39	0.00	0.65	0.00	0.00
1991	44.00	28.46	16.54	0.00	11.92	15.03	19.07	4.53	17.65	0.26	0.00	0.85	0.00	0.00
1992	44.04	29.18	17.55	0.00	11.63	14.08	19.07	4.12	17.40	0.07	0.00	-0.23	0.00	0.00
1993	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00
1994	44.00	29.31	17.39	0.00	11.92	12.01	19.07	2.20	16.96	-0.01	0.00	-0.43	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.02	18.21	0.00	11.81	16.82	19.07	5.40	18.69	0.08	0.00	0.39	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 89-03\XD 89-03.spw
File Creation Date	: Jul 14, 2009 13:00:04
File Last Modified Date	: Jul 14, 2009 14:18:01
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03
Simulation Start Date	: Jan 01, 1989
Simulation End Date	: Dec 31, 2003
Simulation Run Date	: Jul 14, 2009 14:18
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.7I
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 89-03\XD 89-03.fld (Jul 15, 200900:00)
Climate	: Dewey Burdock 89-03 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8903 - Jan 01, 1989 to Dec 31, 2003 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8903 - Jan 01, 1989 to Dec 31, 2003 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
1989	44.00	26.43	14.63	0.00	11.80	15.49	19.07	4.24	18.52	-0.01	0.00	3.90	0.00	0.00
1990	44.00	30.06	18.41	0.00	11.65	19.14	19.07	6.67	19.88	0.58	0.00	0.89	0.00	0.00
1991	44.00	28.22	16.31	0.00	11.92	15.03	19.07	4.53	17.65	0.35	0.00	1.00	0.00	0.00
1992	44.04	28.86	17.22	0.00	11.63	14.08	19.07	4.31	17.21	0.11	0.00	-0.13	0.00	0.00
1993	44.00	32.46	20.47	0.00	11.99	22.31	19.07	7.48	21.91	0.23	0.00	1.21	0.00	0.00
1994	44.00	29.28	17.37	0.00	11.92	12.01	19.07	2.20	16.96	0.00	0.00	-0.40	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
44.04	30.13	18.32	0.00	11.82	16.90	19.07	5.34	18.82	0.08	0.00	0.42	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 90-04\XD 90-04.spw
File Creation Date     : Jul 13, 2009 08:42:33
File Last Modified Date : Jul 13, 2009 08:42:34
Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 90-04
Simulation Start Date  : Jan 01, 1990
Simulation End Date    : Dec 31, 2004
Simulation Run Date    : Jul 13, 2009 08:42
SPAW Interface Version : 6.02.75
Field Model Version    : 6.02.71
Soil Equations         : Saxton et al. 2005
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DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 90-04
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 90-04\XD 90-04.fld (Jul 13, 200900:00)
Climate                : Dewey Burdock 90-04 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD9004 - Jan 01, 1990 to Dec 31, 2004
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD9004 - Jan 01, 1990 to Dec 31, 2004
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1990	44.00	28.51	16.89	0.00	11.62	19.11	19.07	5.73	20.82	0.04	0.00	3.89	0.00	0.00
1991	44.00	27.91	15.99	0.00	11.92	15.03	19.07	4.39	17.79	0.57	0.00	1.23	0.00	0.00
1992	44.04	28.56	16.93	0.00	11.63	14.08	19.07	4.18	17.34	0.25	0.00	0.16	0.00	0.00
1993	44.00	32.25	20.26	0.00	11.99	22.31	19.07	7.19	22.21	0.39	0.00	1.55	0.00	0.00
1994	44.00	29.24	17.33	0.00	11.92	12.01	19.07	2.20	16.96	0.01	0.00	-0.38	0.00	0.00
1995	44.00	32.03	20.22	0.00	11.81	18.32	19.07	5.49	20.10	0.00	0.00	-0.13	0.00	0.00
1996	44.04	31.28	19.54	0.00	11.74	17.60	19.07	4.90	20.02	0.00	0.00	0.48	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.16	18.36	0.00	11.80	16.84	19.07	5.11	19.00	0.08	0.00	0.56	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                      : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 91-05\XD 91-05.spw
File Creation Date        : Jul 16, 2009 14:43:40
File Last Modified Date   : Jul 16, 2009 14:43:41
Description               : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05
Simulation Start Date     : Jan 01, 1991
Simulation End Date       : Dec 31, 2005
Simulation Run Date       : Jul 16, 2009 14:43
SPAW Interface Version    : 6.02.75
Field Model Version       : 6.02.71
Soil Equations            : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

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Field                 : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 91-05\XD 91-05.fld (Jul 17, 200900:00)
Climate               : Dewey Burdock 91-05 climatic data
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation       : SD9105 - Jan 01, 1991 to Dec 31, 2005
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
  Air Temperature     : SD9105 - Jan 01, 1991 to Dec 31, 2005
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)           : Bare feedlot or fallow field
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                  : Dewey TP1, TP2, TP5 Revised Soils Composite
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1991	44.00	26.48	14.60	0.00	11.88	14.99	19.07	3.53	18.65	0.03	0.00	4.03	0.00	0.00
1992	44.04	28.13	16.50	0.00	11.63	14.08	19.07	3.89	17.63	0.53	0.00	0.60	0.00	0.00
1993	44.00	32.12	20.13	0.00	11.99	22.31	19.07	7.04	22.35	0.48	0.00	1.74	0.00	0.00
1994	44.00	28.96	17.05	0.00	11.92	12.01	19.07	2.20	16.96	0.10	0.00	-0.19	0.00	0.00
1995	44.00	31.71	19.91	0.00	11.81	18.32	19.07	5.40	20.18	0.13	0.00	0.14	0.00	0.00
1996	44.04	31.25	19.50	0.00	11.74	17.60	19.07	4.93	19.99	0.00	0.00	0.49	0.00	0.00
1997	44.00	31.29	19.75	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.43	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.28	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.11	18.31	0.00	11.80	16.90	19.07	5.24	18.94	0.08	0.00	0.54	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 92-06\XD 92-06.spw
File Creation Date	: Jul 16, 2009 14:44:49
File Last Modified Date	: Jul 16, 2009 14:44:50
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06
Simulation Start Date	: Jan 01, 1992
Simulation End Date	: Dec 31, 2006
Simulation Run Date	: Jul 16, 2009 14:44
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 92-06\XD 92-06.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 92-06 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9206 - Jan 01, 1992 to Dec 31, 2006 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9206 - Jan 01, 1992 to Dec 31, 2006 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1992	44.04	26.54	14.91	0.00	11.63	14.08	19.07	3.00	18.52	-0.01	0.00	3.62	0.00	0.00
1993	44.00	31.86	19.87	0.00	11.99	22.31	19.07	6.81	22.59	0.69	0.00	2.02	0.00	0.00
1994	44.00	28.63	16.71	0.00	11.92	12.01	19.07	2.04	17.12	0.26	0.00	0.15	0.00	0.00
1995	44.00	31.50	19.69	0.00	11.81	18.32	19.07	5.42	20.16	0.20	0.00	0.27	0.00	0.00
1996	44.04	30.91	19.17	0.00	11.74	17.60	19.07	4.90	20.03	0.13	0.00	0.72	0.00	0.00
1997	44.00	31.26	19.72	0.00	11.54	17.73	19.07	5.93	19.32	0.00	0.00	-0.40	0.00	0.00
1998	44.00	33.11	21.15	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.07	0.00	0.00
1999	44.00	30.29	18.37	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.37	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00
2006	44.00	28.22	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.04	18.24	0.00	11.79	16.79	19.07	5.17	18.89	0.08	0.00	0.56	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 93-07\XD 93-07.spw
File Creation Date	: Jul 16, 2009 14:45:52
File Last Modified Date	: Jul 16, 2009 14:45:53
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07
Simulation Start Date	: Jan 01, 1993
Simulation End Date	: Dec 31, 2007
Simulation Run Date	: Jul 16, 2009 14:45
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 93-07\XD 93-07.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 93-07 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9307 - Jan 01, 1993 to Dec 31, 2007 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9307 - Jan 01, 1993 to Dec 31, 2007 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1993	44.00	29.76	17.81	0.00	11.95	21.44	19.07	6.14	22.43	0.08	0.00	4.53	0.00	0.00
1994	44.00	27.95	16.03	0.00	11.92	12.01	19.07	2.04	17.12	0.53	0.00	0.56	0.00	0.00
1995	44.00	31.24	19.44	0.00	11.81	18.32	19.07	5.27	20.31	0.33	0.00	0.55	0.00	0.00
1996	44.04	30.72	18.98	0.00	11.74	17.60	19.07	4.90	20.03	0.20	0.00	0.85	0.00	0.00
1997	44.00	30.86	19.31	0.00	11.54	17.73	19.07	5.93	19.32	0.14	0.00	-0.13	0.00	0.00
1998	44.00	33.08	21.12	0.00	11.96	24.28	19.07	10.17	21.22	0.00	0.00	0.10	0.00	0.00
1999	44.00	30.23	18.32	0.00	11.91	17.17	19.07	6.59	17.73	-0.01	0.00	-0.57	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.38	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00
2006	44.00	28.22	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.93	18.15	0.00	11.78	16.82	19.07	5.26	18.84	0.08	0.00	0.61	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 94-80\XD 94-80.spw
File Creation Date	: Jul 16, 2009 14:46:57
File Last Modified Date	: Jul 16, 2009 14:46:58
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80
Simulation Start Date	: Jan 01, 1994
Simulation End Date	: Dec 31, 2008
Simulation Run Date	: Jul 16, 2009 14:46
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 94-80\XD 94-80.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 94-80 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9480 - Jan 01, 1994 to Dec 31, 2008 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9480 - Jan 01, 1994 to Dec 31, 2008 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1994	44.00	25.16	13.24	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	3.91	0.00	0.00
1995	44.00	30.81	19.01	0.00	11.81	18.32	19.07	4.95	20.63	0.61	0.00	1.02	0.00	0.00
1996	44.04	30.47	18.73	0.00	11.74	17.60	19.07	4.90	20.03	0.29	0.00	1.00	0.00	0.00
1997	44.00	30.51	18.96	0.00	11.54	17.73	19.07	5.69	19.56	0.34	0.00	0.26	0.00	0.00
1998	44.00	33.07	21.12	0.00	11.96	24.28	19.07	9.94	21.45	0.07	0.00	0.26	0.00	0.00
1999	44.00	30.24	18.32	0.00	11.91	17.17	19.07	6.59	17.73	-0.02	0.00	-0.58	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.38	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00
2006	44.00	28.22	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.19	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.77	17.98	0.00	11.79	16.43	19.07	5.08	18.64	0.08	0.00	0.57	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 95-81\XD 95-81.spw
File Creation Date	: Jul 16, 2009 14:49:05
File Last Modified Date	: Jul 16, 2009 14:49:05
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81
Simulation Start Date	: Jan 01, 1995
Simulation End Date	: Dec 31, 2009
Simulation Run Date	: Jul 16, 2009 14:49
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 95-81\XD 95-81.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 95-81 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9581 - Jan 01, 1995 to Dec 31, 2009 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9581 - Jan 01, 1995 to Dec 31, 2009 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1995	44.00	29.26	17.48	0.00	11.79	18.14	19.07	3.87	21.56	0.04	0.00	4.04	0.00	0.00
1996	44.04	30.07	18.33	0.00	11.74	17.60	19.07	4.76	20.17	0.54	0.00	1.30	0.00	0.00
1997	44.00	30.27	18.72	0.00	11.54	17.73	19.07	5.68	19.58	0.42	0.00	0.43	0.00	0.00
1998	44.00	32.79	20.83	0.00	11.96	24.28	19.07	9.62	21.77	0.27	0.00	0.67	0.00	0.00
1999	44.00	30.27	18.35	0.00	11.91	17.17	19.07	6.54	17.78	-0.01	0.00	-0.56	0.00	0.00
2000	44.04	29.27	17.19	0.00	12.07	14.51	19.07	3.97	17.53	-0.04	0.00	0.38	0.00	0.00
2001	44.00	30.09	18.34	0.00	11.75	18.10	19.07	6.79	18.63	0.04	0.00	0.25	0.00	0.00
2002	44.00	29.59	17.96	0.00	11.63	13.11	19.07	3.07	17.48	0.00	0.00	-0.49	0.00	0.00
2003	44.00	29.55	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00
2006	44.00	28.22	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.19	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.82	18.07	0.00	11.74	16.52	19.07	5.14	18.70	0.08	0.00	0.54	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 96-82\XD 96-82.spw
File Creation Date	: Jul 16, 2009 14:51:25
File Last Modified Date	: Jul 16, 2009 14:51:25
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82
Simulation Start Date	: Jan 01, 1996
Simulation End Date	: Dec 31, 2010
Simulation Run Date	: Jul 16, 2009 14:51
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 96-82\XD 96-82.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 96-82 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9682 - Jan 01, 1996 to Dec 31, 2010 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9682 - Jan 01, 1996 to Dec 31, 2010 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1996	44.04	28.13	16.39	0.00	11.74	17.60	19.07	4.09	20.83	0.04	0.00	4.40	0.00	0.00
1997	44.00	29.89	18.34	0.00	11.54	17.73	19.07	5.62	19.64	0.63	0.00	0.66	0.00	0.00
1998	44.00	32.50	20.55	0.00	11.96	24.28	19.07	9.52	21.87	0.38	0.00	0.94	0.00	0.00
1999	44.00	30.13	18.21	0.00	11.91	17.17	19.07	6.37	17.96	0.10	0.00	-0.35	0.00	0.00
2000	44.04	29.16	17.08	0.00	12.07	14.51	19.07	3.97	17.53	0.00	0.00	0.45	0.00	0.00
2001	44.00	29.90	18.15	0.00	11.75	18.10	19.07	6.79	18.63	0.11	0.00	0.38	0.00	0.00
2002	44.00	29.57	17.94	0.00	11.63	13.11	19.07	3.07	17.48	0.01	0.00	-0.47	0.00	0.00
2003	44.00	29.54	17.64	0.00	11.91	14.69	19.07	3.80	18.06	0.00	0.00	0.42	0.00	0.00
2004	44.04	29.17	17.73	0.00	11.44	12.18	19.07	2.26	17.55	0.00	0.00	-0.19	0.00	0.00
2005	44.00	30.38	18.72	0.00	11.66	20.16	19.07	9.07	18.50	-0.01	0.00	-0.21	0.00	0.00
2006	44.00	28.18	16.40	0.00	11.79	13.22	19.07	3.87	16.64	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.20	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.80	18.06	0.00	11.75	16.77	19.07	5.38	18.71	0.08	0.00	0.57	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 97-83\XD 97-83.spw
File Creation Date      : Jul 16, 2009 14:52:45
File Last Modified Date : Jul 16, 2009 14:52:46
Description             : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83
Simulation Start Date   : Jan 01, 1997
Simulation End Date     : Dec 31, 2011
Simulation Run Date     : Jul 16, 2009 14:52
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

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Field                   : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 97-83\XD 97-83.fld (Jul 17, 200900:00)
Climate                 : Dewey Burdock 97-83 climatic data
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.clm (Sep 16, 2008 00:00)
   Evaporation Defaults: Dewey-Burdock Evap. Defaults
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
   Precipitation        : SD9783 - Jan 01, 1997 to Dec 31, 2011
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
   Air Temperature      : SD9783 - Jan 01, 1997 to Dec 31, 2011
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Management              : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
   Crop ( 1)            : Bare feedlot or fallow field
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                    : Dewey TP1, TP2, TP5 Revised Soils Composite
                          G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1997	44.00	27.98	16.44	0.00	11.54	17.73	19.07	4.75	20.50	0.08	0.00	3.98	0.00	0.00
1998	44.00	32.12	20.16	0.00	11.96	24.28	19.07	9.18	22.22	0.66	0.00	1.40	0.00	0.00
1999	44.00	29.69	17.78	0.00	11.91	17.17	19.07	6.54	17.78	0.19	0.00	-0.19	0.00	0.00
2000	44.04	28.91	16.83	0.00	12.07	14.51	19.07	3.97	17.53	0.08	0.00	0.62	0.00	0.00
2001	44.00	29.77	18.02	0.00	11.75	18.10	19.07	6.79	18.63	0.14	0.00	0.47	0.00	0.00
2002	44.00	29.42	17.79	0.00	11.63	13.11	19.07	3.07	17.48	0.06	0.00	-0.38	0.00	0.00
2003	44.00	29.47	17.56	0.00	11.91	14.69	19.07	3.80	18.06	0.02	0.00	0.47	0.00	0.00
2004	44.04	29.10	17.66	0.00	11.44	12.18	19.07	2.26	17.55	0.02	0.00	-0.13	0.00	0.00
2005	44.00	30.36	18.70	0.00	11.66	20.16	19.07	9.07	18.50	0.00	0.00	-0.20	0.00	0.00
2006	44.00	28.18	16.40	0.00	11.79	13.22	19.07	3.87	16.64	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.19	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.68	17.93	0.00	11.75	16.74	19.07	5.39	18.66	0.08	0.00	0.65	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 98-84\XD 98-84.spw
File Creation Date	: Jul 16, 2009 14:54:37
File Last Modified Date	: Jul 16, 2009 14:54:38
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84
Simulation Start Date	: Jan 01, 1998
Simulation End Date	: Dec 31, 2012
Simulation Run Date	: Jul 16, 2009 14:54
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 98-84\XD 98-84.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 98-84 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9884 - Jan 01, 1998 to Dec 31, 2012 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9884 - Jan 01, 1998 to Dec 31, 2012 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1998	44.00	30.67	18.71	0.00	11.96	24.28	19.07	8.41	22.98	0.06	0.00	4.21	0.00	0.00
1999	44.00	29.36	17.44	0.00	11.91	17.17	19.07	6.00	18.33	0.56	0.00	0.33	0.00	0.00
2000	44.04	28.64	16.57	0.00	12.07	14.51	19.07	3.84	17.67	0.22	0.00	0.88	0.00	0.00
2001	44.00	29.59	17.84	0.00	11.75	18.10	19.07	6.79	18.63	0.20	0.00	0.59	0.00	0.00
2002	44.00	29.29	17.66	0.00	11.63	13.11	19.07	3.07	17.48	0.10	0.00	-0.29	0.00	0.00
2003	44.00	29.40	17.50	0.00	11.91	14.69	19.07	3.80	18.06	0.05	0.00	0.52	0.00	0.00
2004	44.04	28.99	17.55	0.00	11.44	12.18	19.07	2.26	17.55	0.06	0.00	-0.06	0.00	0.00
2005	44.00	30.28	18.62	0.00	11.66	20.16	19.07	9.07	18.50	0.02	0.00	-0.14	0.00	0.00
2006	44.00	28.21	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.19	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.75	17.97	0.00	11.78	16.61	19.07	5.29	18.61	0.08	0.00	0.55	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
     File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 99-85\XD 99-85.spw
     File Creation Date     : Jul 16, 2009 14:55:48
     File Last Modified Date : Jul 16, 2009 14:55:49
     Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85
     Simulation Start Date  : Jan 01, 1999
     Simulation End Date    : Dec 31, 2013
     Simulation Run Date    : Jul 16, 2009 14:55
     SPAW Interface Version : 6.02.75
     Field Model Version    : 6.02.71
     Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
     Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 99-85\XD 99-85.fld (Jul 17, 200900:00)
     Climate                : Dewey Burdock 99-85 climatic data
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.clm (Sep 16, 2008 00:00)
        Evaporation Defaults: Dewey-Burdock Evap. Defaults
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
        Precipitation       : SD9985 - Jan 01, 1999 to Dec 31, 2013
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
        Air Temperature     : SD9985 - Jan 01, 1999 to Dec 31, 2013
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
     Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
        Crop ( 1)           : Bare feedlot or fallow field
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
     Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1999	44.00	27.31	15.40	0.00	11.91	17.17	19.07	5.43	18.90	0.02	0.00	3.47	0.00	0.00
2000	44.04	27.93	15.86	0.00	12.07	14.51	19.07	3.84	17.67	0.51	0.00	1.30	0.00	0.00
2001	44.00	29.44	17.69	0.00	11.75	18.10	19.07	6.40	19.03	0.37	0.00	0.96	0.00	0.00
2002	44.00	29.15	17.52	0.00	11.63	13.11	19.07	3.07	17.48	0.15	0.00	-0.19	0.00	0.00
2003	44.00	29.35	17.44	0.00	11.91	14.69	19.07	3.80	18.06	0.06	0.00	0.55	0.00	0.00
2004	44.04	28.93	17.49	0.00	11.44	12.18	19.07	2.26	17.55	0.08	0.00	-0.02	0.00	0.00
2005	44.00	30.15	18.49	0.00	11.66	20.16	19.07	9.05	18.51	0.07	0.00	-0.05	0.00	0.00
2006	44.00	28.21	16.43	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.25	0.00	0.00
2007	44.00	28.57	17.12	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.28	19.19	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.28	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.37	17.61	0.00	11.76	15.78	19.07	4.84	18.25	0.08	0.00	0.56	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 00-86\XD 00-86.spw
File Creation Date : Jul 16, 2009 14:57:19
File Last Modified Date : Jul 16, 2009 14:57:19
Description : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Jul 16, 2009 14:57
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 00-86\XD 00-86.fld (Jul 17, 200900:00)
Climate : Dewey Burdock 00-86 climatic data
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0086 - Jan 01, 2000 to Dec 31, 2014
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Air Temperature : SD0086 - Jan 01, 2000 to Dec 31, 2014
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Management : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1) : Bare feedlot or fallow field
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2000	44.04	25.91	13.83	0.00	12.07	14.51	19.07	3.82	17.69	0.03	0.00	3.82	0.00	0.00
2001	44.00	28.95	17.21	0.00	11.75	18.10	19.07	6.49	18.94	0.53	0.00	1.20	0.00	0.00
2002	44.00	28.76	17.13	0.00	11.63	13.11	19.07	3.07	17.48	0.28	0.00	0.07	0.00	0.00
2003	44.00	29.13	17.23	0.00	11.91	14.69	19.07	3.80	18.06	0.13	0.00	0.69	0.00	0.00
2004	44.04	28.79	17.35	0.00	11.44	12.18	19.07	2.26	17.55	0.12	0.00	0.07	0.00	0.00
2005	44.00	29.87	18.21	0.00	11.66	20.16	19.07	9.05	18.51	0.16	0.00	0.14	0.00	0.00
2006	44.00	28.20	16.42	0.00	11.79	13.22	19.07	3.84	16.67	-0.01	0.00	0.26	0.00	0.00
2007	44.00	28.56	17.11	0.00	11.45	14.33	19.07	5.06	16.89	-0.02	0.00	-0.21	0.00	0.00
2008	44.04	31.27	19.18	0.00	12.08	16.74	19.07	4.21	19.51	0.04	0.00	0.29	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.53	17.77	0.00	11.76	16.21	19.07	5.06	18.45	0.08	0.00	0.60	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 01-87\XD 01-87.spw
File Creation Date	: Jul 16, 2009 14:58:26
File Last Modified Date	: Jul 16, 2009 14:58:27
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87
Simulation Start Date	: Jan 01, 2001
Simulation End Date	: Dec 31, 2015
Simulation Run Date	: Jul 16, 2009 14:58
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 01-87\XD 01-87.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 01-87 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0187 - Jan 01, 2001 to Dec 31, 2015 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0187 - Jan 01, 2001 to Dec 31, 2015 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2001	44.00	27.22	15.48	0.00	11.75	18.10	19.07	5.86	19.57	0.02	0.00	4.07	0.00	0.00
2002	44.00	28.26	16.62	0.00	11.63	13.11	19.07	2.87	17.68	0.56	0.00	0.50	0.00	0.00
2003	44.00	29.02	17.11	0.00	11.91	14.69	19.07	3.56	18.30	0.26	0.00	0.92	0.00	0.00
2004	44.04	28.77	17.33	0.00	11.44	12.18	19.07	2.09	17.71	0.18	0.00	0.21	0.00	0.00
2005	44.00	29.80	18.14	0.00	11.66	20.16	19.07	9.05	18.51	0.19	0.00	0.19	0.00	0.00
2006	44.00	28.00	16.21	0.00	11.79	13.22	19.07	4.00	16.51	0.01	0.00	0.29	0.00	0.00
2007	44.00	28.67	17.22	0.00	11.45	14.33	19.07	4.76	17.19	0.04	0.00	-0.07	0.00	0.00
2008	44.04	31.32	19.24	0.00	12.08	16.74	19.07	4.21	19.51	0.02	0.00	0.25	0.00	0.00
2009	44.00	28.29	16.98	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.37	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.63	17.88	0.00	11.75	16.13	19.07	4.87	18.58	0.08	0.00	0.61	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 02-88\XD 02-88.spw
File Creation Date	: Jul 14, 2009 14:22:30
File Last Modified Date	: Jul 14, 2009 14:22:31
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88
Simulation Start Date	: Jan 01, 2002
Simulation End Date	: Dec 31, 2016
Simulation Run Date	: Jul 14, 2009 14:22
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 02-88\XD 02-88.fld (Jul 15, 200900:00)
Climate	: Dewey Burdock 02-88 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0288 - Jan 01, 2002 to Dec 31, 2016 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0288 - Jan 01, 2002 to Dec 31, 2016 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2002	44.00	26.11	14.47	0.00	11.63	13.11	19.07	2.65	17.89	-0.04	0.00	3.46	0.00	0.00
2003	44.00	28.44	16.54	0.00	11.91	14.69	19.07	3.45	18.41	0.55	0.00	1.33	0.00	0.00
2004	44.04	28.39	16.95	0.00	11.44	12.18	19.07	2.09	17.71	0.30	0.00	0.47	0.00	0.00
2005	44.00	29.61	17.95	0.00	11.66	20.16	19.07	9.05	18.51	0.25	0.00	0.32	0.00	0.00
2006	44.00	28.01	16.22	0.00	11.79	13.22	19.07	3.87	16.64	0.04	0.00	0.37	0.00	0.00
2007	44.00	28.40	16.95	0.00	11.45	14.33	19.07	5.06	16.89	0.03	0.00	-0.09	0.00	0.00
2008	44.04	30.98	18.90	0.00	12.08	16.74	19.07	4.19	19.54	0.14	0.00	0.50	0.00	0.00
2009	44.00	28.28	16.97	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.36	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.43	17.68	0.00	11.75	15.78	19.07	4.78	18.31	0.08	0.00	0.55	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 03-89\XD 03-89.spw
File Creation Date	: Jul 16, 2009 15:02:02
File Last Modified Date	: Jul 16, 2009 15:02:03
Description	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89
Simulation Start Date	: Jan 01, 2003
Simulation End Date	: Dec 31, 2017
Simulation Run Date	: Jul 16, 2009 15:02
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 03-89\XD 03-89.fld (Jul 17, 200900:00)
Climate	: Dewey Burdock 03-89 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0289 - Jan 01, 2003 to Dec 31, 2017 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0289 - Jan 01, 2003 to Dec 31, 2017 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Dewey TP1, TP2, TP5 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2003	44.00	26.68	14.78	0.00	11.91	14.69	19.07	3.07	18.79	0.05	0.00	3.96	0.00	0.00
2004	44.04	27.86	16.42	0.00	11.44	12.18	19.07	2.09	17.71	0.50	0.00	0.79	0.00	0.00
2005	44.00	29.38	17.72	0.00	11.66	20.16	19.07	9.05	18.51	0.33	0.00	0.46	0.00	0.00
2006	44.00	27.90	16.11	0.00	11.79	13.22	19.07	3.84	16.67	0.09	0.00	0.47	0.00	0.00
2007	44.00	28.47	17.02	0.00	11.45	14.33	19.07	4.76	17.19	0.11	0.00	0.07	0.00	0.00
2008	44.04	30.85	18.76	0.00	12.08	16.74	19.07	4.19	19.54	0.19	0.00	0.59	0.00	0.00
2009	44.00	28.28	16.97	0.00	11.31	13.46	19.07	4.62	16.60	-0.01	0.00	-0.36	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
2017	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.48	17.71	0.00	11.77	15.94	19.07	4.87	18.37	0.09	0.00	0.57	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 04-90\XD 04-90.spw
File Creation Date     : Jul 16, 2009 15:03:20
File Last Modified Date : Jul 16, 2009 15:03:21
Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90
Simulation Start Date  : Jan 01, 2004
Simulation End Date    : Dec 31, 2018
Simulation Run Date    : Jul 16, 2009 15:03
SPAW Interface Version : 6.02.75
Field Model Version    : 6.02.71
Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 04-90\XD 04-90.fld (Jul 17, 200900:00)
Climate                : Dewey Burdock 04-90 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD0490 - Jan 01, 2004 to Dec 31, 2018
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD0490 - Jan 01, 2004 to Dec 31, 2018
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2004	44.04	25.69	14.27	0.00	11.42	12.16	19.07	1.89	17.91	-0.05	0.00	3.70	0.00	0.00
2005	44.00	29.01	17.34	0.00	11.66	20.16	19.07	8.79	18.78	0.60	0.00	0.83	0.00	0.00
2006	44.00	27.49	15.70	0.00	11.79	13.22	19.07	3.84	16.67	0.23	0.00	0.74	0.00	0.00
2007	44.00	28.28	16.83	0.00	11.45	14.33	19.07	4.76	17.19	0.16	0.00	0.20	0.00	0.00
2008	44.04	30.49	18.40	0.00	12.08	16.74	19.07	4.12	19.60	0.33	0.00	0.87	0.00	0.00
2009	44.00	28.27	16.95	0.00	11.31	13.46	19.07	4.62	16.60	0.00	0.00	-0.35	0.00	0.00
2010	44.00	32.18	20.33	0.00	11.85	21.88	19.07	8.40	20.70	0.01	0.00	0.35	0.00	0.00
2011	44.00	29.69	17.91	0.00	11.78	16.16	19.07	5.31	18.14	-0.01	0.00	0.24	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.41	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
2017	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
2018	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.56	17.81	0.00	11.75	16.24	19.07	5.09	18.46	0.08	0.00	0.56	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                     : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 05-91\XD 05-91.spw
File Creation Date       : Jul 16, 2009 15:04:21
File Last Modified Date  : Jul 16, 2009 15:04:22
Description              : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91
Simulation Start Date    : Jan 01, 2005
Simulation End Date      : Dec 31, 2019
Simulation Run Date      : Jul 16, 2009 15:04
SPAW Interface Version   : 6.02.75
Field Model Version      : 6.02.71
Soil Equations           : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                 : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 05-91\XD 05-91.fld (Jul 17, 200900:00)
Climate               : Dewey Burdock 05-91 climatic data
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation       : SD0591 - Jan 01, 2005 to Dec 31, 2019
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
  Air Temperature     : SD0591 - Jan 01, 2005 to Dec 31, 2019
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)           : Bare feedlot or fallow field
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                  : Dewey TP1, TP2, TP5 Revised Soils Composite
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2005	44.00	27.57	15.91	0.00	11.66	20.16	19.07	7.95	19.62	0.05	0.00	3.66	0.00	0.00
2006	44.00	26.92	15.13	0.00	11.79	13.22	19.07	3.84	16.67	0.47	0.00	1.07	0.00	0.00
2007	44.00	28.08	16.63	0.00	11.45	14.33	19.07	4.56	17.39	0.29	0.00	0.47	0.00	0.00
2008	44.04	30.19	18.10	0.00	12.08	16.74	19.07	4.19	19.54	0.41	0.00	1.03	0.00	0.00
2009	44.00	28.21	16.90	0.00	11.31	13.46	19.07	4.62	16.60	0.01	0.00	-0.31	0.00	0.00
2010	44.00	31.99	20.15	0.00	11.85	21.88	19.07	8.53	20.58	0.04	0.00	0.39	0.00	0.00
2011	44.00	29.65	17.87	0.00	11.78	16.16	19.07	5.31	18.14	0.00	0.00	0.27	0.00	0.00
2012	44.04	31.69	19.65	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.40	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
2017	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
2018	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
2019	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.61	17.83	0.00	11.78	16.27	19.07	5.21	18.35	0.08	0.00	0.44	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
     File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 06-92\XD 06-92.spw
     File Creation Date     : Jul 16, 2009 15:05:26
     File Last Modified Date : Jul 16, 2009 15:05:27
     Description            : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92
     Simulation Start Date  : Jan 01, 2006
     Simulation End Date    : Dec 31, 2020
     Simulation Run Date    : Jul 16, 2009 15:05
     SPAW Interface Version : 6.02.75
     Field Model Version    : 6.02.71
     Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
     Field                  : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 06-92\XD 06-92.fld (Jul 17, 200900:00)
     Climate                : Dewey Burdock 06-92 climatic data
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.clm (Sep 16, 2008 00:00)
        Evaporation Defaults: Dewey-Burdock Evap. Defaults
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
        Precipitation       : SD0692 - Jan 01, 2006 to Dec 31, 2020
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
        Air Temperature     : SD0692 - Jan 01, 2006 to Dec 31, 2020
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
     Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
        Crop ( 1)           : Bare feedlot or fallow field
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
     Soil                   : Dewey TP1, TP2, TP5 Revised Soils Composite
                              G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2006	44.00	25.31	13.57	0.00	11.75	13.13	19.07	3.23	17.22	-0.05	0.00	3.71	0.00	0.00
2007	44.00	27.58	16.13	0.00	11.45	14.33	19.07	4.44	17.51	0.54	0.00	0.83	0.00	0.00
2008	44.04	30.01	17.93	0.00	12.08	16.74	19.07	4.19	19.54	0.47	0.00	1.14	0.00	0.00
2009	44.00	27.97	16.65	0.00	11.31	13.46	19.07	4.62	16.60	0.09	0.00	-0.14	0.00	0.00
2010	44.00	31.59	19.74	0.00	11.85	21.88	19.07	8.47	20.63	0.20	0.00	0.69	0.00	0.00
2011	44.00	29.57	17.79	0.00	11.78	16.16	19.07	5.30	18.15	0.02	0.00	0.34	0.00	0.00
2012	44.04	31.68	19.64	0.00	12.04	16.89	19.07	4.68	19.24	-0.01	0.00	-0.40	0.00	0.00
2013	44.00	28.18	16.56	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.06	0.00	0.00
2014	44.00	33.36	21.43	0.00	11.93	23.59	19.07	8.73	22.01	0.03	0.00	0.55	0.00	0.00
2015	44.00	29.83	17.96	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.76	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
2017	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
2018	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
2019	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
2020	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.53	17.76	0.00	11.77	15.86	19.07	4.92	18.24	0.08	0.00	0.40	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 07-93\XD 07-93.spw
File Creation Date      : Jul 13, 2009 09:46:30
File Last Modified Date : Jul 13, 2009 09:46:30
Description             : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93
Simulation Start Date   : Jan 01, 2007
Simulation End Date     : Dec 31, 2021
Simulation Run Date     : Jul 13, 2009 09:46
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                 : Dewey-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Dewey July 09\XD 07-93\XD 07-93.fld (Jul 13, 200900:00)
Climate               : Dewey Burdock 07-93 climatic data
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation       : SD0793 - Jan 01, 2007 to Dec 31, 2021
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
  Air Temperature     : SD0793 - Jan 01, 2007 to Dec 31, 2021
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)           : Bare feedlot or fallow field
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                  : Dewey TP1, TP2, TP5 Revised Soils Composite
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)
```

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2007	44.00	25.45	14.00	0.00	11.45	14.33	19.07	4.44	17.51	-0.07	0.00	3.58	0.00	0.00
2008	44.04	29.73	17.64	0.00	12.08	16.74	19.07	4.12	19.60	0.65	0.00	1.31	0.00	0.00
2009	44.00	27.60	16.29	0.00	11.31	13.46	19.07	4.50	16.72	0.25	0.00	0.19	0.00	0.00
2010	44.00	31.47	19.62	0.00	11.85	21.88	19.07	8.55	20.55	0.21	0.00	0.72	0.00	0.00
2011	44.00	29.33	17.54	0.00	11.78	16.16	19.07	5.30	18.15	0.11	0.00	0.50	0.00	0.00
2012	44.04	31.48	19.44	0.00	12.04	16.89	19.07	4.49	19.43	0.12	0.00	-0.13	0.00	0.00
2013	44.00	28.18	16.55	0.00	11.63	11.75	19.07	2.59	16.60	-0.02	0.00	0.07	0.00	0.00
2014	44.00	33.40	21.47	0.00	11.93	23.59	19.07	8.67	22.07	0.03	0.00	0.56	0.00	0.00
2015	44.00	29.84	17.97	0.00	11.87	12.36	19.07	2.37	17.18	-0.02	0.00	-0.77	0.00	0.00
2016	44.04	28.20	16.39	0.00	11.81	13.79	19.07	4.63	16.41	0.00	0.00	0.02	0.00	0.00
2017	44.00	29.51	17.66	0.00	11.85	15.58	19.07	4.75	18.06	0.01	0.00	0.38	0.00	0.00
2018	44.00	31.45	19.79	0.00	11.65	19.14	19.07	6.93	19.63	0.00	0.00	-0.16	0.00	0.00
2019	44.00	29.24	17.32	0.00	11.92	15.03	19.07	4.53	17.65	0.00	0.00	0.34	0.00	0.00
2020	44.04	29.28	17.64	0.00	11.63	14.08	19.07	4.34	17.18	-0.01	0.00	-0.45	0.00	0.00
2021	44.00	32.92	20.93	0.00	11.99	22.31	19.07	7.70	21.69	0.01	0.00	0.75	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.81	18.03	0.00	11.79	16.47	19.07	5.19	18.56	0.09	0.00	0.45	0.00	0.00

SPAW Model Results

Burdock Field

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 80-94\XB 80-94.spw
File Creation Date	: Jul 09, 2009 14:51:24
File Last Modified Date	: Jul 09, 2009 14:51:25
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94
Simulation Start Date	: Jan 01, 1980
Simulation End Date	: Dec 31, 1994
Simulation Run Date	: Jul 09, 2009 14:51
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 80-94\XB 80-94.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 81-94 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8094 - Jan 01, 1980 to Dec 31, 1994 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Air Temperature	: SD8094 - Jan 01, 1980 to Dec 31, 1994 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1980	44.04	25.41	13.40	0.00	12.01	16.33	19.07	3.80	19.59	1.45	0.00	4.74	0.00	0.00
1981	44.00	27.06	15.74	0.00	11.31	13.46	19.07	4.20	17.02	0.41	0.00	0.87	0.00	0.00
1982	44.00	33.78	21.93	0.00	11.85	21.88	19.07	6.77	22.33	0.08	0.00	0.31	0.00	0.00
1983	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
1984	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
1985	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
1986	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
1987	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.39	18.58	0.00	11.81	16.29	19.07	4.45	19.10	0.13	0.00	0.39	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 81-95\XB 81-95.spw
File Creation Date	: Jul 09, 2009 15:05:31
File Last Modified Date	: Jul 09, 2009 15:05:32
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95
Simulation Start Date	: Jan 01, 1981
Simulation End Date	: Dec 31, 1995
Simulation Run Date	: Jul 09, 2009 15:05
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 81-95\XB 81-95.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 81-95 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8195 - Jan 01, 1981 to Dec 31, 1995 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8195 - Jan 01, 1981 to Dec 31, 1995 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1981	44.00	24.01	12.70	0.00	11.31	13.46	19.07	4.20	17.02	0.88	0.00	3.44	0.00	0.00
1982	44.00	32.11	20.26	0.00	11.85	21.88	19.07	5.32	23.79	1.06	0.00	2.47	0.00	0.00
1983	44.00	30.62	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.02	0.00	-0.03	0.00	0.00
1984	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
1985	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
1986	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
1987	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.56	18.76	0.00	11.80	16.42	19.07	4.42	19.28	0.13	0.00	0.39	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 82-96\XB 82-96.spw
File Creation Date      : Jul 09, 2009 16:09:52
File Last Modified Date : Jul 09, 2009 16:09:53
Description             : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96
Simulation Start Date   : Jan 01, 1982
Simulation End Date     : Dec 31, 1996
Simulation Run Date     : Jul 09, 2009 16:09
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 82-96\XB 82-96.fld (Jul 10, 200900:00)
Climate                : Dewey Burdock 82-96 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.clm (Sep 16, 2008 00:00)
   Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
   Precipitation       : SD8296 - Jan 01, 1982 to Dec 31, 1996
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
   Air Temperature     : SD8296 - Jan 01, 1982 to Dec 31, 1996
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
   Crop ( 1)           : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Burdock TP8, TP9, TP10 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1982	44.00	27.91	16.09	0.00	11.81	21.83	19.07	5.32	23.77	1.89	0.00	5.79	0.00	0.00
1983	44.00	30.46	18.68	0.00	11.78	16.16	19.07	4.65	18.80	0.02	0.00	0.10	0.00	0.00
1984	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
1985	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
1986	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
1987	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.78	18.96	0.00	11.83	16.70	19.07	4.45	19.49	0.13	0.00	0.40	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                     : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 83-97\XB 83-97.spw
File Creation Date       : Jul 09, 2009 17:41:33
File Last Modified Date  : Jul 09, 2009 17:41:33
Description              : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97
Simulation Start Date    : Jan 01, 1983
Simulation End Date      : Dec 31, 1997
Simulation Run Date      : Jul 09, 2009 17:41
SPAW Interface Version   : 6.02.75
Field Model Version      : 6.02.71
Soil Equations           : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                    : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 83-97\XB 83-97.fld (Jul 10, 200900:00)
Climate                  : Dewey Burdock 83-97 climatic data
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation          : SD8397 - Jan 01, 1983 to Dec 31, 1997
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
  Air Temperature        : SD8397 - Jan 01, 1983 to Dec 31, 1997
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Management               : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)              : Bare feedlot or fallow field
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                     : Burdock TP8, TP9, TP10 Revised Soils Composite
                           G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1983	44.00	25.39	13.69	0.00	11.70	16.08	19.07	4.45	19.00	1.10	0.00	4.21	0.00	0.00
1984	44.04	30.62	18.58	0.00	12.04	16.89	19.07	3.11	20.81	0.74	0.00	1.49	0.00	0.00
1985	44.00	28.14	16.51	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.10	0.00	0.00
1986	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
1987	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.59	18.79	0.00	11.80	16.42	19.07	4.39	19.30	0.13	0.00	0.39	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 84-98\XB 84-98.spw
File Creation Date	: Jul 10, 2009 08:52:26
File Last Modified Date	: Jul 10, 2009 08:54:19
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98
Simulation Start Date	: Jan 01, 1984
Simulation End Date	: Dec 31, 1998
Simulation Run Date	: Jul 10, 2009 08:54
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 84-98\XB 84-98.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 84-98 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8498 - Jan 01, 1984 to Dec 31, 1998 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8498 - Jan 01, 1984 to Dec 31, 1998 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1984	44.04	26.06	14.25	0.00	11.81	15.65	19.07	3.11	19.79	1.28	0.00	4.27	0.00	0.00
1985	44.00	26.20	14.57	0.00	11.63	11.75	19.07	2.57	16.62	0.56	0.00	1.49	0.00	0.00
1986	44.00	35.03	23.10	0.00	11.93	23.59	19.07	7.32	23.41	0.12	0.00	0.19	0.00	0.00
1987	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.73	18.93	0.00	11.80	16.88	19.07	4.68	19.47	0.13	0.00	0.41	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 85-99\XB 85-99.spw
File Creation Date      : Jul 10, 2009 09:12:34
File Last Modified Date : Jul 10, 2009 09:12:35
Description             : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99
Simulation Start Date   : Jan 01, 1985
Simulation End Date     : Dec 31, 1999
Simulation Run Date     : Jul 10, 2009 09:12
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                 : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 85-99\XB 85-99.fld (Jul 10, 200900:00)
Climate               : Dewey Burdock 85-99 climatic data
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation       : SD8599 - Jan 01, 1985 to Dec 31, 1999
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
  Air Temperature     : SD8599 - Jan 01, 1985 to Dec 31, 1999
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)           : Bare feedlot or fallow field
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                  : Burdock TP8, TP9, TP10 Revised Soils Composite
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1985	44.00	24.45	12.83	0.00	11.63	11.75	19.07	2.57	16.62	0.65	0.00	3.14	0.00	0.00
1986	44.00	31.39	19.46	0.00	11.93	23.59	19.07	7.16	23.57	1.30	0.00	2.81	0.00	0.00
1987	44.00	29.71	17.83	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.74	18.93	0.00	11.81	16.98	19.07	4.83	19.41	0.12	0.00	0.36	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 86-00\XB 86-00.spw
File Creation Date	: Jul 10, 2009 09:22:47
File Last Modified Date	: Jul 10, 2009 09:22:48
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00
Simulation Start Date	: Jan 01, 1986
Simulation End Date	: Dec 31, 2000
Simulation Run Date	: Jul 10, 2009 09:22
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 86-00\XB 86-00.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 86-00 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8600 - Jan 01, 1986 to Dec 31, 2000 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.txt (Feb 13, 2009 00:00)
Air Temperature	: SD8600 - Jan 01, 1986 to Dec 31, 2000 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\86-00.txt (Feb 13, 2009 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1986	44.00	26.83	15.07	0.00	11.76	22.03	19.07	6.92	22.42	1.77	0.00	5.58	0.00	0.00
1987	44.00	29.21	17.33	0.00	11.87	12.36	19.07	2.23	17.32	0.04	0.00	-0.05	0.00	0.00
1988	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
1989	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.74	18.91	0.00	11.83	17.06	19.07	4.89	19.41	0.13	0.00	0.38	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 87-01\XB 87-01.spw
File Creation Date	: Jul 10, 2009 09:33:48
File Last Modified Date	: Jul 10, 2009 09:33:48
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01
Simulation Start Date	: Jan 01, 1987
Simulation End Date	: Dec 31, 2001
Simulation Run Date	: Jul 10, 2009 09:33
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 87-01\XB 87-01.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 87-01climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8701 - Jan 01, 1987 to Dec 31, 2001 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8701 - Jan 01, 1987 to Dec 31, 2001 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1987	44.00	24.78	12.91	0.00	11.87	12.36	19.07	2.13	17.43	0.96	0.00	3.55	0.00	0.00
1988	44.04	25.87	14.06	0.00	11.81	13.79	19.07	4.23	16.81	0.81	0.00	1.94	0.00	0.00
1989	44.00	29.84	17.99	0.00	11.85	15.58	19.07	4.14	18.67	0.12	0.00	0.55	0.00	0.00
1990	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.53	18.70	0.00	11.83	16.80	19.07	4.84	19.21	0.13	0.00	0.38	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 88-02\XB 88-02.spw
File Creation Date : Jul 10, 2009 09:43:39
File Last Modified Date : Jul 10, 2009 09:43:40
Description : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02
Simulation Start Date : Jan 01, 1988
Simulation End Date : Dec 31, 2002
Simulation Run Date : Jul 10, 2009 09:43
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 88-02\XB 88-02.fld (Jul 10, 200900:00)
Climate : Dewey Burdock 88-02 climatic data
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8802 - Jan 01, 1988 to Dec 31, 2002
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Air Temperature : SD8802 - Jan 01, 1988 to Dec 31, 2002
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Management : Combinod-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1) : Bare feedlot or fallow field
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1988	44.04	23.68	11.88	0.00	11.80	13.40	19.07	4.23	16.43	1.00	0.00	3.55	0.00	0.00
1989	44.00	27.29	15.44	0.00	11.85	15.58	19.07	4.01	18.80	0.88	0.00	2.47	0.00	0.00
1990	44.00	31.82	20.16	0.00	11.65	19.14	19.07	6.58	19.98	0.01	0.00	-0.20	0.00	0.00
1991	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.54	18.73	0.00	11.81	16.82	19.07	4.86	19.22	0.12	0.00	0.37	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 89-03\XB 89-03.spw
File Creation Date	: Jul 10, 2009 10:05:17
File Last Modified Date	: Jul 10, 2009 10:05:18
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03
Simulation Start Date	: Jan 01, 1989
Simulation End Date	: Dec 31, 2003
Simulation Run Date	: Jul 10, 2009 10:05
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 89-03\XB 89-03.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 89-03 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD8903 - Jan 01, 1989 to Dec 31, 2003 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Air Temperature	: SD8903 - Jan 01, 1989 to Dec 31, 2003 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1989	44.00	24.99	13.19	0.00	11.80	15.49	19.07	4.01	18.75	1.20	0.00	4.36	0.00	0.00
1990	44.00	30.59	18.93	0.00	11.65	19.14	19.07	5.46	21.10	0.70	0.00	1.47	0.00	0.00
1991	44.00	29.51	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.76	18.95	0.00	11.82	16.90	19.07	4.71	19.45	0.13	0.00	0.38	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 90-04\XB 90-04.spw
File Creation Date : Jul 09, 2009 13:18:59
File Last Modified Date : Jul 09, 2009 13:19:00
Description : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 90-04
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Jul 09, 2009 13:18
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 90-04
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 90-04\XB 90-04.fld (Jul 10, 200900:00)
Climate : Dewey Burdock 90-04 climatic data
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9004 - Jan 01, 1990 to Dec 31, 2004
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Air Temperature : SD9004 - Jan 01, 1990 to Dec 31, 2004
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Management : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1) : Bare feedlot or fallow field
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1990	44.00	25.98	14.36	0.00	11.62	19.11	19.07	5.25	21.31	1.68	0.00	5.26	0.00	0.00
1991	44.00	29.10	17.18	0.00	11.92	15.03	19.07	4.23	17.95	0.19	0.00	0.58	0.00	0.00
1992	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.72	18.92	0.00	11.80	16.84	19.07	4.53	19.58	0.13	0.00	0.53	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 91-05\XB 91-05.spw
File Creation Date	: Jul 10, 2009 10:17:32
File Last Modified Date	: Jul 10, 2009 10:17:32
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05
Simulation Start Date	: Jan 01, 1991
Simulation End Date	: Dec 31, 2005
Simulation Run Date	: Jul 10, 2009 10:17
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 91-05\XB 91-05.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 91-05 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9105 - Jan 01, 1991 to Dec 31, 2005 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9105 - Jan 01, 1991 to Dec 31, 2005 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1991	44.00	24.81	12.93	0.00	11.88	14.99	19.07	3.33	18.85	1.34	0.00	4.58	0.00	0.00
1992	44.04	28.63	17.00	0.00	11.63	14.08	19.07	2.92	18.60	0.49	0.00	1.11	0.00	0.00
1993	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.84	22.56	0.11	0.00	0.67	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.03	0.00	-0.43	0.00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.67	18.87	0.00	11.80	16.90	19.07	4.66	19.51	0.12	0.00	0.52	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                      : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 92-06\XB 92-06.spw
File Creation Date        : Jul 10, 2009 10:30:21
File Last Modified Date   : Jul 10, 2009 10:30:21
Description               : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06
Simulation Start Date     : Jan 01, 1992
Simulation End Date       : Dec 31, 2006
Simulation Run Date       : Jul 10, 2009 10:30
SPAW Interface Version    : 6.02.75
Field Model Version       : 6.02.71
Soil Equations            : Saxton et al. 2005
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DATABASE FILES USED: DESCRIPTION/FILE (DATE)

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Field                  : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 92-06\XB 92-06.fld (Jul 10, 200900:00)
Climate                : Dewey Burdock 92-06 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD9206 - Jan 01, 1992 to Dec 31, 2006
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD9206 - Jan 01, 1992 to Dec 31, 2006
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Burdock TP8, TP9, TP10 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1992	44.04	24.81	13.18	0.00	11.63	14.08	19.07	2.92	18.60	1.24	0.00	4.17	0.00	0.00
1993	44.00	32.48	20.49	0.00	11.99	22.31	19.07	6.01	23.38	0.70	0.00	2.19	0.00	0.00
1994	44.00	29.49	17.58	0.00	11.92	12.01	19.07	2.04	17.12	-0.02	0.00	-0.43	0:00	0.00
1995	44.00	32.59	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.59	18.80	0.00	11.79	16.79	19.07	4.61	19.46	0.12	0.00	0.54	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 93-07\XB 93-07.spw
File Creation Date	: Jul 10, 2009 10:39:20
File Last Modified Date	: Jul 10, 2009 10:39:20
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07
Simulation Start Date	: Jan 01, 1993
Simulation End Date	: Dec 31, 2007
Simulation Run Date	: Jul 10, 2009 10:39
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 93-07\XB 93-07.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 93-07 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9307 - Jan 01, 1993 to Dec 31, 2007 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9307 - Jan 01, 1993 to Dec 31, 2007 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1993	44.00	27.37	15.43	0.00	11.95	21.44	19.07	5.31	23.26	1.78	0.00	6.05	0.00	0.00
1994	44.00	29.02	17.10	0.00	11.92	12.01	19.07	2.04	17.12	0.13	0.00	-0.12	0.00	0.00
1995	44.00	32.58	20.78	0.00	11.81	18.32	19.07	4.81	20.78	0.02	0.00	-0.02	0.00	0.00
1996	44.04	31.74	19.99	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.24	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.51	18.73	0.00	11.78	16.82	19.07	4.66	19.44	0.13	0.00	0.59	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 94-80\XB 94-80.spw
File Creation Date : Jul 10, 2009 10:51:44
File Last Modified Date : Jul 10, 2009 10:51:45
Description : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Jul 10, 2009 10:51
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 94-80\XB 94-80.fld (Jul 10, 200900:00)
Climate : Dewey Burdock 94-80 climatic data
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9480 - Jan 01, 1994 to Dec 31, 2008
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Air Temperature : SD9480 - Jan 01, 1994 to Dec 31, 2008
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Management : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1) : Bare feedlot or fallow field
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1994	44.00	24.52	12.61	0.00	11.92	12.01	19.07	2.04	17.12	0.79	0.00	3.72	0.00	0.00
1995	44.00	30.36	18.55	0.00	11.81	18.32	19.07	3.71	21.87	1.14	0.00	2.18	0.00	0.00
1996	44.04	31.72	19.98	0.00	11.74	17.60	19.07	4.70	20.23	-0.01	0.00	0.25	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.02	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.28	18.49	0.00	11.79	16.43	19.07	4.56	19.15	0.13	0.00	0.53	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 95-81\XB 95-81.spw
File Creation Date	: Jul 10, 2009 11:04:03
File Last Modified Date	: Jul 10, 2009 11:04:04
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81
Simulation Start Date	: Jan 01, 1995
Simulation End Date	: Dec 31, 2009
Simulation Run Date	: Jul 10, 2009 11:04
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 95-81\XB 95-81.fld (Jul 10, 200900:00)
Climate	: Dewey Burdock 95-81 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9581 - Jan 01, 1995 to Dec 31, 2009 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9581 - Jan 01, 1995 to Dec 31, 2009 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1995	44.00	26.88	15.09	0.00	11.79	18.14	19.07	3.71	21.71	1.59	0.00	5.03	0.00	0.00
1996	44.04	30.95	19.20	0.00	11.74	17.60	19.07	4.26	20.66	0.33	0.00	1.13	0.00	0.00
1997	44.00	32.11	20.57	0.00	11.54	17.73	19.07	5.01	20.24	-0.05	0.00	-0.28	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.27	18.52	0.00	11.74	16.52	19.07	4.68	19.16	0.12	0.00	0.52	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

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File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 96-82\XB 96-82.spw
File Creation Date     : Jul 10, 2009 11:13:04
File Last Modified Date : Jul 10, 2009 11:13:04
Description            : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82
Simulation Start Date  : Jan 01, 1996
Simulation End Date    : Dec 31, 2010
Simulation Run Date    : Jul 10, 2009 11:13
SPAW Interface Version : 6.02.75
Field Model Version    : 6.02.71
Soil Equations         : Saxton et al. 2005
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DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 96-82\XB 96-82.fld (Jul 10, 200900:00)
Climate                : Dewey Burdock 96-82 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD9682 - Jan 01, 1996 to Dec 31, 2010
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD9682 - Jan 01, 1996 to Dec 31, 2010
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Burdock TP8, TP9, TP10 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1996	44.04	26.04	14.30	0.00	11.74	17.60	19.07	4.09	20.84	1.44	0.00	5.09	0.00	0.00
1997	44.00	30.92	19.38	0.00	11.54	17.73	19.07	4.66	20.59	0.43	0.00	0.78	0.00	0.00
1998	44.00	34.14	22.18	0.00	11.96	24.28	19.07	8.76	22.63	0.14	0.00	0.31	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.32	18.57	0.00	11.75	16.77	19.07	4.85	19.24	0.13	0.00	0.54	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 97-83\XB 97-83.spw
File Creation Date	: Jul 10, 2009 12:47:44
File Last Modified Date	: Jul 10, 2009 12:47:46
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83
Simulation Start Date	: Jan 01, 1997
Simulation End Date	: Dec 31, 2011
Simulation Run Date	: Jul 10, 2009 12:47
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 97-83\XB 97-83.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 97-83 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9783 - Jan 01, 1997 to Dec 31, 2011 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9783 - Jan 01, 1997 to Dec 31, 2011 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1997	44.00	25.87	14.32	0.00	11.54	17.73	19.07	4.04	21.21	1.65	0.00	5.25	0.00	0.00
1998	44.00	33.69	21.73	0.00	11.96	24.28	19.07	8.35	23.04	0.37	0.00	0.94	0.00	0.00
1999	44.00	31.54	19.62	0.00	11.91	17.17	19.07	5.57	18.75	-0.18	0.00	-0.69	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.27	18.51	0.00	11.75	16.74	19.07	4.82	19.24	0.13	0.00	0.60	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
     File                   : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 98-84\XB 98-84.spw
     File Creation Date     : Jul 10, 2009 12:59:28
     File Last Modified Date : Jul 10, 2009 12:59:29
     Description            : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84
     Simulation Start Date  : Jan 01, 1998
     Simulation End Date    : Dec 31, 2012
     Simulation Run Date    : Jul 10, 2009 12:59
     SPAW Interface Version : 6.02.75
     Field Model Version    : 6.02.71
     Soil Equations         : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
     Field                 : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 98-84\XB 98-84.fld (Jul 11, 200900:00)
     Climate               : Dewey Burdock 98-84 climatic data
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.clm (Sep 16, 2008 00:00)
       Evaporation Defaults: Dewey-Burdock Evap. Defaults
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
       Precipitation       : SD9884 - Jan 01, 1998 to Dec 31, 2012
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
       Air Temperature     : SD9884 - Jan 01, 1998 to Dec 31, 2012
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
     Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
       Crop ( 1)           : Bare feedlot or fallow field
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
     Soil                  : Burdock TP8, TP9, TP10 Revised Soils Composite
                             G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1998	44.00	28.00	16.04	0.00	11.96	24.28	19.07	7.33	24.06	1.96	0.00	6.06	0.00	0.00
1999	44.00	31.37	19.45	0.00	11.91	17.17	19.07	5.56	18.77	-0.13	0.00	-0.56	0.00	0.00
2000	44.04	29.37	17.30	0.00	12.07	14.51	19.07	3.82	17.69	0.04	0.00	0.35	0.00	0.00
2001	44.00	30.91	19.16	0.00	11.75	18.10	19.07	6.25	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.32	18.54	0.00	11.78	16.61	19.07	4.72	19.18	0.12	0.00	0.52	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 99-85\XB 99-85.spw
File Creation Date	: Jul 10, 2009 13:07:36
File Last Modified Date	: Jul 10, 2009 13:07:36
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85
Simulation Start Date	: Jan 01, 1999
Simulation End Date	: Dec 31, 2013
Simulation Run Date	: Jul 10, 2009 13:07
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 99-85\XB 99-85.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 99-85 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD9985 - Jan 01, 1999 to Dec 31, 2013 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Air Temperature	: SD9985 - Jan 01, 1999 to Dec 31, 2013 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1999	44.00	25.40	13.48	0.00	11.91	17.17	19.07	5.17	19.16	1.36	0.00	4.32	0.00	0.00
2000	44.04	27.72	15.64	0.00	12.07	14.51	19.07	3.82	17.69	0.52	0.00	1.53	0.00	0.00
2001	44.00	30.90	19.15	0.00	11.75	18.10	19.07	6.24	19.18	0.01	0.00	0.01	0.00	0.00
2002	44.00	29.77	18.13	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.22	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.82	18.06	0.00	11.76	15.78	19.07	4.37	18.71	0.12	0.00	0.53	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 00-86\XB 00-86.spw
File Creation Date	: Jul 10, 2009 13:34:02
File Last Modified Date	: Jul 10, 2009 13:34:02
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86
Simulation Start Date	: Jan 01, 2000
Simulation End Date	: Dec 31, 2014
Simulation Run Date	: Jul 10, 2009 13:34
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 00-86\XB 00-86.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 00-86 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.clm (Sep 16, 2008 00:00)
Evaporation Dafaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0086 - Jan 01, 2000 to Dec 31, 2014 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0086 - Jan 01, 2000 to Dec 31, 2014 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2000	44.04	25.34	13.27	0.00	12.07	14.51	19.07	3.82	17.69	0.87	0.00	3.55	0.00	0.00
2001	44.00	28.24	16.49	0.00	11.75	18.10	19.07	5.62	19.80	1.01	0.00	2.30	0.00	0.00
2002	44.00	29.75	18.12	0.00	11.63	13.11	19.07	2.65	17.90	-0.01	0.00	-0.21	0.00	0.00
2003	44.00	30.46	18.55	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.22	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.13	18.37	0.00	11.76	16.21	19.07	4.47	19.04	0.13	0.00	0.54	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 01-87\XB 01-87.spw
File Creation Date	: Jul 10, 2009 13:43:16
File Last Modified Date	: Jul 10, 2009 13:43:16
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87
Simulation Start Date	: Jan 01, 2001
Simulation End Date	: Dec 31, 2015
Simulation Run Date	: Jul 10, 2009 13:43
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 01-87\XB 01-87.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 01-87 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0187 - Jan 01, 2001 to Dec 31, 2015 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0187 - Jan 01, 2001 to Dec 31, 2015 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2001	44.00	25.47	13.72	0.00	11.75	18.10	19.07	5.62	19.80	1.37	0.00	4.71	0.00	0.00
2002	44.00	28.12	16.49	0.00	11.63	13.11	19.07	2.65	17.90	0.49	0.00	0.92	0.00	0.00
2003	44.00	30.44	18.53	0.00	11.91	14.69	19.07	3.07	18.79	0.02	0.00	0.24	0.00	0.00
2004	44.04	29.36	17.92	0.00	11.44	12.18	19.07	1.89	17.91	0.01	0.00	-0.02	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.13	18.38	0.00	11.75	16.13	19.07	4.37	19.08	0.12	0.00	0.58	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 02-88\XB 02-88.spw
File Creation Date      : Jul 10, 2009 13:52:27
File Last Modified Date : Jul 10, 2009 13:52:28
Description             : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88
Simulation Start Date   : Jan 01, 2002
Simulation End Date     : Dec 31, 2016
Simulation Run Date     : Jul 10, 2009 13:52
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                  : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 02-88\XB 02-88.fld (Jul 11, 200900:00)
Climate                : Dewey Burdock 02-88 climatic data
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation        : SD0288 - Jan 01, 2002 to Dec 31, 2016
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
  Air Temperature      : SD0288 - Jan 01, 2002 to Dec 31, 2016
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Management             : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)            : Bare feedlot or fallow field
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                   : Burdock TP8, TP9, TP10 Revised Soils Composite
                         G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2002	44.00	25.11	13.48	0.00	11.63	13.11	19.07	2.65	17.89	0.91	0.00	3.51	0.00	0.00
2003	44.00	27.40	15.49	0.00	11.91	14.69	19.07	3.07	18.79	0.96	0.00	2.34	0.00	0.00
2004	44.04	29.33	17.89	0.00	11.44	12.18	19.07	1.89	17.91	0.03	0.00	0.00	0.00	0.00
2005	44.00	31.17	19.51	0.00	11.66	20.16	19.07	8.29	19.27	-0.05	0.00	-0.19	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.93	18.17	0.00	11.75	15.78	19.07	4.28	18.81	0.12	0.00	0.52	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

```
File                    : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 03-89\XB 03-89.spw
File Creation Date      : Jul 10, 2009 14:01:13
File Last Modified Date : Jul 10, 2009 14:01:14
Description             : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89
Simulation Start Date   : Jan 01, 2003
Simulation End Date     : Dec 31, 2017
Simulation Run Date     : Jul 10, 2009 14:01
SPAW Interface Version  : 6.02.75
Field Model Version     : 6.02.71
Soil Equations          : Saxton et al. 2005
```

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

```
Field                 : Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 03-89\XB 03-89.fld (Jul 11, 200900:00)
Climate               : Dewey Burdock 03-89 climatic data
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.clm (Sep 16, 2008 00:00)
  Evaporation Defaults: Dewey-Burdock Evap. Defaults
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
  Precipitation       : SD0289 - Jan 01, 2003 to Dec 31, 2017
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
  Air Temperature     : SD0289 - Jan 01, 2003 to Dec 31, 2017
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Management            : Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
  Crop ( 1)           : Bare feedlot or fallow field
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil                  : Burdock TP8, TP9, TP10 Revised Soils Composite
                        G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)
```

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2003	44.00	25.36	13.46	0.00	11.91	14.69	19.07	3.49	18.37	1.02	0.00	3.89	0.00	0.00
2004	44.04	26.62	15.18	0.00	11.44	12.18	19.07	1.89	17.91	0.86	0.00	1.88	0.00	0.00
2005	44.00	31.08	19.42	0.00	11.66	20.16	19.07	8.28	19.28	-0.03	0.00	-0.11	0.00	0.00
2006	44.00	28.68	16.89	0.00	11.79	13.22	19.07	3.32	17.18	0.01	0.00	0.28	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
2017	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.93	18.16	0.00	11.77	15.94	19.07	4.41	18.83	0.13	0.00	0.55	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 04-90\XB 04-90.spw
File Creation Date	: Jul 10, 2009 14:59:42
File Last Modified Date	: Jul 10, 2009 14:59:43
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90
Simulation Start Date	: Jan 01, 2004
Simulation End Date	: Dec 31, 2018
Simulation Run Date	: Jul 10, 2009 14:59
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 04-90\XB 04-90.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 04-90 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0490 - Jan 01, 2004 to Dec 31, 2018 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0490 - Jan 01, 2004 to Dec 31, 2018 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2004	44.04	24.68	13.26	0.00	11.42	12.16	19.07	1.89	17.91	0.94	0.00	3.72	0.00	0.00
2005	44.00	28.85	17.18	0.00	11.66	20.16	19.07	7.55	20.02	0.90	0.00	1.93	0.00	0.00
2006	44.00	28.66	16.87	0.00	11.79	13.22	19.07	3.32	17.18	0.02	0.00	0.30	0.00	0.00
2007	44.00	29.09	17.64	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.16	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
2017	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
2018	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.08	18.33	0.00	11.75	16.24	19.07	4.57	18.99	0.13	0.00	0.53	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 05-91\XB 05-91.spw
File Creation Date	: Jul 10, 2009 15:10:11
File Last Modified Date	: Jul 10, 2009 15:10:12
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91
Simulation Start Date	: Jan 01, 2005
Simulation End Date	: Dec 31, 2019
Simulation Run Date	: Jul 10, 2009 15:10
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 05-91\XB 05-91.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 05-91 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0591 - Jan 01, 2005 to Dec 31, 2019 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0591 - Jan 01, 2005 to Dec 31, 2019 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2005	44.00	25.35	13.69	0.00	11.66	20.16	19.07	7.55	20.02	1.53	0.00	4.80	0.00	0.00
2006	44.00	27.61	15.82	0.00	11.79	13.22	19.07	3.23	17.28	0.32	0.00	1.13	0.00	0.00
2007	44.00	29.08	17.63	0.00	11.45	14.33	19.07	4.44	17.51	0.03	0.00	-0.15	0.00	0.00
2008	44.04	30.81	18.73	0.00	12.08	16.74	19.07	4.92	18.80	0.00	0.00	0.08	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
2017	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
2018	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
2019	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.09	18.31	0.00	11.78	16.27	19.07	4.74	18.83	0.12	0.00	0.39	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 06-92\XB 06-92.spw
File Creation Date	: Jul 10, 2009 15:18:33
File Last Modified Date	: Jul 10, 2009 15:18:34
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92
Simulation Start Date	: Jan 01, 2006
Simulation End Date	: Dec 31, 2020
Simulation Run Date	: Jul 10, 2009 15:18
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 06-92\XB 06-92.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 06-92 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0692 - Jan 01, 2006 to Dec 31, 2020 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0692 - Jan 01, 2006 to Dec 31, 2020 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2006	44.00	24.32	12.57	0.00	11.75	13.13	19.07	3.23	17.22	0.91	0.00	3.74	0.00	0.00
2007	44.00	26.12	14.67	0.00	11.45	14.33	19.07	4.44	17.51	0.92	0.00	1.91	0.00	0.00
2008	44.04	30.66	18.58	0.00	12.08	16.74	19.07	4.89	18.84	0.05	0.00	0.21	0.00	0.00
2009	44.00	28.60	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.24	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
2017	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
2018	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
2019	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
2020	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	29.99	18.22	0.00	11.77	15.86	19.07	4.44	18.72	0.12	0.00	0.37	0.00	0.00

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:

File	: G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 07-93\XB 07-93.spw
File Creation Date	: Jul 10, 2009 15:27:28
File Last Modified Date	: Jul 10, 2009 15:27:29
Description	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93
Simulation Start Date	: Jan 01, 2007
Simulation End Date	: Dec 31, 2021
Simulation Run Date	: Jul 10, 2009 15:27
SPAW Interface Version	: 6.02.75
Field Model Version	: 6.02.71
Soil Equations	: Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)

Field	: Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 07-93\XB 07-93.fld (Jul 11, 200900:00)
Climate	: Dewey Burdock 07-93 climatic data G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.clm (Sep 16, 2008 00:00)
Evaporation Defaults	: Dewey-Burdock Evap. Defaults G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation	: SD0793 - Jan 01, 2007 to Dec 31, 2021 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Air Temperature	: SD0793 - Jan 01, 2007 to Dec 31, 2021 G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Management	: Combined-0.05 in per day Mar 29-May10 and Sep25-Oct 31; 0.11 in/day May11-Sep24; bare soil; 314.5 acres G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Managements\XD-217d-bare.mgmt (Jun 23, 2009 00:00)
Crop (1)	: Bare feedlot or fallow field G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Crops\Bare Soil.crop (Jun 10, 2009 00:00)
Soil	: Burdock TP8, TP9, TP10 Revised Soils Composite G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Database\Soils\BRev 8-9-10.soil (Jun 23, 2009 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2007	44.00	24.35	12.90	0.00	11.45	14.33	19.07	4.44	17.51	0.95	0.00	3.66	0.00	0.00
2008	44.04	29.29	17.20	0.00	12.08	16.74	19.07	3.39	20.33	0.93	0.00	2.20	0.00	0.00
2009	44.00	28.59	17.28	0.00	11.31	13.46	19.07	4.20	17.02	-0.03	0.00	-0.23	0.00	0.00
2010	44.00	33.79	21.94	0.00	11.85	21.88	19.07	6.79	22.32	0.08	0.00	0.30	0.00	0.00
2011	44.00	30.63	18.84	0.00	11.78	16.16	19.07	4.66	18.79	-0.03	0.00	-0.03	0.00	0.00
2012	44.04	32.65	20.61	0.00	12.04	16.89	19.07	3.56	20.36	-0.06	0.00	-0.18	0.00	0.00
2013	44.00	28.16	16.53	0.00	11.63	11.75	19.07	2.57	16.62	0.01	0.00	0.08	0.00	0.00
2014	44.00	35.08	23.16	0.00	11.93	23.59	19.07	7.33	23.41	0.10	0.00	0.15	0.00	0.00
2015	44.00	29.71	17.84	0.00	11.87	12.36	19.07	2.28	17.27	-0.15	0.00	-0.41	0.00	0.00
2016	44.04	28.55	16.74	0.00	11.81	13.79	19.07	4.28	16.76	-0.01	0.00	0.03	0.00	0.00
2017	44.00	29.93	18.08	0.00	11.85	15.58	19.07	4.14	18.67	0.10	0.00	0.49	0.00	0.00
2018	44.00	31.85	20.19	0.00	11.65	19.14	19.07	6.58	19.97	0.00	0.00	-0.23	0.00	0.00
2019	44.00	29.52	17.60	0.00	11.92	15.03	19.07	4.59	17.59	-0.03	0.00	0.02	0.00	0.00
2020	44.04	30.27	18.64	0.00	11.63	14.08	19.07	3.06	18.46	-0.04	0.00	-0.14	0.00	0.00
2021	44.00	33.76	21.77	0.00	11.99	22.31	19.07	6.86	22.53	0.11	0.00	0.66	0.00	0.00

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.41	18.63	0.00	11.79	16.47	19.07	4.58	19.17	0.13	0.00	0.42	0.00	0.00

Knight Piésold
CONSULTING

SPAW Model Results

Burdock Pond

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 80-94

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 80-94\XB 80-94.pnd
File Creation Date : Jul 09, 2009 14:55:31
File Last Modified Date : Jul 09, 2009 14:55:31
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 80-94
Simulation Start Date : Jan 01, 1980
Simulation End Date : Dec 31, 1994
Simulation Run Date : Jul 09, 2009 14:55
SPAW Interface Version : Jul 09, 2009 14:55:31
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 80-94\XB 80-94.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 80-94 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 80-94\XB 80-94.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1980	515.75	425.51	90.23	16.33	10.82	0	3.45	0	501.47	0	0	0	0	0	26.9	0	0	398.61	101.18
1981	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
1982	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
1983	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
1984	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
1985	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
515.93	508.89	7.04	16.29	12.01	0	2.45	0	501.47	0	0	0	0	0	30.67	0	0	478.23	21.57

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 81-95

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 81-95\XB 81-95.pnd
File Creation Date : Jul 09, 2009 15:39:54
File Last Modified Date : Jul 09, 2009 15:39:54
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 81-95
Simulation Start Date : Jan 01, 1981
Simulation End Date : Dec 31, 1995
Simulation Run Date : Jul 09, 2009 15:39
SPAW Interface Version : Jul 09, 2009 15:39:54
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 81-95\XB 81-95.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 81-95 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 81-95\XB 81-95.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1981	511.59	420.75	90.83	13.46	8.55	0	2.93	0	500.1	0	0	0	0	0	26.74	0	0	394.01	105.78
1982	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
1983	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
1984	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
1985	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.83	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.02	508.81	7.21	16.42	12.09	0	2.45	0	501.47	0	0	0	0	0	30.67	0	0	478.14	21.65

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 82-96

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 82-96\XB 82-96.pnd
File Creation Date : Jul 09, 2009 16:11:28
File Last Modified Date : Jul 09, 2009 16:11:28
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 82-96
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Jul 09, 2009 16:11
SPAW Interface Version : Jul 09, 2009 16:11:28
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 82-96\XB 82-96.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 82-96 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 82-96\XB 82-96.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1982	518.31	426.94	91.37	21.83	13.74	0	4.47	0	500.1	0	0	0	0	0	26.8	0	0	400.14	99.66
1983	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
1984	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
1985	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.23	509.2	7.03	16.69	12.25	0	2.51	0	501.47	0	0	0	0	0	30.68	0	0	478.52	21.27

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 83-97

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 83-97\XB 83-97.pnd
File Creation Date : Jul 09, 2009 17:45:28
File Last Modified Date : Jul 09, 2009 17:45:28
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 83-97
Simulation Start Date : Jan 01, 1983
Simulation End Date : Dec 31, 1997
Simulation Run Date : Jul 09, 2009 17:45
SPAW Interface Version : Jul 09, 2009 17:45:28
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 83-97\XB 83-97.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 83-97 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 83-97\XB 83-97.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1983	513.59	422.75	90.85	16.08	9.96	0	3.53	0	500.1	0	0	0	0	0	26.73	0	0	396.02	103.77
1984	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
1985	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.01	509.07	6.93	16.42	12.11	0	2.42	0	501.47	0	0	0	0	0	30.68	0	0	478.4	21.4

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 84-98

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 84-98\XB 84-98.pnd
File Creation Date : Jul 10, 2009 08:55:47
File Last Modified Date : Jul 10, 2009 08:55:47
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 84-98
Simulation Start Date : Jan 01, 1984
Simulation End Date : Dec 31, 1998
Simulation Run Date : Jul 10, 2009 08:55
SPAW Interface Version : Jul 10, 2009 08:55:47
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 84-98\XB 84-98.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 84-98 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 84-98\XB 84-98.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1984	514.22	424.8	89.43	15.65	10.31	0	2.44	0	501.47	0	0	0	0	0	26.85	0	0	397.94	101.85
1985	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.42	509.22	7.2	16.88	12.41	0	2.54	0	501.47	0	0	0	0	0	30.68	0	0	478.55	21.24

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 85-99

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 85-99\XB 85-99.pnd
File Creation Date : Jul 10, 2009 09:14:56
File Last Modified Date : Jul 10, 2009 09:14:56
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 85-99
Simulation Start Date : Jan 01, 1985
Simulation End Date : Dec 31, 1999
Simulation Run Date : Jul 10, 2009 09:14
SPAW Interface Version : Jul 10, 2009 09:14:56
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 85-99\XB 85-99.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 85-99 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 85-99\XB 85-99.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1985	509.66	420.45	89.21	11.75	7.58	0	1.98	0	500.1	0	0	0	0	0	26.73	0	0	393.72	106.07
1986	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.58	509.59	7	16.98	12.54	0	2.57	0	501.47	0	0	0	0	0	30.7	0	0	478.89	20.9

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 86-00

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 86-00\XB 86-00.pnd
File Creation Date : Jul 10, 2009 09:24:21
File Last Modified Date : Jul 10, 2009 09:24:21
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 86-00
Simulation Start Date : Jan 01, 1986
Simulation End Date : Dec 31, 2000
Simulation Run Date : Jul 10, 2009 09:24
SPAW Interface Version : Jul 10, 2009 09:24:21
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 86-00\XB 86-00.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 86-00 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 86-00\XB 86-00.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1986	519.01	426.15	92.86	22.02	13.74	0	5.17	0	500.1	0	0	0	0	0	26.84	0	0	399.31	100.48
1987	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.65	509.7	6.95	17.06	12.57	0	2.61	0	501.47	0	0	0	0	0	30.7	0	0	479	20.79

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 87-01

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 87-01\XB 87-01.pnd
File Creation Date : Jul 10, 2009 09:35:20
File Last Modified Date : Jul 10, 2009 09:35:20
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 87-01
Simulation Start Date : Jan 01, 1987
Simulation End Date : Dec 31, 2001
Simulation Run Date : Jul 10, 2009 09:35
SPAW Interface Version : Jul 10, 2009 09:35:20
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 87-01\XB 87-01.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 87-01 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 87-01\XB 87-01.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1987	510.45	421.1	89.34	12.37	8	0	2.34	0	500.1	0	0	0	0	0	26.76	0	0	394.35	105.45
1988	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.44	509.44	7.01	16.8	12.47	0	2.5	0	501.47	0	0	0	0	0	30.69	0	0	478.75	21.04

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 88-02

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 88-02\XB 88-02.pnd
File Creation Date : Jul 10, 2009 09:45:01
File Last Modified Date : Jul 10, 2009 09:45:01
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 88-02
Simulation Start Date : Jan 01, 1988
Simulation End Date : Dec 31, 2002
Simulation Run Date : Jul 10, 2009 09:45
SPAW Interface Version : Jul 10, 2009 09:45:01
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 88-02\XB 88-02.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 88-02 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 88-02\XB 88-02.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1988	513.03	424.12	88.91	13.4	8.49	0	3.07	0	501.47	0	0	0	0	0	26.8	0	0	397.33	102.47
1989	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.45	509.53	6.92	16.82	12.44	0	2.54	0	501.47	0	0	0	0	0	30.68	0	0	478.85	20.95

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 89-03

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 89-03\XB 89-03.pnd
File Creation Date : Jul 10, 2009 10:06:33
File Last Modified Date : Jul 10, 2009 10:06:33
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 89-03
Simulation Start Date : Jan 01, 1989
Simulation End Date : Dec 31, 2003
Simulation Run Date : Jul 10, 2009 10:06
SPAW Interface Version : Jul 10, 2009 10:06:33
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 89-03\XB 89-03.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 89-03 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 89-03\XB 89-03.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1989	513.17	423.54	89.64	15.49	9.58	0	3.49	0	500.1	0	0	0	0	0	26.71	0	0	396.83	102.97
1990	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.51	509.47	7.04	16.9	12.52	0	2.51	0	501.47	0	0	0	0	0	30.69	0	0	478.78	21.01

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 90-04

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 90-04\XB 90-04.pnd
File Creation Date : Jul 09, 2009 13:57:49
File Last Modified Date : Jul 09, 2009 13:57:49
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil, no return RO
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Jul 09, 2009 13:57
SPAW Interface Version : Jul 09, 2009 13:57:49
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock 06-10-09 Trials\XB-217d-bare\XB-217d-bare.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock 06-10-09 Trials\XB-217d-bare\XB-217d-bare.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1990	516.66	426.53	90.13	19.11	12.13	0	4.43	0	500.1	0	0	0	0	0	26.79	0	0	399.75	100.05
1991	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.41	509.26	7.14	16.84	12.43	0	2.5	0	501.47	0	0	0	0	0	30.68	0	0	478.59	21.21

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 91-05

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 91-05\XB 91-05.pnd
File Creation Date : Jul 10, 2009 10:19:20
File Last Modified Date : Jul 10, 2009 10:19:20
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 91-05
Simulation Start Date : Jan 01, 1991
Simulation End Date : Dec 31, 2005
Simulation Run Date : Jul 10, 2009 10:19
SPAW Interface Version : Jul 10, 2009 10:19:20
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 91-05\XB 91-05.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 91-05 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 91-05\XB 91-05.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1991	512.86	423.23	89.63	14.99	9.91	0	2.85	0	500.1	0	0	0	0	0	26.78	0	0	396.45	103.35
1992	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.49	509.36	7.12	16.9	12.54	0	2.47	0	501.47	0	0	0	0	0	30.69	0	0	478.68	21.12

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 92-06

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 92-06\XB 92-06.pnd
File Creation Date : Jul 10, 2009 10:31:49
File Last Modified Date : Jul 10, 2009 10:31:50
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 92-06
Simulation Start Date : Jan 01, 1992
Simulation End Date : Dec 31, 2006
Simulation Run Date : Jul 10, 2009 10:31
SPAW Interface Version : Jul 10, 2009 10:31:49
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 92-06\XB 92-06.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 92-06 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 92-06\XB 92-06.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1992	512.78	423.71	89.07	14.07	8.87	0	2.44	0	501.47	0	0	0	0	0	26.8	0	0	396.91	102.88
1993	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.36	509.27	7.09	16.79	12.42	0	2.47	0	501.47	0	0	0	0	0	30.68	0	0	478.59	21.2

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 93-07

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 93-07\XB 93-07.pnd
File Creation Date : Jul 10, 2009 10:41:59
File Last Modified Date : Jul 10, 2009 10:41:59
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 93-07
Simulation Start Date : Jan 01, 1993
Simulation End Date : Dec 31, 2007
Simulation Run Date : Jul 10, 2009 10:41
SPAW Interface Version : Jul 10, 2009 10:41:59
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 93-07\XB 93-07.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 93-07 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 93-07\XB 93-07.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1993	518.4	427.65	90.75	21.42	13.86	0	4.43	0	500.1	0	0	0	0	0	26.85	0	0	400.79	99
1994	510.64	510.51	0.13	12	8.8	0	1.74	0	500.1	0	0	0	0	0	30.81	0	0	479.7	20.09
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.4	509.1	7.3	16.82	12.37	0	2.56	0	501.47	0	0	0	0	0	30.67	0	0	478.43	21.36

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 94-80

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 94-80\XB 94-80.pnd
File Creation Date : Jul 10, 2009 10:53:20
File Last Modified Date : Jul 10, 2009 10:53:20
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 94-80
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Jul 10, 2009 10:53
SPAW Interface Version : Jul 10, 2009 10:53:20
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 94-80\XB 94-80.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 94-80 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 94-80\XB 94-80.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1994	510.06	419.18	90.88	12	7.59	0	2.36	0	500.1	0	0	0	0	0	26.73	0	0	392.45	107.34
1995	516.24	515	1.24	18.32	13.44	0	2.69	0	500.1	0	0	0	0	0	30.97	0	0	484.03	15.76
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41	12.38
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.09	508.94	7.15	16.43	12.17	0	2.45	0	501.47	0	0	0	0	0	30.68	0	0	478.26	21.53

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 95-81

SIMULATION FOR:

File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 95-81\XB 95-81.pnd
File Creation Date : Jul 10, 2009 11:05:09
File Last Modified Date : Jul 10, 2009 11:05:09
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 95-81
Simulation Start Date : Jan 01, 1995
Simulation End Date : Dec 31, 2009
Simulation Run Date : Jul 10, 2009 11:05
SPAW Interface Version : Jul 10, 2009 11:05:09
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 95-81\XB 95-81.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 95-81 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 95-81\XB 95-81.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft
1995	515.04	422.92	92.12	18.14	11.6	0	3.34	0	500.1	0	0	0	0	0	26.81	0	0	396.12
1996	517.08	518.52	-1.44	17.59	13.07	0	2.54	0	501.47	0	0	0	0	0	31.11	0	0	487.41
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft
516.15	508.96	7.19	16.52	12.2	0	2.48	0	501.47	0	0	0	0	0	30.67	0	0	478.29

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 96-82

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 96-82\XB 96-82.pnd
File Creation Date : Jul 10, 2009 11:14:30
File Last Modified Date : Jul 10, 2009 11:14:30
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 96-82
Simulation Start Date : Jan 01, 1996
Simulation End Date : Dec 31, 2010
Simulation Run Date : Jul 10, 2009 11:14
SPAW Interface Version : Jul 10, 2009 11:14:30
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 96-82\XB 96-82.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 96-82 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 96-82\XB 96-82.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1996	516.34	425.66	90.68	17.59	11.35	0	3.52	0	501.47	0	0	0	0	0	26.86	0	0	398.8	100.99
1997	515.79	517.19	-1.4	17.73	13.43	0	2.26	0	500.1	0	0	0	0	0	30.97	0	0	486.22	13.58
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.39	509.16	7.23	16.77	12.38	0	2.54	0	501.47	0	0	0	0	0	30.67	0	0	478.49	21.3

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 97-83

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 97-83\XB 97-83.pnd
File Creation Date : Jul 10, 2009 12:49:16
File Last Modified Date : Jul 10, 2009 12:49:16
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 97-83
Simulation Start Date : Jan 01, 1997
Simulation End Date : Dec 31, 2011
Simulation Run Date : Jul 10, 2009 12:49
SPAW Interface Version : Jul 10, 2009 12:49:16
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 97-83\XB 97-83.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 97-83 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 97-83\XB 97-83.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
1997	514.82	425.54	89.28	17.73	11.22	0	3.5	0	500.1	0	0	0	0	0	26.78	0	0	398.76	101.03
1998	522.01	518.03	3.98	24.29	17.28	0	4.62	0	500.1	0	0	0	0	0	30.96	0	0	487.06	12.73
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
516.35	509	7.35	16.74	12.31	0	2.57	0	501.47	0	0	0	0	0	30.66	0	0	478.34	21.45

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 98-84

SIMULATION FOR:

File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 98-84\XB 98-84.pnd
File Creation Date : Jul 10, 2009 13:00:58
File Last Modified Date : Jul 10, 2009 13:00:58
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 98-84
Simulation Start Date : Jan 01, 1998
Simulation End Date : Dec 31, 2012
Simulation Run Date : Jul 10, 2009 13:00
SPAW Interface Version : Jul 10, 2009 13:00:58
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 98-84\XB 98-84.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 98-84 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 98-84\XB 98-84.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runo	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1998	521.14	427.88	93.26	24.29	15.09	0	5.95	0	500.1	0	0	0	0	0	26.84	0	0	401.04	98.75
1999	515.75	520.12	-4.37	17.17	13.4	0	2.25	0	500.1	0	0	0	0	0	31.14	0	0	488.99	10.81
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runo	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.24	509.14	7.1	16.62	12.23	0	2.53	0	501.47	0	0	0	0	0	30.67	0	0	478.47	21.32

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 99-85

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 99-85\XB 99-85.pnd
File Creation Date : Jul 10, 2009 13:08:52
File Last Modified Date : Jul 10, 2009 13:08:52
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 99-85
Simulation Start Date : Jan 01, 1999
Simulation End Date : Dec 31, 2013
Simulation Run Date : Jul 10, 2009 13:08
SPAW Interface Version : Jul 10, 2009 13:08:52
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 99-85\XB 99-85.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 99-85 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 99-85\XB 99-85.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1999	514.89	425.99	88.89	17.17	11.22	0	3.56	0	500.1	0	0	0	0	0	26.81	0	0	399.19	100.61
2000	514.29	513.59	0.71	14.51	11.13	0	1.7	0	501.47	0	0	0	0	0	30.94	0	0	482.65	17.14
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
515.45	508.37	7.08	15.78	11.66	0	2.31	0	501.47	0	0	0	0	0	30.64	0	0	477.72	22.07

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 00-86

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 00-86\XB 00-86.pnd
File Creation Date : Jul 10, 2009 13:35:17
File Last Modified Date : Jul 10, 2009 13:35:17
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 00-86
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Jul 10, 2009 13:35
SPAW Interface Version : Jul 10, 2009 13:35:17
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 00-86\XB 00-86.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 00-86 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 00-86\XB 00-86.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2000	513.72	424.12	89.6	14.51	9.54	0	2.71	0	501.47	0	0	0	0	0	26.88	0	0	397.25	102.55
2001	516.55	515.75	0.79	18.1	13.67	0	2.77	0	500.1	0	0	0	0	0	30.93	0	0	484.82	14.97
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
515.84	508.51	7.33	16.21	11.93	0	2.43	0	501.47	0	0	0	0	0	30.65	0	0	477.86	21.94

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 01-87

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 01-87\XB 01-87.pnd
File Creation Date : Jul 10, 2009 13:44:37
File Last Modified Date : Jul 10, 2009 13:44:38
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 01-87
Simulation Start Date : Jan 01, 2001
Simulation End Date : Dec 31, 2015
Simulation Run Date : Jul 10, 2009 13:44
SPAW Interface Version : Jul 10, 2009 13:44:37
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 01-87\XB 01-87.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 01-87 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 01-87\XB 01-87.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
2001	515.81	425.42	90.39	18.1	11.57	0	4.14	0	500.1	0	0	0	0	0	26.79	0	0	398.63	101.17
2002	511.43	512.73	-1.3	13.1	9.48	0	1.84	0	500.1	0	0	0	0	0	30.78	0	0	481.95	17.85
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
515.77	508.52	7.25	16.14	11.85	0	2.45	0	501.47	0	0	0	0	0	30.65	0	0	477.87	21.93

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 02-88

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 02-88\XB 02-88.pnd
File Creation Date : Jul 10, 2009 13:54:02
File Last Modified Date : Jul 10, 2009 13:54:02
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 02-88
Simulation Start Date : Jan 01, 2002
Simulation End Date : Dec 31, 2016
Simulation Run Date : Jul 10, 2009 13:54
SPAW Interface Version : Jul 10, 2009 13:54:01
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 02-88\XB 02-88.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 02-88 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 02-88\XB 02-88.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
2002	510.82	421.72	89.1	13.1	8.24	0	2.47	0	500.1	0	0	0	0	0	26.71	0	0	395.01	104.78
2003	513.21	512.78	0.43	14.69	11.06	0	2.05	0	500.1	0	0	0	0	0	30.81	0	0	481.97	17.82
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
515.44	508.38	7.06	15.78	11.63	0	2.34	0	501.47	0	0	0	0	0	30.65	0	0	477.73	22.07

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 03-89

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 03-89\XB 03-89.pnd
File Creation Date : Jul 10, 2009 14:03:26
File Last Modified Date : Jul 10, 2009 14:03:26
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 03-89
Simulation Start Date : Jan 01, 2003
Simulation End Date : Dec 31, 2017
Simulation Run Date : Jul 10, 2009 14:03
SPAW Interface Version : Jul 10, 2009 14:03:26
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 03-89\XB 03-89.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 03-89 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 03-89\XB 03-89.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
2003	512.59	423.06	89.53	14.69	9.58	0	2.91	0	500.1	0	0	0	0	0	26.78	0	0	396.29	103.51
2004	511.57	511	0.57	12.19	8.33	0	1.76	0	501.47	0	0	0	0	0	30.77	0	0	480.23	19.56
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
2017	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
515.61	508.5	7.11	15.94	11.71	0	2.43	0	501.47	0	0	0	0	0	30.65	0	0	477.84	21.95

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 04-90

SIMULATION FOR:

File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 04-90\XB 04-90.pnd
File Creation Date : Jul 10, 2009 15:01:32
File Last Modified Date : Jul 10, 2009 15:01:32
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 04-90
Simulation Start Date : Jan 01, 2004
Simulation End Date : Dec 31, 2018
Simulation Run Date : Jul 10, 2009 15:01
SPAW Interface Version : Jul 10, 2009 15:01:31
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 04-90\XB 04-90.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 04-90 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 04-90\XB 04-90.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
2004	510.88	420.79	90.09	12.17	7.28	0	2.13	0	501.47	0	0	0	0	0	26.75	0	0	394.04	105.75
2005	518.63	518.94	-0.31	20.16	15.57	0	2.95	0	500.1	0	0	0	0	0	31.06	0	0	487.88	11.91
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
2017	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
2018	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runo ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft
515.89	508.74	7.14	16.24	11.92	0	2.49	0	501.47	0	0	0	0	0	30.66	0	0	478.08	21.71

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 05-91

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 05-91\XB 05-91.pnd
File Creation Date : Jul 10, 2009 15:11:27
File Last Modified Date : Jul 10, 2009 15:11:27
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 05-91
Simulation Start Date : Jan 01, 2005
Simulation End Date : Dec 31, 2019
Simulation Run Date : Jul 10, 2009 15:11
SPAW Interface Version : Jul 10, 2009 15:11:27
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 05-91\XB 05-91.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 05-91 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 05-91\XB 05-91.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2005	517.87	428.09	89.78	20.16	13.12	0	4.65	0	500.1	0	0	0	0	0	26.85	0	0	401.23	98.56
2006	511.85	512.38	-0.52	13.22	9.83	0	1.92	0	500.1	0	0	0	0	0	30.79	0	0	481.58	18.21
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
2017	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
2018	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
2019	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
515.96	508.91	7.05	16.27	11.95	0	2.54	0	501.47	0	0	0	0	0	30.66	0	0	478.25	21.54

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 06-92

SIMULATION FOR:

File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 06-92\XB 06-92.pnd
File Creation Date : Jul 10, 2009 15:19:57
File Last Modified Date : Jul 10, 2009 15:19:57
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 06-92
Simulation Start Date : Jan 01, 2006
Simulation End Date : Dec 31, 2020
Simulation Run Date : Jul 10, 2009 15:19
SPAW Interface Version : Jul 10, 2009 15:19:57
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 06-92\XB 06-92.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 06-92 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 06-92\XB 06-92.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2006	511.19	421.93	89.26	13.13	8.32	0	2.77	0	500.1	0	0	0	0	0	26.72	0	0	395.21	104.58
2007	512.74	511.96	0.78	14.34	10.38	0	2.25	0	500.1	0	0	0	0	0	30.76	0	0	481.2	18.59
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
2017	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
2018	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
2019	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
2020	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
515.54	508.62	6.92	15.86	11.68	0	2.39	0	501.47	0	0	0	0	0	30.66	0	0	477.97	21.83

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES 07-93

SIMULATION FOR:
File : G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Ponds\Burdock July 09\XB 07-93\XB 07-93.pnd
File Creation Date : Jul 10, 2009 15:29:03
File Last Modified Date : Jul 10, 2009 15:29:03
Description : Burdock 302 AF Pond, 0.05 in/da from Mar-May and Oct; 0.11in/day May11-Sep24;314.5ac, bare soil; 07-93
Simulation Start Date : Jan 01, 2007
Simulation End Date : Dec 31, 2021
Simulation Run Date : Jul 10, 2009 15:29
SPAW Interface Version : Jul 10, 2009 15:29:02
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93 0.00
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 07-93\XB 07-93.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock-0.05/day from Mar29-May10 and Sep25-Oct31;0.11/day May11-Sep24; bare soil; 314.5 acres; 07-93 314.50
G:\102\00279.02\Data Info\DB Land Application-Irrigation\SPAW Model\Projects\Fields\Burdock July 09\XB 07-93\XB 07-93.fpin Dec 30, 1899 00:00

POND PROFILE
MAX AREA (AC) = 12.05
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 295.99
IRRIGATION LIMIT (FT) = 1.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 0.00
SPILLWAY CREST (FT) = 32.50
INITIAL DEPTH (FT) = 0.00
INFIL. INTO DRY SOIL (IN) = 0.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runo	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2007	512.18	422.14	90.04	14.34	8.92	0	3.16	0	500.1	0	0	0	0	0	26.72	0	0	395.41	104.38
2008	516.75	516.56	0.19	16.74	12.91	0	2.37	0	501.47	0	0	0	0	0	31.07	0	0	485.5	14.3
2009	512.18	511.58	0.6	13.46	9.96	0	2.12	0	500.1	0	0	0	0	0	30.82	0	0	480.76	19.03
2010	519.33	518.79	0.54	21.88	15.94	0	3.28	0	500.1	0	0	0	0	0	31.01	0	0	487.78	12.01
2011	514.37	514.89	-0.53	16.16	11.7	0	2.57	0	500.1	0	0	0	0	0	30.9	0	0	483.99	15.8
2012	516.37	517.79	-1.42	16.9	13.11	0	1.79	0	501.47	0	0	0	0	0	31.11	0	0	486.69	13.11
2013	510.18	510.4	-0.22	11.75	8.72	0	1.35	0	500.1	0	0	0	0	0	30.74	0	0	479.66	20.13
2014	521.25	517.6	3.65	23.59	16.85	0	4.3	0	500.1	0	0	0	0	0	31.01	0	0	486.59	13.2
2015	511.06	514.58	-3.52	12.37	9.47	0	1.48	0	500.1	0	0	0	0	0	30.98	0	0	483.6	16.19
2016	513.94	514.37	-0.43	13.79	10.41	0	2.06	0	501.47	0	0	0	0	0	30.91	0	0	483.46	16.33
2017	513.88	513.15	0.73	15.58	10.9	0	2.88	0	500.1	0	0	0	0	0	30.71	0	0	482.44	17.35
2018	517.5	517.01	0.49	19.14	14.18	0	3.22	0	500.1	0	0	0	0	0	30.91	0	0	486.09	13.7
2019	513.64	514.14	-0.5	15.03	11.7	0	1.84	0	500.1	0	0	0	0	0	30.91	0	0	483.23	16.56
2020	513.63	514.19	-0.56	14.07	10.59	0	1.57	0	501.47	0	0	0	0	0	30.91	0	0	483.28	16.51
2021	520.21	518.53	1.68	22.3	17.02	0	3.09	0	500.1	0	0	0	0	0	31.03	0	0	487.5	12.29

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runo	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
516.1	509.07	7.03	16.47	12.16	0	2.47	0	501.47	0	0	0	0	0	30.67	0	0	478.4	21.39

Knight Piésold
CONSULTING

Monthly Runoff Water Balance

Dewey Area

1984-1998 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Jan	1984	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1984	35.00	0.00	0	0.00	0.28	1.23	0.00	-0.95	0.00E+00
Mar	1984	35.00	0.26	0.01	0.09	0.8	1.98	0.00	-1.09	0.00E+00
Apr	1984	35.00	28.04	1.07	9.61	3.59	3.3	52.41	-42.51	5.14E-05
May	1984	35.00	24.90	0.95	8.54	2.93	4.4	54.16	-47.09	5.14E-05
Jun	1984	35.00	5.24	0.2	1.80	1.91	5.76	52.41	-54.46	5.14E-05
Jul	1984	35.00	9.70	0.37	3.32	2.36	7.08	54.16	-55.53	5.14E-05
Aug	1984	35.00	9.44	0.36	3.23	1.68	6.95	54.16	-56.19	5.14E-05
Sep	1984	35.00	0.00	0	0.00	0.4	5.5	52.41	-57.51	5.14E-05
Oct	1984	35.00	0.52	0.02	0.18	0.63	3.74	54.16	-57.09	5.14E-05
Nov	1984	35.00	4.46	0.17	1.53	0.57	2.03	52.41	-52.34	5.14E-05
Dec	1984	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	52.41	-36.30	5.14E-05
May	1985	35.00	2.62	0.1	0.90	1.05	4.4	54.16	-56.61	5.14E-05
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	52.41	-56.60	5.14E-05
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	54.16	-59.23	5.14E-05
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	54.16	-60.61	5.14E-05
Sep	1985	35.00	12.32	0.47	4.22	1.99	5.5	52.41	-51.70	5.14E-05
Oct	1985	35.00	1.05	0.04	0.36	0.68	3.74	54.16	-56.86	5.14E-05
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	52.41	-54.22	5.14E-05
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.28	0.00	0.49	0.00E+00
Mar	1986	35.00	0.00	0	0.49	0.52	1.98	0.00	-0.97	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	52.41	-41.39	5.14E-05
May	1986	35.00	8.39	0.32	2.88	1.07	4.4	54.16	-54.61	5.14E-05
Jun	1986	35.00	76.00	2.9	26.06	4.67	5.76	52.41	-27.24	5.14E-05
Jul	1986	35.00	6.81	0.26	2.34	1.63	7.08	54.16	-57.27	5.14E-05
Aug	1986	35.00	6.81	0.26	2.34	1.19	6.95	54.16	-57.58	5.14E-05
Sep	1986	35.00	36.17	1.38	12.40	3.52	5.5	52.41	-41.99	5.14E-05
Oct	1986	35.00	55.30	2.11	18.96	3.88	3.74	54.16	-35.06	5.14E-05
Nov	1986	35.00	2.10	0.08	0.72	0.86	2.03	52.41	-52.86	5.14E-05
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.23	0.00	-0.36	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	52.41	-52.00	5.14E-05
May	1987	35.00	26.73	1.02	9.17	2.97	4.4	52.41	-44.68	5.14E-05
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	52.41	-57.31	5.14E-05
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	52.41	-52.39	5.14E-05
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	52.41	-57.51	5.14E-05
Sep	1987	35.00	2.62	0.1	0.90	0.76	5.5	52.41	-56.25	5.14E-05
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	52.41	-55.64	5.14E-05
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	52.41	-51.84	5.14E-05
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.61	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	52.41	-54.54	5.14E-05
May	1988	35.00	20.18	0.77	6.92	2.84	4.4	52.41	-47.25	5.14E-05
Jun	1988	35.00	41.93	1.6	14.38	2.78	5.76	52.41	-41.01	5.14E-05
Jul	1988	35.00	28.57	1.09	9.79	2.18	7.08	52.41	-47.52	5.14E-05
Aug	1988	35.00	27.78	1.06	9.52	1.87	6.95	52.41	-47.97	5.14E-05
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	52.41	-56.71	5.14E-05
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	52.41	-56.06	5.14E-05
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	52.41	-53.83	5.14E-05
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	52.41	-50.36	5.14E-05
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	52.41	-54.32	5.14E-05
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	52.41	-56.25	5.14E-05
Jul	1989	35.00	26.47	1.01	9.08	2.21	7.08	52.41	-48.21	5.14E-05
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	52.41	-52.96	5.14E-05
Sep	1989	35.00	64.47	2.48	22.10	3.94	5.5	52.41	-31.87	5.14E-05
Oct	1989	35.00	2.86	0.11	0.99	1.07	3.74	52.41	-54.09	5.14E-05
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	52.41	-54.21	5.14E-05
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.28	0.00	-0.88	0.00E+00

1984-1998 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	52.41	-49.63	5.14E-05
May	1990	35.00	56.09	2.14	19.23	4.45	4.4	52.41	-33.13	5.14E-05
Jun	1990	35.00	8.65	0.33	2.97	1.22	5.76	52.41	-53.99	5.14E-05
Jul	1990	35.00	54.51	2.08	18.69	3.84	7.08	52.41	-36.98	5.14E-05
Aug	1990	35.00	5.24	0.2	1.80	0.86	6.95	52.41	-56.70	5.14E-05
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	52.41	-43.39	5.14E-05
Oct	1990	35.00	1.83	0.07	0.63	0.69	3.74	52.41	-54.83	5.14E-05
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	52.41	-50.99	5.14E-05
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	52.41	-52.60	5.14E-05
May	1991	35.00	56.35	2.15	19.32	4.91	4.4	52.41	-32.58	5.14E-05
Jun	1991	35.00	39.05	1.49	13.39	3.16	5.76	52.41	-41.62	5.14E-05
Jul	1991	35.00	0.26	0.01	0.09	0.36	7.08	52.41	-59.04	5.14E-05
Aug	1991	35.00	13.89	0.53	4.76	1.52	6.95	52.41	-53.08	5.14E-05
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	52.41	-57.62	5.14E-05
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	52.41	-53.58	5.14E-05
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	52.41	-53.84	5.14E-05
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.86	3.3	52.41	-53.72	5.14E-05
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	52.41	-43.54	5.14E-05
Jun	1992	35.00	13.37	0.51	4.58	1.88	5.76	52.41	-51.71	5.14E-05
Jul	1992	35.00	45.08	1.72	15.46	3.92	7.08	52.41	-40.12	5.14E-05
Aug	1992	35.00	14.68	0.56	5.03	1.74	6.95	52.41	-52.59	5.14E-05
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	52.41	-57.83	5.14E-05
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	52.41	-55.00	5.14E-05
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	52.41	-54.24	5.14E-05
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	5.77	0.22	1.98	3.58	1.98	0.00	3.58	0.00E+00
Apr	1993	35.00	13.89	0.53	8.34	1.71	3.3	52.41	-45.66	5.14E-05
May	1993	35.00	16.77	0.64	5.75	1.98	4.4	52.41	-49.08	5.14E-05
Jun	1993	35.00	101.69	3.88	34.86	6.14	5.76	52.41	-17.17	5.14E-05
Jul	1993	35.00	28.57	1.09	9.79	2.67	7.08	52.41	-47.03	5.14E-05
Aug	1993	35.00	20.18	0.77	6.92	1.82	6.95	52.41	-50.62	5.14E-05
Sep	1993	35.00	2.10	0.08	0.72	1	5.5	52.41	-56.19	5.14E-05
Oct	1993	35.00	12.58	0.48	4.31	1.48	3.74	52.41	-50.36	5.14E-05
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	52.41	-53.72	5.14E-05
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.28	0.00	-0.92	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.62	3.3	52.41	-50.68	5.14E-05
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	52.41	-51.39	5.14E-05
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	52.41	-54.79	5.14E-05
Jul	1994	35.00	16.25	0.62	5.57	2.04	7.08	52.41	-51.88	5.14E-05
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	52.41	-58.55	5.14E-05
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	52.41	-57.59	5.14E-05
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	52.41	-49.56	5.14E-05
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	52.41	-54.14	5.14E-05
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	52.41	-53.90	5.14E-05
May	1995	35.00	38.53	1.47	13.21	4.42	4.4	52.41	-39.18	5.14E-05
Jun	1995	35.00	39.57	1.51	13.57	3.09	5.76	52.41	-41.51	5.14E-05
Jul	1995	35.00	1.31	0.05	0.45	1.07	7.08	52.41	-57.97	5.14E-05
Aug	1995	35.00	1.57	0.06	0.54	0.55	6.95	52.41	-58.27	5.14E-05
Sep	1995	35.00	53.73	2.05	18.42	3.61	5.5	52.41	-35.88	5.14E-05
Oct	1995	35.00	5.50	0.21	1.89	1.43	3.74	52.41	-52.83	5.14E-05
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	52.41	-52.82	5.14E-05
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	52.41	-42.83	5.14E-05

1984-1998 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
May	1996	35.00	35.36	1.35	12.13	3.69	4.4	52.41	-40.99	5.14E-05
Jun	1996	35.00	17.56	0.67	6.02	1.85	5.76	52.41	-50.30	5.14E-05
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	52.41	-58.76	5.14E-05
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	52.41	-45.41	5.14E-05
Sep	1996	35.00	6.55	0.25	2.25	1.37	5.5	52.41	-54.30	5.14E-05
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	52.41	-51.85	5.14E-05
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	52.41	-53.94	5.14E-05
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.68	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	52.41	-47.80	5.14E-05
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	52.41	-44.63	5.14E-05
Jun	1997	35.00	34.07	1.3	11.68	3.17	5.76	52.41	-43.32	5.14E-05
Jul	1997	35.00	67.62	2.58	23.18	4.61	7.08	52.41	-31.70	5.14E-05
Aug	1997	35.00	5.50	0.21	1.89	1.05	6.95	52.41	-56.42	5.14E-05
Sep	1997	35.00	2.36	0.09	0.81	0.73	5.5	52.41	-56.37	5.14E-05
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	52.41	-55.09	5.14E-05
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	52.41	-53.29	5.14E-05
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.28	0.00	0.49	0.00E+00
Mar	1998	35.00	19.39	0.74	7.14	2.02	1.98	0.00	7.18	0.00E+00
Apr	1998	35.00	0.00	0	7.18	0.27	3.3	52.41	-48.26	5.14E-05
May	1998	35.00	31.19	1.19	10.69	3.58	4.4	52.41	-42.54	5.14E-05
Jun	1998	35.00	51.63	1.97	17.70	3.36	5.76	52.41	-37.11	5.14E-05
Jul	1998	35.00	45.34	1.73	15.65	3.38	7.08	52.41	-40.57	5.14E-05
Aug	1998	35.00	29.35	1.12	10.06	2.36	6.95	52.41	-46.94	5.14E-05
Sep	1998	35.00	33.55	1.28	11.50	2.08	5.5	52.41	-44.33	5.14E-05
Oct	1998	35.00	44.55	1.7	15.28	4.16	3.74	52.41	-36.72	5.14E-05
Nov	1998	35.00	8.65	0.33	2.97	1.42	2.03	52.41	-50.06	5.14E-05
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
				5.22		16.88	44.00		7.18	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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1985-1999 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	52.41	-36.30	5.14E-05
May	1985	35.00	2.62	0.1	0.90	1.05	4.4	54.16	-56.61	5.14E-05
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	52.41	-56.60	5.14E-05
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	54.16	-59.23	5.14E-05
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	54.16	-60.61	5.14E-05
Sep	1985	35.00	12.32	0.47	4.22	1.99	5.5	52.41	-51.70	5.14E-05
Oct	1985	35.00	1.05	0.04	0.36	0.68	3.74	54.16	-56.86	5.14E-05
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	52.41	-54.22	5.14E-05
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.23	0.00	0.54	0.00E+00
Mar	1986	35.00	0.00	0	0.54	0.52	1.98	0.00	-0.92	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	52.41	-41.39	5.14E-05
May	1986	35.00	8.39	0.32	2.88	1.07	4.4	54.16	-54.61	5.14E-05
Jun	1986	35.00	75.74	2.89	25.97	4.87	5.76	52.41	-27.33	5.14E-05
Jul	1986	35.00	6.29	0.24	2.16	1.63	7.08	54.16	-57.45	5.14E-05
Aug	1986	35.00	6.81	0.26	2.34	1.19	6.95	54.16	-57.58	5.14E-05
Sep	1986	35.00	36.17	1.38	12.40	3.52	5.5	52.41	-41.99	5.14E-05
Oct	1986	35.00	55.30	2.11	18.96	3.88	3.74	54.16	-35.06	5.14E-05
Nov	1986	35.00	2.10	0.08	0.72	0.86	2.03	52.41	-52.86	5.14E-05
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.28	0.00	-0.41	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	52.41	-52.00	5.14E-05
May	1987	35.00	22.02	0.84	7.55	2.97	4.4	54.16	-48.04	5.14E-05
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	52.41	-57.31	5.14E-05
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	54.16	-54.14	5.14E-05
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	54.16	-59.26	5.14E-05
Sep	1987	35.00	2.62	0.1	0.90	0.76	5.5	52.41	-56.25	5.14E-05
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	54.16	-57.39	5.14E-05
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	52.41	-51.84	5.14E-05
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	52.41	-54.54	5.14E-05
May	1988	35.00	20.16	0.77	6.92	2.64	4.4	52.41	-47.25	5.14E-05
Jun	1988	35.00	41.93	1.6	14.38	2.78	5.76	52.41	-41.01	5.14E-05
Jul	1988	35.00	28.57	1.09	9.79	2.18	7.08	52.41	-47.52	5.14E-05
Aug	1988	35.00	27.78	1.06	9.52	1.87	6.95	52.41	-47.97	5.14E-05
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	52.41	-56.71	5.14E-05
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	52.41	-56.06	5.14E-05
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	52.41	-53.83	5.14E-05
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	52.41	-50.36	5.14E-05
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	52.41	-54.32	5.14E-05
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	52.41	-56.25	5.14E-05
Jul	1989	35.00	26.47	1.01	9.08	2.21	7.08	52.41	-48.21	5.14E-05
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	52.41	-52.96	5.14E-05
Sep	1989	35.00	64.47	2.46	22.10	3.94	5.5	52.41	-31.87	5.14E-05
Oct	1989	35.00	2.88	0.11	0.99	1.07	3.74	52.41	-54.09	5.14E-05
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	52.41	-54.21	5.14E-05
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.23	0.00	-0.83	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	52.41	-49.63	5.14E-05
May	1990	35.00	56.09	2.14	19.23	4.45	4.4	52.41	-33.13	5.14E-05
Jun	1990	35.00	6.55	0.25	2.25	1.22	5.76	52.41	-54.71	5.14E-05
Jul	1990	35.00	54.51	2.08	18.69	3.84	7.08	52.41	-36.96	5.14E-05
Aug	1990	35.00	5.24	0.2	1.80	0.86	6.95	52.41	-56.70	5.14E-05
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	52.41	-43.39	5.14E-05
Oct	1990	35.00	1.83	0.07	0.63	0.89	3.74	52.41	-54.63	5.14E-05
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	52.41	-50.99	5.14E-05
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.28	0.00	-0.38	0.00E+00

1985-1999 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	52.41	-52.60	5.14E-05
May	1991	35.00	56.35	2.15	19.32	4.91	4.4	52.41	-32.58	5.14E-05
Jun	1991	35.00	39.05	1.49	13.39	3.16	5.76	52.41	-41.62	5.14E-05
Jul	1991	35.00	0.26	0.01	0.09	0.36	7.08	52.41	-59.04	5.14E-05
Aug	1991	35.00	13.89	0.53	4.76	1.52	6.95	52.41	-53.08	5.14E-05
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	52.41	-57.62	5.14E-05
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	52.41	-53.58	5.14E-05
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	52.41	-53.84	5.14E-05
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	52.41	-53.72	5.14E-05
May	1992	35.00	30.66	1.17	10.51	2.78	4.4	52.41	-43.54	5.14E-05
Jun	1992	35.00	13.37	0.51	4.58	1.88	5.76	52.41	-51.71	5.14E-05
Jul	1992	35.00	45.08	1.72	15.46	3.92	7.08	52.41	-40.12	5.14E-05
Aug	1992	35.00	14.68	0.56	5.03	1.74	6.95	52.41	-52.59	5.14E-05
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	52.41	-57.83	5.14E-05
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	52.41	-55.00	5.14E-05
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	52.41	-54.24	5.14E-05
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	5.77	0.22	1.98	3.58	1.98	0.00	3.58	0.00E+00
Apr	1993	35.00	13.89	0.53	8.34	1.71	3.3	52.41	-45.66	5.14E-05
May	1993	35.00	16.77	0.64	5.75	1.98	4.4	52.41	-49.08	5.14E-05
Jun	1993	35.00	101.69	3.88	34.86	6.14	5.76	52.41	-17.17	5.14E-05
Jul	1993	35.00	28.57	1.09	9.79	2.67	7.08	52.41	-47.03	5.14E-05
Aug	1993	35.00	20.18	0.77	6.92	1.82	6.95	52.41	-50.62	5.14E-05
Sep	1993	35.00	2.10	0.08	0.72	1	5.5	52.41	-56.19	5.14E-05
Oct	1993	35.00	12.58	0.48	4.31	1.48	3.74	52.41	-50.36	5.14E-05
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	52.41	-53.72	5.14E-05
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.23	0.00	-0.87	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.62	3.3	52.41	-50.68	5.14E-05
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	52.41	-51.39	5.14E-05
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	52.41	-54.79	5.14E-05
Jul	1994	35.00	16.25	0.62	5.57	2.04	7.08	52.41	-51.88	5.14E-05
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	52.41	-58.55	5.14E-05
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	52.41	-57.59	5.14E-05
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	52.41	-49.56	5.14E-05
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	52.41	-54.14	5.14E-05
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.28	0.00	-0.58	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	52.41	-53.90	5.14E-05
May	1995	35.00	38.53	1.47	13.21	4.42	4.4	52.41	-39.18	5.14E-05
Jun	1995	35.00	39.57	1.51	13.57	3.09	5.76	52.41	-41.51	5.14E-05
Jul	1995	35.00	1.31	0.05	0.45	1.07	7.08	52.41	-57.97	5.14E-05
Aug	1995	35.00	1.57	0.06	0.54	0.55	6.95	52.41	-58.27	5.14E-05
Sep	1995	35.00	53.73	2.05	18.42	3.61	5.5	52.41	-35.88	5.14E-05
Oct	1995	35.00	5.50	0.21	1.89	1.43	3.74	52.41	-52.83	5.14E-05
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	52.41	-52.82	5.14E-05
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	52.41	-42.83	5.14E-05
May	1996	35.00	35.38	1.35	12.13	3.69	4.4	52.41	-40.99	5.14E-05
Jun	1996	35.00	17.56	0.67	6.02	1.85	5.76	52.41	-50.30	5.14E-05
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	52.41	-58.76	5.14E-05
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	52.41	-45.41	5.14E-05
Sep	1996	35.00	6.55	0.25	2.25	1.37	5.5	52.41	-54.30	5.14E-05
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	52.41	-51.85	5.14E-05
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	52.41	-53.94	5.14E-05
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	52.41	-47.80	5.14E-05

1985-1999 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	52.41	-44.63	5.14E-05
Jun	1997	35.00	34.07	1.3	11.66	3.17	5.76	52.41	-43.32	5.14E-05
Jul	1997	35.00	67.62	2.58	23.18	4.61	7.08	52.41	-31.70	5.14E-05
Aug	1997	35.00	5.50	0.21	1.89	1.05	6.95	52.41	-56.42	5.14E-05
Sep	1997	35.00	2.36	0.09	0.81	0.73	5.5	52.41	-56.37	5.14E-05
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	52.41	-55.09	5.14E-05
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	52.41	-53.29	5.14E-05
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.23	0.00	0.54	0.00E+00
Mar	1998	35.00	19.39	0.74	7.19	2.02	1.98	0.00	7.23	0.00E+00
Apr	1998	35.00	0.00	0	7.23	0.27	3.3	52.41	-48.21	5.14E-05
May	1998	35.00	31.19	1.19	10.69	3.56	4.4	52.41	-42.54	5.14E-05
Jun	1998	35.00	51.63	1.97	17.70	3.36	5.76	52.41	-37.11	5.14E-05
Jul	1998	35.00	45.34	1.73	15.55	3.38	7.08	52.41	-40.57	5.14E-05
Aug	1998	35.00	29.35	1.12	10.08	2.36	6.95	52.41	-46.94	5.14E-05
Sep	1998	35.00	33.55	1.28	11.50	2.08	5.5	52.41	-44.33	5.14E-05
Oct	1998	35.00	44.55	1.7	15.28	4.16	3.74	52.41	-36.72	5.14E-05
Nov	1998	35.00	8.65	0.33	2.97	1.42	2.03	52.41	-50.06	5.14E-05
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.28	0.00	-1.16	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	26.21	1	8.99	3.76	3.3	52.41	-42.97	5.14E-05
May	1999	35.00	2.36	0.09	0.81	1.17	4.4	52.41	-54.83	5.14E-05
Jun	1999	35.00	85.18	3.25	29.20	5.57	5.76	52.41	-23.40	5.14E-05
Jul	1999	35.00	4.98	0.19	1.71	0.98	7.08	52.41	-56.80	5.14E-05
Aug	1999	35.00	31.45	1.2	10.78	1.96	6.95	52.41	-46.62	5.14E-05
Sep	1999	35.00	20.44	0.78	7.01	1.79	5.5	52.41	-49.11	5.14E-05
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	52.41	-56.11	5.14E-05
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	52.41	-53.61	5.14E-05
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
				5.42		16.98	44.00		7.23	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Dewey test pits, see
G:\102\00279.02\Data Info\DB Land Application-Irrigation\Dewey-Burdock\Soil Hydr Props\Dewey_Burdock_Soil.xls

1986-2000 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Jan	1986	35.00	0.00	0	0.00	0.07	0.92	0.00	-0.85	0.00E+00
Feb	1986	35.00	0.00	0	0.00	1.06	1.23	0.00	-0.17	0.00E+00
Mar	1986	35.00	0.00	0	0.00	0.52	1.98	0.00	-1.46	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	52.41	-41.39	5.14E-05
May	1986	35.00	8.39	0.32	2.88	1.07	4.4	54.16	-54.61	5.14E-05
Jun	1986	35.00	66.05	2.52	22.64	4.87	5.76	52.41	-30.66	5.14E-05
Jul	1986	35.00	5.24	0.2	1.80	1.63	7.08	54.16	-57.81	5.14E-05
Aug	1986	35.00	6.81	0.26	2.34	1.19	6.95	54.16	-57.58	5.14E-05
Sep	1986	35.00	31.97	1.22	10.96	3.52	5.5	52.41	-43.43	5.14E-05
Oct	1986	35.00	55.30	2.11	18.96	3.88	3.74	54.16	-35.06	5.14E-05
Nov	1986	35.00	2.10	0.08	0.72	0.86	2.03	52.41	-52.86	5.14E-05
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.67	1.23	0.00	-0.36	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	52.41	-52.00	5.14E-05
May	1987	35.00	22.02	0.84	7.55	2.97	4.4	54.16	-48.04	5.14E-05
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	52.41	-57.31	5.14E-05
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	54.16	-54.14	5.14E-05
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	54.16	-59.26	5.14E-05
Sep	1987	35.00	2.62	0.1	0.90	0.76	5.5	52.41	-56.25	5.14E-05
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	54.16	-57.39	5.14E-05
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	52.41	-51.84	5.14E-05
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	1986	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	52.41	-54.54	5.14E-05
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	54.16	-49.00	5.14E-05
Jun	1988	35.00	41.93	1.6	14.38	2.78	5.76	52.41	-41.01	5.14E-05
Jul	1988	35.00	28.57	1.09	9.79	2.18	7.08	54.16	-49.26	5.14E-05
Aug	1988	35.00	27.76	1.06	9.52	1.87	6.95	54.16	-49.71	5.14E-05
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	52.41	-56.71	5.14E-05
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	54.16	-57.81	5.14E-05
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	52.41	-53.83	5.14E-05
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	52.41	-50.36	5.14E-05
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	52.41	-54.32	5.14E-05
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	52.41	-58.25	5.14E-05
Jul	1989	35.00	28.47	1.01	9.08	2.21	7.08	52.41	-48.21	5.14E-05
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	52.41	-52.96	5.14E-05
Sep	1989	35.00	64.47	2.46	22.10	3.94	5.5	52.41	-31.87	5.14E-05
Oct	1989	35.00	2.88	0.11	0.99	1.07	3.74	52.41	-54.09	5.14E-05
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	52.41	-54.21	5.14E-05
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.23	0.00	-0.83	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	52.41	-49.63	5.14E-05
May	1990	35.00	56.09	2.14	19.23	4.45	4.4	52.41	-33.13	5.14E-05
Jun	1990	35.00	6.55	0.25	2.25	1.22	5.76	52.41	-54.71	5.14E-05
Jul	1990	35.00	54.25	2.07	18.60	3.84	7.08	52.41	-37.05	5.14E-05
Aug	1990	35.00	5.24	0.2	1.80	0.86	6.95	52.41	-56.70	5.14E-05
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	52.41	-43.39	5.14E-05
Oct	1990	35.00	1.83	0.07	0.63	0.89	3.74	52.41	-54.63	5.14E-05
Nov	1990	35.00	8.81	0.26	2.34	1.12	2.03	52.41	-50.99	5.14E-05
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	52.41	-52.60	5.14E-05
May	1991	35.00	56.35	2.15	19.32	4.91	4.4	52.41	-32.58	5.14E-05
Jun	1991	35.00	39.05	1.49	13.39	3.16	5.76	52.41	-41.62	5.14E-05
Jul	1991	35.00	0.26	0.01	0.09	0.36	7.08	52.41	-59.04	5.14E-05
Aug	1991	35.00	13.89	0.53	4.76	1.52	6.95	52.41	-53.08	5.14E-05
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	52.41	-57.62	5.14E-05
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	52.41	-53.58	5.14E-05
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	52.41	-53.84	5.14E-05
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.28	0.00	-0.14	0.00E+00

1986-2000 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	52.41	-53.72	5.14E-05
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	52.41	-43.54	5.14E-05
Jun	1992	35.00	13.37	0.51	4.58	1.88	5.76	52.41	-51.71	5.14E-05
Jul	1992	35.00	45.08	1.72	15.46	3.92	7.08	52.41	-40.12	5.14E-05
Aug	1992	35.00	14.68	0.56	5.03	1.74	6.95	52.41	-52.59	5.14E-05
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	52.41	-57.83	5.14E-05
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	52.41	-55.00	5.14E-05
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	52.41	-54.24	5.14E-05
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	5.77	0.22	1.98	3.58	1.98	0.00	3.58	0.00E+00
Apr	1993	35.00	13.89	0.53	8.34	1.71	3.3	52.41	-45.66	5.14E-05
May	1993	35.00	16.77	0.64	5.75	1.98	4.4	52.41	-49.08	5.14E-05
Jun	1993	35.00	101.69	3.88	34.86	6.14	5.76	52.41	-17.17	5.14E-05
Jul	1993	35.00	28.57	1.09	9.79	2.67	7.08	52.41	-47.03	5.14E-05
Aug	1993	35.00	20.18	0.77	6.92	1.82	6.95	52.41	-50.62	5.14E-05
Sep	1993	35.00	2.10	0.08	0.72	1	5.5	52.41	-56.19	5.14E-05
Oct	1993	35.00	12.58	0.48	4.31	1.48	3.74	52.41	-50.36	5.14E-05
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	52.41	-53.72	5.14E-05
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.23	0.00	-0.87	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.62	3.3	52.41	-50.68	5.14E-05
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	52.41	-51.39	5.14E-05
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	52.41	-54.79	5.14E-05
Jul	1994	35.00	16.25	0.62	5.57	2.04	7.08	52.41	-51.88	5.14E-05
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	52.41	-58.55	5.14E-05
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	52.41	-57.59	5.14E-05
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	52.41	-49.56	5.14E-05
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	52.41	-54.14	5.14E-05
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	52.41	-53.90	5.14E-05
May	1995	35.00	38.53	1.47	13.21	4.42	4.4	52.41	-39.18	5.14E-05
Jun	1995	35.00	39.57	1.51	13.57	3.09	5.76	52.41	-41.51	5.14E-05
Jul	1995	35.00	1.31	0.05	0.45	1.07	7.08	52.41	-57.97	5.14E-05
Aug	1995	35.00	1.57	0.06	0.54	0.55	6.95	52.41	-58.27	5.14E-05
Sep	1995	35.00	53.73	2.05	18.42	3.61	5.5	52.41	-35.88	5.14E-05
Oct	1995	35.00	5.50	0.21	1.89	1.43	3.74	52.41	-52.83	5.14E-05
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	52.41	-52.82	5.14E-05
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.28	0.00	-1.04	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	52.41	-42.83	5.14E-05
May	1996	35.00	35.38	1.35	12.13	3.69	4.4	52.41	-40.99	5.14E-05
Jun	1996	35.00	17.56	0.67	6.02	1.85	5.76	52.41	-50.30	5.14E-05
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	52.41	-58.76	5.14E-05
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	52.41	-45.41	5.14E-05
Sep	1996	35.00	6.55	0.25	2.25	1.37	5.5	52.41	-54.30	5.14E-05
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	52.41	-51.85	5.14E-05
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	52.41	-53.94	5.14E-05
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	52.41	-47.80	5.14E-05
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	52.41	-44.63	5.14E-05
Jun	1997	35.00	34.07	1.3	11.68	3.17	5.76	52.41	-43.32	5.14E-05
Jul	1997	35.00	67.62	2.58	23.18	4.61	7.08	52.41	-31.70	5.14E-05
Aug	1997	35.00	5.50	0.21	1.89	1.05	6.95	52.41	-56.42	5.14E-05
Sep	1997	35.00	2.36	0.09	0.81	0.73	5.5	52.41	-56.37	5.14E-05
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	52.41	-55.09	5.14E-05
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	52.41	-53.29	5.14E-05
Dec	1997	35.00	0.00	0	0.00	0.28	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.23	0.00	0.54	0.00E+00
Mar	1998	35.00	19.39	0.74	7.19	2.02	1.98	0.00	7.23	0.00E+00
Apr	1998	35.00	0.00	0	7.23	0.27	3.3	52.41	-48.21	5.14E-05

1986-2000 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
May	1998	35.00	31.19	1.19	10.69	3.58	4.4	52.41	-42.54	5.14E-05
Jun	1998	35.00	51.63	1.97	17.70	3.36	5.76	52.41	-37.11	5.14E-05
Jul	1998	35.00	45.34	1.73	15.55	3.38	7.08	52.41	-40.57	5.14E-05
Aug	1998	35.00	29.35	1.12	10.06	2.36	6.95	52.41	-46.94	5.14E-05
Sep	1998	35.00	33.55	1.28	11.50	2.08	5.5	52.41	-44.33	5.14E-05
Oct	1998	35.00	44.55	1.7	15.28	4.16	3.74	52.41	-36.72	5.14E-05
Nov	1998	35.00	8.65	0.33	2.97	1.42	2.03	52.41	-50.06	5.14E-05
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.23	0.00	-1.11	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	26.21	1	8.99	3.76	3.3	52.41	-42.97	5.14E-05
May	1999	35.00	2.36	0.09	0.81	1.17	4.4	52.41	-54.83	5.14E-05
Jun	1999	35.00	85.18	3.25	29.20	5.57	5.76	52.41	-23.40	5.14E-05
Jul	1999	35.00	4.98	0.19	1.71	0.98	7.08	52.41	-56.80	5.14E-05
Aug	1999	35.00	31.45	1.2	10.78	1.96	6.95	52.41	-46.62	5.14E-05
Sep	1999	35.00	20.44	0.78	7.01	1.79	5.5	52.41	-49.11	5.14E-05
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	52.41	-56.11	5.14E-05
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	52.41	-53.61	5.14E-05
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
Jan	2000	35.00	0.00	0	0.00	0.16	0.92	0.00	-0.76	0.00E+00
Feb	2000	35.00	0.26	0.01	0.09	1.09	1.28	0.00	-0.10	0.00E+00
Mar	2000	35.00	8.12	0.31	2.79	1.48	1.98	0.00	2.29	0.00E+00
Apr	2000	35.00	69.45	2.65	26.10	4.74	3.3	52.41	-24.87	5.14E-05
May	2000	35.00	0.52	0.02	0.18	0.78	4.4	52.41	-55.85	5.14E-05
Jun	2000	35.00	0.00	0	0.00	0.43	5.76	52.41	-57.74	5.14E-05
Jul	2000	35.00	16.51	0.63	5.66	2.24	7.08	52.41	-51.59	5.14E-05
Aug	2000	35.00	1.57	0.06	0.54	0.69	6.95	52.41	-58.13	5.14E-05
Sep	2000	35.00	4.46	0.17	1.53	1.03	5.5	52.41	-55.35	5.14E-05
Oct	2000	35.00	2.88	0.11	0.99	1.08	3.74	52.41	-54.08	5.14E-05
Nov	2000	35.00	0.00	0	0.00	0.43	2.03	52.41	-54.01	5.14E-05
Dec	2000	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
				5.48		17.06	44.00		7.23	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Dewey test pits, see
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1988-2002 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (In)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Jan	1988	35.00	0.00	0	0.00	0.24	0.92	0.00	-0.68	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	52.41	-54.54	5.14E-05
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	54.16	-49.00	5.14E-05
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.76	52.41	-41.55	5.14E-05
Jul	1988	35.00	22.02	0.84	7.55	2.18	7.08	54.16	-51.51	5.14E-05
Aug	1988	35.00	27.78	1.06	9.52	1.87	8.95	54.16	-49.71	5.14E-05
Sep	1988	35.00	1.05	0.04	0.38	0.84	5.5	52.41	-56.71	5.14E-05
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	54.16	-57.81	5.14E-05
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	52.41	-53.83	5.14E-05
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	52.41	-50.36	5.14E-05
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	54.16	-56.07	5.14E-05
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	52.41	-56.25	5.14E-05
Jul	1989	35.00	20.18	0.77	6.92	2.21	7.08	54.16	-52.11	5.14E-05
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	54.16	-54.71	5.14E-05
Sep	1989	35.00	64.47	2.46	22.10	3.94	5.5	52.41	-31.87	5.14E-05
Oct	1989	35.00	2.88	0.11	0.99	1.07	3.74	54.16	-55.84	5.14E-05
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	52.41	-54.21	5.14E-05
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.28	0.00	-0.88	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	52.41	-49.63	5.14E-05
May	1990	35.00	52.94	2.02	18.15	4.45	4.4	54.16	-35.96	5.14E-05
Jun	1990	35.00	6.55	0.25	2.25	1.22	5.76	52.41	-54.71	5.14E-05
Jul	1990	35.00	54.25	2.07	18.60	3.84	7.08	54.16	-38.80	5.14E-05
Aug	1990	35.00	4.98	0.19	1.71	0.86	6.95	54.16	-58.54	5.14E-05
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	52.41	-43.39	5.14E-05
Oct	1990	35.00	1.83	0.07	0.63	0.89	3.74	54.16	-56.38	5.14E-05
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	52.41	-50.99	5.14E-05
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	52.41	-52.60	5.14E-05
May	1991	35.00	56.35	2.15	19.32	4.91	4.4	52.41	-32.58	5.14E-05
Jun	1991	35.00	39.05	1.49	13.39	3.16	5.76	52.41	-41.62	5.14E-05
Jul	1991	35.00	0.26	0.01	0.09	0.36	7.08	52.41	-59.04	5.14E-05
Aug	1991	35.00	13.69	0.53	4.76	1.52	6.95	52.41	-53.08	5.14E-05
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	52.41	-57.62	5.14E-05
Oct	1991	35.00	4.72	0.16	1.62	0.95	3.74	52.41	-53.58	5.14E-05
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	52.41	-53.84	5.14E-05
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.63	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	52.41	-53.72	5.14E-05
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	52.41	-43.54	5.14E-05
Jun	1992	35.00	13.37	0.51	4.58	1.88	5.76	52.41	-51.71	5.14E-05
Jul	1992	35.00	45.08	1.72	15.46	3.92	7.08	52.41	-40.12	5.14E-05
Aug	1992	35.00	9.17	0.35	3.15	1.74	6.95	52.41	-54.48	5.14E-05
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	52.41	-57.83	5.14E-05
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	52.41	-55.00	5.14E-05
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	52.41	-54.24	5.14E-05
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	5.77	0.22	1.98	3.58	1.98	0.00	3.58	0.00E+00
Apr	1993	35.00	13.89	0.53	8.34	1.71	3.3	52.41	-45.66	5.14E-05
May	1993	35.00	16.77	0.64	5.75	1.98	4.4	52.41	-49.08	5.14E-05
Jun	1993	35.00	101.69	3.88	34.86	6.14	5.76	52.41	-17.17	5.14E-05
Jul	1993	35.00	28.57	1.09	9.79	2.67	7.08	52.41	-47.03	5.14E-05
Aug	1993	35.00	20.18	0.77	6.92	1.82	6.95	52.41	-50.62	5.14E-05
Sep	1993	35.00	2.10	0.08	0.72	1	5.5	52.41	-56.19	5.14E-05
Oct	1993	35.00	12.58	0.48	4.31	1.48	3.74	52.41	-50.36	5.14E-05
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	52.41	-53.72	5.14E-05
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.28	0.00	-0.92	0.00E+00

1986-2002 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.82	3.3	52.41	-50.68	5.14E-05
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	52.41	-51.39	5.14E-05
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	52.41	-54.79	5.14E-05
Jul	1994	35.00	16.25	0.62	5.57	2.04	7.08	52.41	-51.88	5.14E-05
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	52.41	-58.55	5.14E-05
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	52.41	-57.59	5.14E-05
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	52.41	-49.56	5.14E-05
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	52.41	-54.14	5.14E-05
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	52.41	-53.90	5.14E-05
May	1995	35.00	38.53	1.47	13.21	4.42	4.4	52.41	-39.18	5.14E-05
Jun	1995	35.00	39.57	1.51	13.57	3.09	5.76	52.41	-41.51	5.14E-05
Jul	1995	35.00	1.31	0.05	0.45	1.07	7.08	52.41	-57.97	5.14E-05
Aug	1995	35.00	1.57	0.06	0.54	0.55	6.95	52.41	-58.27	5.14E-05
Sep	1995	35.00	53.73	2.05	18.42	3.61	5.5	52.41	-35.88	5.14E-05
Oct	1995	35.00	5.50	0.21	1.89	1.43	3.74	52.41	-52.83	5.14E-05
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	52.41	-52.82	5.14E-05
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.86	3	3.3	52.41	-42.83	5.14E-05
May	1996	35.00	35.38	1.35	12.13	3.69	4.4	52.41	-40.99	5.14E-05
Jun	1996	35.00	17.56	0.67	6.02	1.85	5.76	52.41	-50.30	5.14E-05
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	52.41	-58.76	5.14E-05
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	52.41	-45.41	5.14E-05
Sep	1996	35.00	6.55	0.25	2.25	1.37	5.5	52.41	-54.30	5.14E-05
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	52.41	-51.85	5.14E-05
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	52.41	-53.94	5.14E-05
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	52.41	-47.80	5.14E-05
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	52.41	-44.63	5.14E-05
Jun	1997	35.00	34.07	1.3	11.66	3.17	5.76	52.41	-43.32	5.14E-05
Jul	1997	35.00	67.62	2.58	23.18	4.61	7.08	52.41	-31.70	5.14E-05
Aug	1997	35.00	5.50	0.21	1.89	1.05	6.95	52.41	-56.42	5.14E-05
Sep	1997	35.00	2.36	0.09	0.81	0.73	5.5	52.41	-56.37	5.14E-05
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	52.41	-55.09	5.14E-05
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	52.41	-53.29	5.14E-05
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.28	0.00	0.49	0.00E+00
Mar	1998	35.00	19.39	0.74	7.14	2.02	1.98	0.00	7.18	0.00E+00
Apr	1998	35.00	0.00	0	7.18	0.27	3.3	52.41	-48.26	5.14E-05
May	1998	35.00	31.19	1.19	10.69	3.58	4.4	52.41	-42.54	5.14E-05
Jun	1998	35.00	51.63	1.97	17.70	3.36	5.76	52.41	-37.11	5.14E-05
Jul	1998	35.00	45.34	1.73	15.55	3.38	7.08	52.41	-40.57	5.14E-05
Aug	1998	35.00	29.35	1.12	10.06	2.36	6.95	52.41	-46.94	5.14E-05
Sep	1998	35.00	33.55	1.28	11.50	2.08	5.5	52.41	-44.33	5.14E-05
Oct	1998	35.00	44.55	1.7	15.28	4.16	3.74	52.41	-36.72	5.14E-05
Nov	1998	35.00	8.65	0.33	2.97	1.42	2.03	52.41	-50.06	5.14E-05
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.23	0.00	-1.11	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	28.21	1	8.99	3.76	3.3	52.41	-42.97	5.14E-05
May	1999	35.00	2.36	0.09	0.81	1.17	4.4	52.41	-54.83	5.14E-05
Jun	1999	35.00	85.18	3.25	29.20	5.57	5.76	52.41	-23.40	5.14E-05
Jul	1999	35.00	4.98	0.19	1.71	0.98	7.08	52.41	-56.80	5.14E-05
Aug	1999	35.00	31.45	1.2	10.78	1.96	6.95	52.41	-46.62	5.14E-05
Sep	1999	35.00	20.44	0.78	7.01	1.79	5.5	52.41	-49.11	5.14E-05
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	52.41	-56.11	5.14E-05
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	52.41	-53.61	5.14E-05
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
Jan	2000	35.00	0.00	0	0.00	0.16	0.92	0.00	-0.76	0.00E+00
Feb	2000	35.00	0.26	0.01	0.09	1.09	1.23	0.00	-0.05	0.00E+00
Mar	2000	35.00	8.12	0.31	2.79	1.48	1.98	0.00	2.29	0.00E+00
Apr	2000	35.00	69.45	2.65	26.10	4.74	3.3	52.41	-24.87	5.14E-05

1988-2002 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
May	2000	35.00	0.52	0.02	0.18	0.78	4.4	52.41	-55.85	5.14E-05
Jun	2000	35.00	0.00	0	0.00	0.43	5.76	52.41	-57.74	5.14E-05
Jul	2000	35.00	16.51	0.63	5.66	2.24	7.08	52.41	-51.59	5.14E-05
Aug	2000	35.00	1.57	0.06	0.54	0.69	6.95	52.41	-58.13	5.14E-05
Sep	2000	35.00	4.46	0.17	1.53	1.03	5.5	52.41	-55.35	5.14E-05
Oct	2000	35.00	2.88	0.11	0.99	1.08	3.74	52.41	-54.08	5.14E-05
Nov	2000	35.00	0.00	0	0.00	0.43	2.03	52.41	-54.01	5.14E-05
Dec	2000	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
Jan	2001	35.00	0.00	0	0.00	0.06	0.92	0.00	-0.86	0.00E+00
Feb	2001	35.00	0.00	0	0.00	0.58	1.23	0.00	-0.65	0.00E+00
Mar	2001	35.00	0.00	0	0.00	0.95	1.98	0.00	-1.03	0.00E+00
Apr	2001	35.00	19.66	0.75	6.74	2.46	3.3	52.41	-46.51	5.14E-05
May	2001	35.00	10.75	0.41	3.68	1.67	4.4	52.41	-51.46	5.14E-05
Jun	2001	35.00	38.00	1.45	13.03	3.22	5.76	52.41	-41.92	5.14E-05
Jul	2001	35.00	90.42	3.45	31.00	4.96	7.08	52.41	-23.53	5.14E-05
Aug	2001	35.00	6.81	0.26	2.34	1.26	6.95	52.41	-55.77	5.14E-05
Sep	2001	35.00	0.00	0	0.00	0.33	5.5	52.41	-57.58	5.14E-05
Oct	2001	35.00	6.29	0.24	2.16	1.18	3.74	52.41	-52.81	5.14E-05
Nov	2001	35.00	5.77	0.22	1.98	1.3	2.03	52.41	-51.16	5.14E-05
Dec	2001	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	2002	35.00	0.00	0	0.00	0.04	0.92	0.00	-0.88	0.00E+00
Feb	2002	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	2002	35.00	0.00	0	0.00	1.44	1.98	0.00	-0.54	0.00E+00
Apr	2002	35.00	4.98	0.19	1.71	1.69	3.3	52.41	-52.31	5.14E-05
May	2002	35.00	6.03	0.23	2.07	1.68	4.4	52.41	-53.06	5.14E-05
Jun	2002	35.00	6.03	0.23	2.07	1.23	5.76	52.41	-54.87	5.14E-05
Jul	2002	35.00	1.57	0.06	0.54	0.74	7.08	52.41	-58.21	5.14E-05
Aug	2002	35.00	31.19	1.19	10.69	2.38	6.95	52.41	-46.29	5.14E-05
Sep	2002	35.00	27.78	1.06	9.52	2.47	5.5	52.41	-45.92	5.14E-05
Oct	2002	35.00	2.62	0.1	0.90	0.82	3.74	52.41	-54.43	5.14E-05
Nov	2002	35.00	0.26	0.01	0.09	0.33	2.03	52.41	-54.02	5.14E-05
Dec	2002	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
				5.40		16.82	44.00		7.18	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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2002-1988 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Jan	2002	35.00	0.00	0	0.00	0.04	0.92	0.00	-0.88	0.00E+00
Feb	2002	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	2002	35.00	0.00	0	0.00	1.44	1.98	0.00	-0.54	0.00E+00
Apr	2002	35.00	4.98	0.19	1.71	1.69	3.3	52.41	-52.31	5.14E-05
May	2002	35.00	6.03	0.23	2.07	1.68	4.4	54.16	-54.81	5.14E-05
Jun	2002	35.00	6.03	0.23	2.07	1.23	5.76	52.41	-54.87	5.14E-05
Jul	2002	35.00	1.57	0.06	0.54	0.74	7.08	54.16	-59.96	5.14E-05
Aug	2002	35.00	30.93	1.18	10.60	2.38	6.95	54.16	-48.13	5.14E-05
Sep	2002	35.00	16.77	0.64	5.75	2.47	5.5	52.41	-49.69	5.14E-05
Oct	2002	35.00	2.62	0.1	0.90	0.82	3.74	54.16	-56.18	5.14E-05
Nov	2002	35.00	0.26	0.01	0.09	0.33	2.03	52.41	-54.02	5.14E-05
Dec	2002	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
Jan	2003	35.00	0.00	0	0.00	0.47	0.92	0.00	-0.45	0.00E+00
Feb	2003	35.00	0.00	0	0.00	0.43	1.23	0.00	-0.80	0.00E+00
Mar	2003	35.00	13.63	0.52	4.67	1.92	1.98	0.00	4.61	0.00E+00
Apr	2003	35.00	15.46	0.59	9.91	1.96	3.3	52.41	-43.84	5.14E-05
May	2003	35.00	12.32	0.47	4.22	1.95	4.4	54.16	-52.39	5.14E-05
Jun	2003	35.00	14.15	0.54	4.85	2.8	5.76	52.41	-50.52	5.14E-05
Jul	2003	35.00	0.00	0	0.00	0.05	7.08	54.16	-61.19	5.14E-05
Aug	2003	35.00	21.23	0.81	7.28	1.89	6.95	54.16	-51.94	5.14E-05
Sep	2003	35.00	10.75	0.41	3.68	1.58	5.5	52.41	-52.65	5.14E-05
Oct	2003	35.00	0.52	0.02	0.18	0.6	3.74	54.16	-57.12	5.14E-05
Nov	2003	35.00	0.26	0.01	0.09	0.44	2.03	52.41	-53.91	5.14E-05
Dec	2003	35.00	2.10	0.08	0.72	0.8	1.1	0.00	0.22	0.00E+00
Jan	2004	35.00	0.00	0	0.22	0.3	0.92	0.00	-0.40	0.00E+00
Feb	2004	35.00	0.00	0	0.00	1.3	1.28	0.00	0.02	0.00E+00
Mar	2004	35.00	0.00	0	0.02	0.06	1.98	0.00	-1.90	0.00E+00
Apr	2004	35.00	0.00	0	0.00	0.32	3.3	52.41	-55.39	5.14E-05
May	2004	35.00	1.31	0.05	0.45	0.97	4.4	54.16	-57.14	5.14E-05
Jun	2004	35.00	1.05	0.04	0.36	1.26	5.78	52.41	-56.55	5.14E-05
Jul	2004	35.00	9.44	0.36	3.23	2.21	7.08	54.16	-55.79	5.14E-05
Aug	2004	35.00	1.57	0.06	0.54	0.98	6.95	54.16	-59.59	5.14E-05
Sep	2004	35.00	23.59	0.9	8.09	2.61	5.5	52.41	-47.21	5.14E-05
Oct	2004	35.00	18.08	0.69	6.20	1.89	3.74	54.16	-49.81	5.14E-05
Nov	2004	35.00	0.00	0	0.00	0.2	2.03	52.41	-54.24	5.14E-05
Dec	2004	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
Jan	2005	35.00	0.00	0	0.00	0.47	0.92	0.00	-0.45	0.00E+00
Feb	2005	35.00	0.00	0	0.00	0.1	1.23	0.00	-1.13	0.00E+00
Mar	2005	35.00	13.10	0.5	4.49	1.68	1.98	0.00	4.19	0.00E+00
Apr	2005	35.00	27.52	1.05	13.63	2.73	3.3	52.41	-39.35	5.14E-05
May	2005	35.00	16.25	0.62	5.57	2.86	4.4	52.41	-48.58	5.14E-05
Jun	2005	35.00	112.70	4.3	38.64	6.24	5.76	52.41	-13.29	5.14E-05
Jul	2005	35.00	31.71	1.21	10.87	2.07	7.08	52.41	-46.55	5.14E-05
Aug	2005	35.00	22.28	0.85	7.64	1.91	6.95	52.41	-49.81	5.14E-05
Sep	2005	35.00	0.00	0	0.00	0.37	5.5	52.41	-57.54	5.14E-05
Oct	2005	35.00	13.63	0.52	4.67	1.49	3.74	52.41	-49.99	5.14E-05
Nov	2005	35.00	0.00	0	0.00	0.04	2.03	52.41	-54.40	5.14E-05
Dec	2005	35.00	0.00	0	0.00	0.4	1.1	0.00	-0.70	0.00E+00
Jan	2006	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	2006	35.00	0.00	0	0.00	0.51	1.23	0.00	-0.72	0.00E+00
Mar	2006	35.00	0.00	0	0.00	0.93	1.98	0.00	-1.05	0.00E+00
Apr	2006	35.00	6.03	0.23	2.07	1.35	3.3	52.41	-52.29	5.14E-05
May	2006	35.00	18.08	0.69	6.20	2.11	4.4	52.41	-48.50	5.14E-05
Jun	2006	35.00	6.29	0.24	2.16	1.35	5.76	52.41	-54.66	5.14E-05
Jul	2006	35.00	51.63	1.97	17.70	3.15	7.08	52.41	-38.64	5.14E-05
Aug	2006	35.00	9.44	0.36	3.23	1.34	6.95	52.41	-54.79	5.14E-05
Sep	2006	35.00	8.12	0.31	2.79	0.91	5.5	52.41	-54.22	5.14E-05
Oct	2006	35.00	1.57	0.06	0.54	0.69	3.74	52.41	-54.92	5.14E-05
Nov	2006	35.00	0.00	0	0.00	0.26	2.03	52.41	-54.18	5.14E-05
Dec	2006	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
Jan	2007	35.00	0.00	0	0.00	0.14	0.92	0.00	-0.76	0.00E+00
Feb	2007	35.00	0.00	0	0.00	0.44	1.23	0.00	-0.79	0.00E+00
Mar	2007	35.00	26.21	1	8.99	1.74	1.98	0.00	6.75	0.00E+00
Apr	2007	35.00	2.88	0.11	9.73	1.09	3.3	52.41	-44.69	5.14E-05
May	2007	35.00	15.99	0.61	5.48	1.72	4.4	52.41	-49.61	5.14E-05
Jun	2007	35.00	1.31	0.05	0.45	0.67	5.76	52.41	-57.05	5.14E-05
Jul	2007	35.00	55.58	2.12	19.05	3.5	7.06	52.41	-36.94	5.14E-05
Aug	2007	35.00	15.99	0.61	5.48	2.05	6.95	52.41	-51.83	5.14E-05
Sep	2007	35.00	1.31	0.05	0.45	0.63	5.5	52.41	-56.63	5.14E-05
Oct	2007	35.00	13.10	0.5	4.49	1.72	3.74	52.41	-49.94	5.14E-05
Nov	2007	35.00	0.00	0	0.00	0.06	2.03	52.41	-54.36	5.14E-05
Dec	2007	35.00	0.00	0	0.00	0.37	1.1	0.00	-0.73	0.00E+00
Jan	1980	35.00	0.00	0	0.00	0.59	0.92	0.00	-0.33	0.00E+00
Feb	1980	35.00	0.00	0	0.00	0.77	1.28	0.00	-0.51	0.00E+00

2002-1988 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
Mar	1980	35.00	0.00	0	0.00	2.82	1.98	0.00	0.84	0.00E+00
Apr	1980	35.00	21.49	0.82	8.21	1.72	3.3	52.41	-45.78	5.14E-05
May	1980	35.00	30.14	1.15	10.33	3.33	4.4	52.41	-43.15	5.14E-05
Jun	1980	35.00	28.31	1.08	9.70	1.99	5.76	52.41	-46.48	5.14E-05
Jul	1980	35.00	3.41	0.13	1.17	0.97	7.08	52.41	-57.35	5.14E-05
Aug	1980	35.00	14.94	0.57	5.12	1.85	6.95	52.41	-52.39	5.14E-05
Sep	1980	35.00	2.10	0.08	0.72	0.39	5.5	52.41	-56.80	5.14E-05
Oct	1980	35.00	5.77	0.22	1.98	1.01	3.74	52.41	-53.16	5.14E-05
Nov	1980	35.00	3.67	0.14	1.26	0.62	2.03	52.41	-52.58	5.14E-05
Dec	1980	35.00	0.00	0	0.00	0.68	1.1	0.00	-0.42	0.00E+00
Jan	1981	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1981	35.00	0.00	0	0.00	0.27	1.23	0.00	-0.96	0.00E+00
Mar	1981	35.00	5.77	0.22	1.98	0.66	1.98	0.00	0.66	0.00E+00
Apr	1981	35.00	1.31	0.05	1.11	0.74	3.3	52.41	-53.87	5.14E-05
May	1981	35.00	27.26	1.04	9.35	3.22	4.4	52.41	-44.25	5.14E-05
Jun	1981	35.00	22.28	0.85	7.64	1.73	5.76	52.41	-48.80	5.14E-05
Jul	1981	35.00	23.33	0.89	8.00	2.54	7.08	52.41	-48.95	5.14E-05
Aug	1981	35.00	6.55	0.25	2.25	1	6.95	52.41	-56.12	5.14E-05
Sep	1981	35.00	0.00	0	0.00	0.16	5.5	52.41	-57.75	5.14E-05
Oct	1981	35.00	34.60	1.32	11.86	2.92	3.74	52.41	-41.37	5.14E-05
Nov	1981	35.00	0.00	0	0.00	0.04	2.03	52.41	-54.40	5.14E-05
Dec	1981	35.00	0.00	0	0.00	0.1	1.1	0.00	-1.00	0.00E+00
Jan	1982	35.00	0.00	0	0.00	0.18	0.92	0.00	-0.74	0.00E+00
Feb	1982	35.00	0.00	0	0.00	0.05	1.23	0.00	-1.18	0.00E+00
Mar	1982	35.00	0.00	0	0.00	1.34	1.98	0.00	-0.64	0.00E+00
Apr	1982	35.00	2.36	0.09	0.81	1	3.3	52.41	-53.90	5.14E-05
May	1982	35.00	43.24	1.65	14.83	4.18	4.4	52.41	-37.81	5.14E-05
Jun	1982	35.00	72.60	2.77	24.89	4.45	5.76	52.41	-28.83	5.14E-05
Jul	1982	35.00	19.66	0.75	6.74	2.2	7.08	52.41	-50.55	5.14E-05
Aug	1982	35.00	42.98	1.64	14.74	3.29	6.95	52.41	-41.33	5.14E-05
Sep	1982	35.00	17.56	0.67	6.02	2.42	5.5	52.41	-49.47	5.14E-05
Oct	1982	35.00	9.44	0.36	3.23	1.27	3.74	52.41	-51.65	5.14E-05
Nov	1982	35.00	12.58	0.48	4.31	1.3	2.03	52.41	-48.83	5.14E-05
Dec	1982	35.00	0.00	0	0.00	0.2	1.1	0.00	-0.90	0.00E+00
Jan	1983	35.00	0.00	0	0.00	0.22	0.92	0.00	-0.70	0.00E+00
Feb	1983	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1983	35.00	4.46	0.17	1.53	0.89	1.98	0.00	0.44	0.00E+00
Apr	1983	35.00	1.05	0.04	0.80	0.75	3.3	52.41	-54.16	5.14E-05
May	1983	35.00	11.27	0.43	3.86	1.95	4.4	52.41	-51.00	5.14E-05
Jun	1983	35.00	52.66	2.01	18.06	4.25	5.76	52.41	-35.86	5.14E-05
Jul	1983	35.00	6.29	0.24	2.16	1.05	7.08	52.41	-56.28	5.14E-05
Aug	1983	35.00	46.65	1.78	15.99	3.31	6.95	52.41	-40.06	5.14E-05
Sep	1983	35.00	0.26	0.01	0.09	0.28	5.5	52.41	-57.54	5.14E-05
Oct	1983	35.00	4.46	0.17	1.53	1.6	3.74	52.41	-53.02	5.14E-05
Nov	1983	35.00	12.58	0.48	4.31	1.6	2.03	52.41	-48.53	5.14E-05
Dec	1983	35.00	0.00	0	0.00	0.05	1.1	0.00	-1.05	0.00E+00
Jan	1984	35.00	0.00	0	0.00	1.37	0.92	0.00	0.45	0.00E+00
Feb	1984	35.00	0.00	0	0.45	0.28	1.28	0.00	-0.55	0.00E+00
Mar	1984	35.00	0.26	0.01	0.09	0.8	1.98	0.00	-1.09	0.00E+00
Apr	1984	35.00	33.28	1.27	11.41	3.59	3.3	52.41	-40.71	5.14E-05
May	1984	35.00	29.62	1.13	10.15	2.93	4.4	52.41	-43.73	5.14E-05
Jun	1984	35.00	21.49	0.82	7.37	1.91	5.76	52.41	-48.89	5.14E-05
Jul	1984	35.00	17.04	0.65	5.84	2.38	7.08	52.41	-51.27	5.14E-05
Aug	1984	35.00	16.25	0.62	5.57	1.68	6.95	52.41	-52.11	5.14E-05
Sep	1984	35.00	0.00	0	0.00	0.4	5.5	52.41	-57.51	5.14E-05
Oct	1984	35.00	0.52	0.02	0.18	0.63	3.74	52.41	-55.34	5.14E-05
Nov	1984	35.00	4.46	0.17	1.53	0.57	2.03	52.41	-52.34	5.14E-05
Dec	1984	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	52.41	-36.30	5.14E-05
May	1985	35.00	2.62	0.1	0.90	1.05	4.4	52.41	-54.86	5.14E-05
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	52.41	-56.60	5.14E-05
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	52.41	-57.48	5.14E-05
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	52.41	-58.86	5.14E-05
Sep	1985	35.00	12.58	0.48	4.31	1.99	5.5	52.41	-51.61	5.14E-05
Oct	1985	35.00	1.05	0.04	0.36	0.68	3.74	52.41	-55.11	5.14E-05
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	52.41	-54.22	5.14E-05
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.23	0.00	0.54	0.00E+00
Mar	1986	35.00	0.00	0	0.54	0.52	1.98	0.00	-0.92	0.00E+00
Apr	1988	35.00	32.24	1.23	11.05	3.27	3.3	52.41	-41.39	5.14E-05

2002-1988 Estimated Monthly Water Balance for Evap Pond--Dewey Site (XD Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Dewey Perm. (cm/sec)
May	1986	35.00	8.39	0.32	2.88	1.07	4.4	52.41	-52.87	5.14E-05
Jun	1986	35.00	76.00	2.9	26.06	4.87	5.76	52.41	-27.24	5.14E-05
Jul	1986	35.00	8.91	0.34	3.08	1.63	7.08	52.41	-54.81	5.14E-05
Aug	1986	35.00	6.61	0.26	2.34	1.19	6.95	52.41	-55.84	5.14E-05
Sep	1986	35.00	38.79	1.48	13.30	3.52	5.5	52.41	-41.09	5.14E-05
Oct	1986	35.00	55.30	2.11	18.96	3.88	3.74	52.41	-33.31	5.14E-05
Nov	1986	35.00	2.10	0.08	0.72	0.86	2.03	52.41	-52.86	5.14E-05
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.23	0.00	-0.36	0.00E+00
Mar	1967	35.00	3.15	0.12	1.06	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	52.41	-52.00	5.14E-05
May	1987	35.00	26.73	1.02	9.17	2.97	4.4	52.41	-44.68	5.14E-05
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	52.41	-57.31	5.14E-05
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	52.41	-52.39	5.14E-05
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	52.41	-57.51	5.14E-05
Sep	1987	35.00	2.62	0.1	0.90	0.76	5.5	52.41	-56.25	5.14E-05
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	52.41	-55.64	5.14E-05
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	52.41	-51.64	5.14E-05
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	52.41	-54.54	5.14E-05
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	52.41	-47.25	5.14E-05
Jun	1986	35.00	41.93	1.6	14.38	2.78	5.76	52.41	-41.01	5.14E-05
Jul	1988	35.00	28.57	1.09	9.79	2.18	7.08	52.41	-47.52	5.14E-05
Aug	1988	35.00	27.78	1.06	9.52	1.87	6.95	52.41	-47.97	5.14E-05
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	52.41	-56.71	5.14E-05
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	52.41	-56.06	5.14E-05
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	52.41	-53.83	5.14E-05
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
				4.78		15.62	44.00		8.75	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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Knight Piésold
CONSULTING

Monthly Runoff Water Balance

Burdock Area

1984-1998 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Jan	1984	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1984	35.00	0.00	0	0.00	0.28	1.23	0.00	-0.95	0.00E+00
Mar	1984	35.00	0.26	0.01	0.09	0.8	1.98	0.00	-1.09	0.00E+00
Apr	1984	35.00	28.04	1.07	9.61	3.59	3.3	8.11	1.79	7.95E-06
May	1984	35.00	24.90	0.95	10.33	2.93	4.4	8.38	0.48	7.95E-06
Jun	1984	35.00	5.24	0.2	2.27	1.91	5.76	8.11	-9.69	7.95E-06
Jul	1984	35.00	9.70	0.37	3.32	2.38	7.08	8.38	-9.76	7.95E-06
Aug	1984	35.00	8.65	0.33	2.97	1.68	6.95	8.38	-10.69	7.95E-06
Sep	1984	35.00	0.00	0	0.00	0.4	5.5	8.11	-13.21	7.95E-06
Oct	1984	35.00	0.52	0.02	0.18	0.63	3.74	8.38	-11.31	7.95E-06
Nov	1984	35.00	4.46	0.17	1.53	0.57	2.03	8.11	-8.05	7.95E-06
Dec	1984	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	8.11	8.00	7.95E-06
May	1985	35.00	2.62	0.1	8.90	1.05	4.4	8.38	-2.83	7.95E-06
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	8.11	-12.30	7.95E-06
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	8.38	-13.45	7.95E-06
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	8.38	-14.83	7.95E-06
Sep	1985	35.00	12.32	0.47	4.22	1.99	5.5	8.11	-7.40	7.95E-06
Oct	1985	35.00	1.05	0.04	0.36	0.68	3.74	8.38	-11.08	7.95E-06
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	8.11	-9.92	7.95E-06
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.28	0.00	0.49	0.00E+00
Mar	1986	35.00	0.00	0	0.49	0.52	1.98	0.00	-0.97	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	8.11	2.91	7.95E-06
May	1986	35.00	8.39	0.32	5.79	1.07	4.4	8.38	-5.93	7.95E-06
Jun	1986	35.00	68.40	2.61	23.45	4.87	5.76	8.11	14.45	7.95E-06
Jul	1986	35.00	5.24	0.2	16.25	1.63	7.08	8.38	2.41	7.95E-06
Aug	1986	35.00	6.81	0.26	4.75	1.19	6.95	8.38	-9.39	7.95E-06
Sep	1986	35.00	18.08	0.69	6.20	3.52	5.5	8.11	-3.89	7.95E-06
Oct	1986	35.00	50.84	1.94	17.43	3.86	3.74	8.38	9.19	7.95E-06
Nov	1986	35.00	2.10	0.08	9.91	0.86	2.03	8.11	0.63	7.95E-06
Dec	1986	35.00	0.00	0	0.63	0.09	1.1	0.00	-0.38	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.23	0.00	-0.36	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	8.11	-7.70	7.95E-06
May	1987	35.00	25.16	0.96	8.63	2.97	4.4	8.11	-0.92	7.95E-06
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	8.11	-13.01	7.95E-06
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	8.11	-8.09	7.95E-06
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	8.11	-13.21	7.95E-06
Sep	1987	35.00	1.83	0.07	0.63	0.76	5.5	8.11	-12.22	7.95E-06
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	8.11	-11.34	7.95E-06
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	8.11	-7.55	7.95E-06
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	8.11	-10.24	7.95E-06
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	8.11	-2.95	7.95E-06
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.76	8.11	2.75	7.95E-06
Jul	1988	35.00	23.33	0.89	10.74	2.18	7.08	8.11	-2.27	7.95E-06
Aug	1988	35.00	25.42	0.97	8.72	1.87	6.95	8.11	-4.46	7.95E-06
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	8.11	-12.41	7.95E-06
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	8.11	-11.76	7.95E-06
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	8.11	-9.53	7.95E-06
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	8.11	-6.06	7.95E-06
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	8.11	-10.02	7.95E-06
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	8.11	-11.95	7.95E-06
Jul	1989	35.00	19.13	0.73	6.56	2.21	7.08	8.11	-6.42	7.95E-06
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	8.11	-8.66	7.95E-06
Sep	1989	35.00	55.56	2.12	19.05	3.94	5.5	8.11	9.38	7.95E-06
Oct	1989	35.00	2.88	0.11	10.37	1.07	3.74	8.11	-0.42	7.95E-06
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	8.11	-9.91	7.95E-06
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.28	0.00	-0.88	0.00E+00

1984-1998 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	8.11	-5.33	7.95E-06
May	1990	35.00	61.59	2.35	21.12	4.45	4.4	8.11	13.05	7.95E-06
Jun	1990	35.00	3.15	0.12	14.13	1.22	5.76	8.11	1.48	7.95E-06
Jul	1990	35.00	46.91	1.79	17.56	3.84	7.08	8.11	6.21	7.95E-06
Aug	1990	35.00	4.98	0.19	7.92	0.86	6.95	8.11	-6.28	7.95E-06
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	8.11	0.91	7.95E-06
Oct	1990	35.00	1.83	0.07	1.54	0.89	3.74	8.11	-9.43	7.95E-06
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	8.11	-6.69	7.95E-06
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	8.11	-8.31	7.95E-06
May	1991	35.00	63.42	2.42	21.75	4.91	4.4	8.11	14.14	7.95E-06
Jun	1991	35.00	33.28	1.27	25.55	3.16	5.76	8.11	14.84	7.95E-06
Jul	1991	35.00	0.26	0.01	14.93	0.36	7.08	8.11	0.10	7.95E-06
Aug	1991	35.00	13.89	0.53	4.86	1.52	6.95	8.11	-8.68	7.95E-06
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	8.11	-13.32	7.95E-06
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	8.11	-9.29	7.95E-06
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	8.11	-9.54	7.95E-06
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	8.11	-9.42	7.95E-06
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	8.11	0.76	7.95E-06
Jun	1992	35.00	11.27	0.43	4.62	1.88	5.76	8.11	-7.37	7.95E-06
Jul	1992	35.00	20.16	0.77	6.92	3.92	7.08	8.11	-4.35	7.95E-06
Aug	1992	35.00	8.39	0.32	2.88	1.74	6.95	8.11	-10.45	7.95E-06
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	8.11	-13.53	7.95E-06
Oct	1992	35.00	1.57	0.06	0.54	0.81	3.74	8.11	-10.70	7.95E-06
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	8.11	-9.94	7.95E-06
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	7.60	0.29	2.61	3.58	1.98	0.00	4.21	0.00E+00
Apr	1993	35.00	9.17	0.35	7.35	1.71	3.3	8.11	-2.35	7.95E-06
May	1993	35.00	13.37	0.51	4.58	1.98	4.4	8.11	-5.95	7.95E-06
Jun	1993	35.00	99.59	3.8	34.15	6.14	5.76	8.11	26.41	7.95E-06
Jul	1993	35.00	22.54	0.86	34.14	2.67	7.08	8.11	21.62	7.95E-06
Aug	1993	35.00	12.58	0.48	25.93	1.82	6.95	8.11	12.69	7.95E-06
Sep	1993	35.00	2.10	0.08	13.41	1	5.5	8.11	0.79	7.95E-06
Oct	1993	35.00	12.58	0.48	5.11	1.48	3.74	8.11	-5.27	7.95E-06
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	8.11	-9.42	7.95E-06
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.28	0.00	-0.92	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.82	3.3	8.11	-6.38	7.95E-06
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	8.11	-7.09	7.95E-06
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	8.11	-10.50	7.95E-06
Jul	1994	35.00	12.06	0.46	4.13	2.04	7.08	8.11	-9.02	7.95E-06
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	8.11	-14.25	7.95E-06
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	8.11	-13.29	7.95E-06
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	8.11	-5.26	7.95E-06
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	8.11	-9.84	7.95E-06
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	8.11	-9.60	7.95E-06
May	1995	35.00	41.41	1.58	14.20	4.42	4.4	8.11	6.10	7.95E-06
Jun	1995	35.00	24.64	0.94	14.55	3.09	5.76	8.11	3.77	7.95E-06
Jul	1995	35.00	0.79	0.03	4.04	1.07	7.08	8.11	-10.08	7.95E-06
Aug	1995	35.00	0.26	0.01	0.09	0.55	6.95	8.11	-14.42	7.95E-06
Sep	1995	35.00	49.80	1.9	17.07	3.61	5.5	8.11	7.07	7.95E-06
Oct	1995	35.00	5.50	0.21	8.96	1.43	3.74	8.11	-1.47	7.95E-06
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	8.11	-8.52	7.95E-06
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	8.11	1.47	7.95E-06

1984-1998 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
May	1996	35.00	41.41	1.58	15.67	3.69	4.4	8.11	6.85	7.95E-06
Jun	1996	35.00	9.17	0.35	9.99	1.85	5.76	8.11	-2.03	7.95E-06
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	8.11	-14.46	7.95E-06
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	8.11	-1.11	7.95E-06
Sep	1996	35.00	3.41	0.13	1.17	1.37	5.5	8.11	-11.07	7.95E-06
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	8.11	-7.55	7.95E-06
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	8.11	-9.64	7.95E-06
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	8.11	-3.50	7.95E-06
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	8.11	-0.33	7.95E-06
Jun	1997	35.00	22.80	0.87	7.82	3.17	5.76	8.11	-2.89	7.95E-06
Jul	1997	35.00	55.30	2.11	16.96	4.61	7.08	8.11	8.38	7.95E-06
Aug	1997	35.00	5.24	0.2	10.17	1.05	6.95	8.11	-3.84	7.95E-06
Sep	1997	35.00	1.83	0.07	0.63	0.73	5.5	8.11	-12.25	7.95E-08
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	8.11	-10.79	7.95E-06
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	8.11	-8.99	7.95E-06
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.28	0.00	0.49	0.00E+00
Mar	1998	35.00	18.87	0.72	6.96	2.02	1.98	0.00	7.00	0.00E+00
Apr	1998	35.00	0.00	0	7.00	0.27	3.3	8.11	-4.14	7.95E-06
May	1998	35.00	30.66	1.17	10.51	3.58	4.4	8.11	1.58	7.95E-06
Jun	1998	35.00	44.55	1.7	16.86	3.36	5.76	8.11	6.34	7.95E-06
Jul	1998	35.00	38.00	1.45	19.37	3.38	7.08	8.11	7.56	7.95E-06
Aug	1998	35.00	15.20	0.58	12.77	2.36	6.95	8.11	0.07	7.95E-06
Sep	1998	35.00	32.76	1.25	11.30	2.08	5.5	8.11	-0.23	7.95E-06
Oct	1998	35.00	41.15	1.57	14.11	4.16	3.74	8.11	6.41	7.95E-06
Nov	1998	35.00	5.24	0.2	8.21	1.42	2.03	8.11	-0.51	7.95E-06
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
				4.68		16.88	44.00		26.41	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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1985-1999 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	8.11	8.00	7.95E-06
May	1985	35.00	2.62	0.1	8.90	1.05	4.4	8.38	-2.83	7.95E-06
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	8.11	-12.30	7.95E-06
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	8.38	-13.45	7.95E-06
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	8.38	-14.83	7.95E-06
Sep	1985	35.00	12.32	0.47	4.22	1.99	5.5	8.11	-7.40	7.95E-06
Oct	1985	35.00	1.05	0.04	0.36	0.66	3.74	8.38	-11.08	7.95E-06
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	8.11	-9.92	7.95E-06
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.23	0.00	0.54	0.00E+00
Mar	1986	35.00	0.00	0	0.54	0.52	1.98	0.00	-0.92	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	8.11	2.91	7.95E-06
May	1986	35.00	8.39	0.32	5.79	1.07	4.4	8.38	-5.93	7.95E-06
Jun	1986	35.00	65.78	2.51	22.55	4.87	5.78	8.11	13.55	7.95E-06
Jul	1986	35.00	5.24	0.2	15.35	1.63	7.08	8.38	1.52	7.95E-06
Aug	1986	35.00	6.81	0.26	3.85	1.19	6.95	8.38	-10.29	7.95E-08
Sep	1986	35.00	18.08	0.69	6.20	3.52	5.5	8.11	-3.89	7.95E-06
Oct	1986	35.00	49.01	1.87	16.80	3.88	3.74	8.38	8.56	7.95E-06
Nov	1986	35.00	2.10	0.08	9.28	0.86	2.03	8.11	0.00	7.95E-06
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.28	0.00	-0.41	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	8.11	-7.70	7.95E-06
May	1987	35.00	25.16	0.96	8.63	2.97	4.4	8.38	-1.19	7.95E-06
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	8.11	-13.01	7.95E-06
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	8.38	-8.38	7.95E-06
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	8.38	-13.48	7.95E-08
Sep	1987	35.00	1.83	0.07	0.63	0.76	5.5	8.11	-12.22	7.95E-06
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	8.38	-11.61	7.95E-06
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	8.11	-7.55	7.95E-06
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	8.11	-10.24	7.95E-06
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	8.11	-2.95	7.95E-08
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.76	8.11	2.76	7.95E-06
Jul	1988	35.00	23.33	0.89	10.74	2.18	7.08	8.11	-2.27	7.95E-06
Aug	1988	35.00	25.42	0.97	8.72	1.87	6.95	8.11	-4.48	7.95E-06
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	8.11	-12.41	7.95E-06
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	8.11	-11.76	7.95E-08
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	8.11	-9.53	7.95E-06
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.83	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	8.11	-6.06	7.95E-06
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	8.11	-10.02	7.95E-06
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	8.11	-11.95	7.95E-06
Jul	1989	35.00	19.13	0.73	6.56	2.21	7.08	8.11	-6.42	7.95E-06
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	8.11	-8.66	7.95E-06
Sep	1989	35.00	55.56	2.12	19.05	3.94	5.5	8.11	9.38	7.95E-06
Oct	1989	35.00	2.88	0.11	10.37	1.07	3.74	8.11	-0.42	7.95E-06
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	8.11	-9.91	7.95E-06
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.23	0.00	-0.83	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	8.11	-5.33	7.95E-06
May	1990	35.00	61.59	2.35	21.12	4.45	4.4	8.11	13.05	7.95E-06
Jun	1990	35.00	3.15	0.12	14.13	1.22	5.76	8.11	1.48	7.95E-06
Jul	1990	35.00	46.91	1.79	17.56	3.84	7.08	8.11	6.21	7.95E-06
Aug	1990	35.00	4.98	0.19	7.92	0.86	6.95	8.11	-6.28	7.95E-06
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	8.11	0.91	7.95E-06
Oct	1990	35.00	1.83	0.07	1.54	0.89	3.74	8.11	-9.43	7.95E-06
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	8.11	-6.69	7.95E-06
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.28	0.00	-0.38	0.00E+00

1985-1999 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	8.11	-8.31	7.95E-06
May	1991	35.00	63.42	2.42	21.75	4.91	4.4	8.11	14.14	7.95E-06
Jun	1991	35.00	33.28	1.27	25.55	3.16	5.76	8.11	14.84	7.95E-06
Jul	1991	35.00	0.26	0.01	14.93	0.36	7.08	8.11	0.10	7.95E-06
Aug	1991	35.00	13.89	0.53	4.86	1.52	6.95	8.11	-8.68	7.95E-06
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	8.11	-13.32	7.95E-06
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	8.11	-9.29	7.95E-06
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	8.11	-9.54	7.95E-06
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	8.11	-9.42	7.95E-06
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	8.11	0.76	7.95E-06
Jun	1992	35.00	11.27	0.43	4.62	1.88	5.76	8.11	-7.37	7.95E-06
Jul	1992	35.00	20.18	0.77	6.92	3.92	7.08	8.11	-4.35	7.95E-06
Aug	1992	35.00	8.39	0.32	2.88	1.74	6.95	8.11	-10.45	7.95E-06
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	8.11	-13.53	7.95E-06
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	8.11	-10.70	7.95E-06
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	8.11	-9.94	7.95E-06
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	7.60	0.29	2.61	3.58	1.98	0.00	4.21	0.00E+00
Apr	1993	35.00	9.17	0.35	7.35	1.71	3.3	8.11	-2.35	7.95E-06
May	1993	35.00	13.37	0.51	4.58	1.98	4.4	8.11	-5.95	7.95E-06
Jun	1993	35.00	99.59	3.8	34.15	6.14	5.76	8.11	26.41	7.95E-06
Jul	1993	35.00	22.54	0.86	34.14	2.67	7.08	8.11	21.62	7.95E-06
Aug	1993	35.00	12.58	0.48	25.93	1.62	6.95	8.11	12.69	7.95E-06
Sep	1993	35.00	2.10	0.08	13.41	1	5.5	8.11	0.79	7.95E-06
Oct	1993	35.00	12.58	0.48	5.11	1.48	3.74	8.11	-5.27	7.95E-06
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	8.11	-9.42	7.95E-06
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.23	0.00	-0.87	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.98	0.38	3.41	1.62	3.3	8.11	-6.38	7.95E-06
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	8.11	-7.09	7.95E-06
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	8.11	-10.50	7.95E-06
Jul	1994	35.00	12.06	0.46	4.13	2.04	7.08	8.11	-9.02	7.95E-06
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	8.11	-14.25	7.95E-06
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	8.11	-13.29	7.95E-06
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	8.11	-5.26	7.95E-06
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	8.11	-9.84	7.95E-06
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.28	0.00	-0.58	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	8.11	-9.60	7.95E-06
May	1995	35.00	41.41	1.58	14.20	4.42	4.4	8.11	6.10	7.95E-06
Jun	1995	35.00	24.64	0.94	14.55	3.09	5.76	8.11	3.77	7.95E-06
Jul	1995	35.00	0.79	0.03	4.04	1.07	7.08	8.11	-10.08	7.95E-06
Aug	1995	35.00	0.26	0.01	0.09	0.55	6.95	8.11	-14.42	7.95E-06
Sep	1995	35.00	49.80	1.9	17.07	3.61	5.5	8.11	7.07	7.95E-06
Oct	1995	35.00	5.50	0.21	8.96	1.43	3.74	8.11	-1.47	7.95E-06
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	8.11	-8.52	7.95E-06
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	8.11	1.47	7.95E-06
May	1996	35.00	41.41	1.58	15.67	3.69	4.4	8.11	6.85	7.95E-06
Jun	1996	35.00	9.17	0.35	9.99	1.85	5.76	8.11	-2.03	7.95E-06
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	8.11	-14.46	7.95E-06
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	8.11	-1.11	7.95E-06
Sep	1996	35.00	3.41	0.13	1.17	1.37	5.5	8.11	-11.07	7.95E-06
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	8.11	-7.55	7.95E-06
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	8.11	-9.64	7.95E-06
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	8.11	-3.50	7.95E-06

1985-1999 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	8.11	-0.33	7.95E-06
Jun	1997	35.00	22.80	0.87	7.82	3.17	5.76	8.11	-2.89	7.95E-06
Jul	1997	35.00	55.30	2.11	18.96	4.61	7.08	8.11	8.38	7.95E-06
Aug	1997	35.00	5.24	0.2	10.17	1.05	6.95	8.11	-3.84	7.95E-06
Sep	1997	35.00	1.83	0.07	0.63	0.73	5.5	8.11	-12.25	7.95E-06
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	8.11	-10.79	7.95E-06
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	8.11	-8.99	7.95E-06
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.23	0.00	0.54	0.00E+00
Mar	1998	35.00	18.87	0.72	7.01	2.02	1.98	0.00	7.05	0.00E+00
Apr	1998	35.00	0.00	0	7.05	0.27	3.3	8.11	-4.09	7.95E-06
May	1998	35.00	30.66	1.17	10.51	3.58	4.4	8.11	1.58	7.95E-06
Jun	1998	35.00	44.55	1.7	16.86	3.36	5.76	8.11	6.34	7.95E-06
Jul	1998	35.00	38.00	1.45	19.37	3.38	7.08	8.11	7.56	7.95E-06
Aug	1998	35.00	15.20	0.58	12.77	2.36	6.95	8.11	0.07	7.95E-06
Sep	1998	35.00	32.76	1.25	11.30	2.08	5.5	8.11	-0.23	7.95E-06
Oct	1998	35.00	41.15	1.57	14.11	4.16	3.74	8.11	6.41	7.95E-06
Nov	1998	35.00	5.24	0.2	8.21	1.42	2.03	8.11	-0.51	7.95E-06
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.28	0.00	-1.16	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	26.21	1	8.99	3.76	3.3	8.11	1.33	7.95E-06
May	1999	35.00	2.36	0.09	2.14	1.17	4.4	8.11	-9.20	7.95E-06
Jun	1999	35.00	71.81	2.74	24.62	5.57	5.76	8.11	16.32	7.95E-06
Jul	1999	35.00	3.15	0.12	17.40	0.98	7.08	8.11	3.18	7.95E-06
Aug	1999	35.00	31.45	1.2	13.97	1.96	6.95	8.11	0.86	7.95E-06
Sep	1999	35.00	10.22	0.39	4.37	1.79	5.5	8.11	-7.45	7.95E-06
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	8.11	-11.61	7.95E-06
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	8.11	-9.31	7.95E-06
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
				4.63		16.98	44.00		26.41	

Assumea seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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1986-2000 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Jan	1986	35.00	0.00	0	0.00	0.07	0.92	0.00	-0.85	0.00E+00
Feb	1986	35.00	0.00	0	0.00	1.06	1.23	0.00	-0.17	0.00E+00
Mar	1986	35.00	0.00	0	0.00	0.52	1.98	0.00	-1.46	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	8.11	2.91	7.95E-06
May	1986	35.00	8.39	0.32	5.79	1.07	4.4	8.38	-5.93	7.95E-06
Jun	1986	35.00	65.78	2.51	22.55	4.87	5.76	8.11	13.55	7.95E-06
Jul	1986	35.00	5.24	0.2	15.35	1.63	7.08	8.38	1.52	7.95E-06
Aug	1986	35.00	6.81	0.26	3.85	1.19	6.95	8.38	-10.29	7.95E-06
Sep	1986	35.00	18.08	0.69	6.20	3.52	5.5	8.11	-3.89	7.95E-06
Oct	1986	35.00	42.72	1.63	14.65	3.88	3.74	8.38	6.40	7.95E-06
Nov	1986	35.00	2.10	0.08	7.12	0.86	2.03	8.11	-2.16	7.95E-06
Dec	1986	35.00	0.00	0	0.00	0.09	1.1	0.00	-1.01	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.23	0.00	-0.36	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.89	3.3	8.11	-7.70	7.95E-06
May	1987	35.00	23.85	0.91	8.18	2.97	4.4	8.38	-1.64	7.95E-06
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	8.11	-13.01	7.95E-06
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	8.38	-8.36	7.95E-06
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	8.38	-13.48	7.95E-06
Sep	1987	35.00	1.83	0.07	0.63	0.76	5.5	8.11	-12.22	7.95E-06
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	8.38	-11.61	7.95E-06
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	8.11	-7.55	7.95E-06
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	8.11	-10.24	7.95E-06
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	8.38	-3.22	7.95E-06
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.76	8.11	2.75	7.95E-06
Jul	1988	35.00	23.33	0.89	10.74	2.18	7.08	8.38	-2.54	7.95E-06
Aug	1988	35.00	25.42	0.97	8.72	1.87	6.95	8.38	-4.75	7.95E-06
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	8.11	-12.41	7.95E-06
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	8.38	-12.03	7.95E-06
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	8.11	-9.53	7.95E-06
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	8.11	-6.06	7.95E-06
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	8.11	-10.02	7.95E-06
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	8.11	-11.95	7.95E-06
Jul	1989	35.00	19.13	0.73	6.56	2.21	7.08	8.11	-6.42	7.95E-06
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	8.11	-8.66	7.95E-06
Sep	1989	35.00	55.56	2.12	19.05	3.94	5.5	8.11	9.38	7.95E-06
Oct	1989	35.00	2.88	0.11	10.37	1.07	3.74	8.11	-0.42	7.95E-06
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	8.11	-9.91	7.95E-06
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.23	0.00	-0.83	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	8.11	-5.33	7.95E-06
May	1990	35.00	61.59	2.35	21.12	4.45	4.4	8.11	13.05	7.95E-06
Jun	1990	35.00	3.15	0.12	14.13	1.22	5.76	8.11	1.48	7.95E-06
Jul	1990	35.00	46.91	1.79	17.56	3.84	7.08	8.11	6.21	7.95E-06
Aug	1990	35.00	4.98	0.19	7.92	0.86	6.95	8.11	-6.28	7.95E-06
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	8.11	0.91	7.95E-06
Oct	1990	35.00	1.83	0.07	1.54	0.89	3.74	8.11	-9.43	7.95E-06
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	8.11	-6.69	7.95E-06
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	8.11	-8.31	7.95E-06
May	1991	35.00	63.42	2.42	21.75	4.91	4.4	8.11	14.14	7.95E-06
Jun	1991	35.00	33.28	1.27	25.55	3.16	5.76	8.11	14.84	7.95E-06
Jul	1991	35.00	0.26	0.01	14.93	0.36	7.08	8.11	0.10	7.95E-06
Aug	1991	35.00	13.89	0.53	4.86	1.52	6.95	8.11	-8.68	7.95E-06
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	8.11	-13.32	7.95E-06
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	8.11	-9.29	7.95E-06
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	8.11	-9.54	7.95E-06
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.80	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.28	0.00	-0.14	0.00E+00

1986-2000 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	8.11	-9.42	7.95E-06
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	8.11	0.76	7.95E-06
Jun	1992	35.00	11.27	0.43	4.62	1.88	5.76	8.11	-7.37	7.95E-06
Jul	1992	35.00	20.18	0.77	6.92	3.92	7.08	8.11	-4.35	7.95E-06
Aug	1992	35.00	8.39	0.32	2.88	1.74	6.95	8.11	-10.45	7.95E-06
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	8.11	-13.53	7.95E-06
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	8.11	-10.70	7.95E-06
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	8.11	-9.94	7.95E-06
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	7.60	0.29	2.61	3.58	1.98	0.00	4.21	0.00E+00
Apr	1993	35.00	9.17	0.35	7.35	1.71	3.3	8.11	-2.35	7.95E-06
May	1993	35.00	13.37	0.51	4.56	1.98	4.4	8.11	-5.95	7.95E-06
Jun	1993	35.00	99.59	3.8	34.15	6.14	5.76	8.11	26.41	7.95E-06
Jul	1993	35.00	22.54	0.86	34.14	2.67	7.08	8.11	21.62	7.95E-06
Aug	1993	35.00	12.58	0.48	25.93	1.82	6.95	8.11	12.69	7.95E-06
Sep	1993	35.00	2.10	0.08	13.41	1	5.5	8.11	0.79	7.95E-06
Oct	1993	35.00	12.58	0.48	5.11	1.48	3.74	8.11	-5.27	7.95E-06
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	8.11	-9.42	7.95E-06
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.23	0.00	-0.87	0.00E+00
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.98	0.38	3.41	1.62	3.3	8.11	-6.38	7.95E-06
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	8.11	-7.09	7.95E-06
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	8.11	-10.50	7.95E-06
Jul	1994	35.00	12.06	0.46	4.13	2.04	7.08	8.11	-9.02	7.95E-06
Aug	1994	35.00	1.05	0.04	0.36	0.45	6.95	8.11	-14.25	7.95E-06
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	8.11	-13.29	7.95E-06
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	8.11	-5.26	7.95E-06
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	8.11	-9.84	7.95E-06
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	8.11	-9.60	7.95E-06
May	1995	35.00	41.41	1.58	14.20	4.42	4.4	8.11	6.10	7.95E-06
Jun	1995	35.00	24.64	0.94	14.55	3.09	5.76	8.11	3.77	7.95E-06
Jul	1995	35.00	0.79	0.03	4.04	1.07	7.08	8.11	-10.08	7.95E-06
Aug	1995	35.00	0.26	0.01	0.09	0.55	6.95	8.11	-14.42	7.95E-06
Sep	1995	35.00	49.80	1.9	17.07	3.61	5.5	8.11	7.07	7.95E-06
Oct	1995	35.00	5.50	0.21	8.96	1.43	3.74	8.11	-1.47	7.95E-06
Nov	1995	35.00	2.36	0.09	0.81	0.81	2.03	8.11	-8.52	7.95E-06
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.28	0.00	-1.04	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	8.11	1.47	7.95E-06
May	1996	35.00	41.41	1.58	15.87	3.69	4.4	8.11	6.85	7.95E-06
Jun	1996	35.00	9.17	0.35	9.99	1.85	5.76	8.11	-2.03	7.95E-06
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	8.11	-14.46	7.95E-06
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	8.11	-1.11	7.95E-06
Sep	1996	35.00	3.41	0.13	1.17	1.37	5.5	8.11	-11.07	7.95E-06
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	8.11	-7.55	7.95E-06
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	8.11	-9.64	7.95E-06
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	8.11	-3.50	7.95E-06
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	8.11	-0.33	7.95E-06
Jun	1997	35.00	22.80	0.87	7.82	3.17	5.76	8.11	-2.89	7.95E-06
Jul	1997	35.00	55.30	2.11	18.96	4.61	7.08	8.11	8.38	7.95E-06
Aug	1997	35.00	5.24	0.2	10.17	1.05	6.95	8.11	-3.84	7.95E-06
Sep	1997	35.00	1.83	0.07	0.63	0.73	5.5	8.11	-12.25	7.95E-06
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	8.11	-10.79	7.95E-06
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	8.11	-8.99	7.95E-06
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.23	0.00	0.54	0.00E+00
Mar	1998	35.00	18.87	0.72	7.01	2.02	1.98	0.00	7.05	0.00E+00
Apr	1998	35.00	0.00	0	7.05	0.27	3.3	8.11	-4.09	7.95E-06

1986-2000 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
May	1998	35.00	30.66	1.17	10.51	3.58	4.4	8.11	1.58	7.95E-06
Jun	1998	35.00	44.55	1.7	16.86	3.36	5.76	8.11	6.34	7.95E-06
Jul	1998	35.00	38.00	1.45	19.37	3.38	7.08	8.11	7.56	7.95E-06
Aug	1998	35.00	15.20	0.58	12.77	2.36	6.95	8.11	0.07	7.95E-06
Sep	1998	35.00	32.76	1.25	11.30	2.08	5.5	8.11	-0.23	7.95E-06
Oct	1998	35.00	41.15	1.57	14.11	4.16	3.74	8.11	6.41	7.95E-06
Nov	1998	35.00	5.24	0.2	8.21	1.42	2.03	8.11	-0.51	7.95E-06
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.23	0.00	-1.11	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	26.21	1	8.99	3.76	3.3	8.11	1.33	7.95E-06
May	1999	35.00	2.36	0.09	2.14	1.17	4.4	8.11	-9.20	7.95E-06
Jun	1999	35.00	71.81	2.74	24.62	5.57	5.76	8.11	16.32	7.95E-06
Jul	1999	35.00	3.15	0.12	17.40	0.98	7.08	8.11	3.18	7.95E-06
Aug	1999	35.00	31.45	1.2	13.97	1.96	6.95	8.11	0.86	7.95E-06
Sep	1999	35.00	10.22	0.39	4.37	1.79	5.5	8.11	-7.45	7.95E-06
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	8.11	-11.81	7.95E-06
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	8.11	-9.31	7.95E-06
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
Jan	2000	35.00	0.00	0	0.00	0.16	0.92	0.00	-0.76	0.00E+00
Feb	2000	35.00	0.26	0.01	0.09	1.09	1.28	0.00	-0.10	0.00E+00
Mar	2000	35.00	8.12	0.31	2.79	1.48	1.98	0.00	2.29	0.00E+00
Apr	2000	35.00	69.45	2.65	26.10	4.74	3.3	8.11	19.42	7.95E-06
May	2000	35.00	0.52	0.02	19.60	0.78	4.4	8.11	7.87	7.95E-06
Jun	2000	35.00	0.00	0	7.87	0.43	5.76	8.11	-5.57	7.95E-06
Jul	2000	35.00	13.10	0.5	4.49	2.24	7.08	8.11	-8.46	7.95E-06
Aug	2000	35.00	1.57	0.06	0.54	0.69	6.95	8.11	-13.83	7.95E-06
Sep	2000	35.00	3.93	0.15	1.35	1.03	5.5	8.11	-11.23	7.95E-06
Oct	2000	35.00	2.88	0.11	0.99	1.08	3.74	8.11	-9.78	7.95E-06
Nov	2000	35.00	0.00	0	0.00	0.43	2.03	8.11	-9.71	7.95E-06
Dec	2000	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
				4.89		17.08	44.00		26.41	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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1988-2002 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Jan	1988	35.00	0.00	0	0.00	0.24	0.92	0.00	-0.68	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	8.11	-10.24	7.95E-08
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	8.38	-3.22	7.95E-06
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.78	8.11	2.75	7.95E-06
Jul	1988	35.00	22.02	0.84	10.29	2.18	7.08	8.38	-2.99	7.95E-06
Aug	1988	35.00	25.42	0.97	8.72	1.87	8.95	6.38	-4.75	7.95E-06
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	8.11	-12.41	7.95E-06
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	8.38	-12.03	7.95E-06
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	8.11	-9.53	7.95E-06
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
Jan	1989	35.00	0.00	0	0.00	0.09	0.92	0.00	-0.83	0.00E+00
Feb	1989	35.00	0.00	0	0.00	0.6	1.23	0.00	-0.63	0.00E+00
Mar	1989	35.00	0.52	0.02	0.18	1.14	1.98	0.00	-0.66	0.00E+00
Apr	1989	35.00	10.75	0.41	3.68	1.67	3.3	8.11	-6.06	7.95E-06
May	1989	35.00	3.15	0.12	1.08	1.41	4.4	8.38	-10.29	7.95E-06
Jun	1989	35.00	2.10	0.08	0.72	1.2	5.76	8.11	-11.95	7.95E-08
Jul	1989	35.00	19.13	0.73	6.56	2.21	7.08	8.38	-6.69	7.95E-06
Aug	1989	35.00	14.41	0.55	4.94	1.46	6.95	8.38	-8.93	7.95E-06
Sep	1989	35.00	52.15	1.99	17.88	3.94	5.5	8.11	8.21	7.95E-06
Oct	1989	35.00	2.88	0.11	9.20	1.07	3.74	8.38	-1.86	7.95E-06
Nov	1989	35.00	0.00	0	0.00	0.23	2.03	8.11	-9.91	7.95E-06
Dec	1989	35.00	0.00	0	0.00	0.56	1.1	0.00	-0.54	0.00E+00
Jan	1990	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1990	35.00	0.00	0	0.00	0.4	1.28	0.00	-0.88	0.00E+00
Mar	1990	35.00	0.79	0.03	0.27	1.17	1.98	0.00	-0.54	0.00E+00
Apr	1990	35.00	11.01	0.42	3.77	2.31	3.3	8.11	-5.33	7.95E-06
May	1990	35.00	61.33	2.34	21.03	4.45	4.4	8.38	12.69	7.95E-06
Jun	1990	35.00	3.15	0.12	13.77	1.22	5.76	8.11	1.12	7.95E-06
Jul	1990	35.00	46.91	1.79	17.20	3.84	7.08	8.38	5.58	7.95E-06
Aug	1990	35.00	4.98	0.19	7.29	0.86	6.95	8.38	-7.19	7.95E-06
Sep	1990	35.00	35.12	1.34	12.04	2.48	5.5	8.11	0.91	7.95E-06
Oct	1990	35.00	1.83	0.07	1.54	0.89	3.74	8.38	-9.70	7.95E-06
Nov	1990	35.00	6.81	0.26	2.34	1.12	2.03	8.11	-6.69	7.95E-06
Dec	1990	35.00	0.79	0.03	0.27	0.32	1.1	0.00	-0.51	0.00E+00
Jan	1991	35.00	0.00	0	0.00	0.15	0.92	0.00	-0.77	0.00E+00
Feb	1991	35.00	0.00	0	0.00	0.9	1.23	0.00	-0.33	0.00E+00
Mar	1991	35.00	0.00	0	0.00	0.35	1.98	0.00	-1.63	0.00E+00
Apr	1991	35.00	4.46	0.17	1.53	1.58	3.3	8.11	-8.31	7.95E-06
May	1991	35.00	63.42	2.42	21.75	4.91	4.4	8.11	14.14	7.95E-06
Jun	1991	35.00	33.28	1.27	25.55	3.16	5.76	8.11	14.84	7.95E-06
Jul	1991	35.00	0.26	0.01	14.93	0.36	7.08	8.11	0.10	7.95E-06
Aug	1991	35.00	13.89	0.53	4.86	1.52	6.95	8.11	-8.68	7.95E-06
Sep	1991	35.00	0.00	0	0.00	0.29	5.5	8.11	-13.32	7.95E-06
Oct	1991	35.00	4.72	0.18	1.62	0.95	3.74	8.11	-9.29	7.95E-06
Nov	1991	35.00	0.26	0.01	0.09	0.51	2.03	8.11	-9.54	7.95E-06
Dec	1991	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1992	35.00	0.00	0	0.00	0.32	0.92	0.00	-0.60	0.00E+00
Feb	1992	35.00	1.83	0.07	0.63	0.51	1.23	0.00	-0.09	0.00E+00
Mar	1992	35.00	5.77	0.22	1.98	1.07	1.98	0.00	1.07	0.00E+00
Apr	1992	35.00	0.79	0.03	1.34	0.66	3.3	8.11	-9.42	7.95E-06
May	1992	35.00	30.66	1.17	10.51	2.76	4.4	8.11	0.76	7.95E-06
Jun	1992	35.00	11.27	0.43	4.62	1.88	5.76	8.11	-7.37	7.95E-06
Jul	1992	35.00	20.18	0.77	6.92	3.92	7.08	8.11	-4.35	7.95E-06
Aug	1992	35.00	8.39	0.32	2.88	1.74	6.95	8.11	-10.45	7.95E-06
Sep	1992	35.00	0.00	0	0.00	0.08	5.5	8.11	-13.53	7.95E-06
Oct	1992	35.00	1.57	0.06	0.54	0.61	3.74	8.11	-10.70	7.95E-06
Nov	1992	35.00	0.00	0	0.00	0.2	2.03	8.11	-9.94	7.95E-06
Dec	1992	35.00	0.00	0	0.00	0.33	1.1	0.00	-0.77	0.00E+00
Jan	1993	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	1993	35.00	0.00	0	0.00	0.13	1.23	0.00	-1.10	0.00E+00
Mar	1993	35.00	7.60	0.29	2.61	3.58	1.98	0.00	4.21	0.00E+00
Apr	1993	35.00	9.17	0.35	7.35	1.71	3.3	8.11	-2.35	7.95E-06
Mey	1993	35.00	13.37	0.51	4.58	1.98	4.4	8.11	-5.95	7.95E-06
Jun	1993	35.00	99.59	3.8	34.15	6.14	5.76	8.11	28.41	7.95E-06
Jul	1993	35.00	22.54	0.86	34.14	2.67	7.08	8.11	21.62	7.95E-06
Aug	1993	35.00	12.58	0.48	25.93	1.82	6.95	8.11	12.69	7.95E-06
Sep	1993	35.00	2.10	0.08	13.41	1	5.5	8.11	0.79	7.95E-06
Oct	1993	35.00	12.58	0.48	5.11	1.48	3.74	8.11	-5.27	7.95E-06
Nov	1993	35.00	0.00	0	0.00	0.72	2.03	8.11	-9.42	7.95E-06
Dec	1993	35.00	0.00	0	0.00	0.82	1.1	0.00	-0.28	0.00E+00
Jan	1994	35.00	0.00	0	0.00	0.6	0.92	0.00	-0.32	0.00E+00
Feb	1994	35.00	0.00	0	0.00	0.36	1.28	0.00	-0.92	0.00E+00

1988-2002 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Mar	1994	35.00	0.00	0	0.00	0.73	1.98	0.00	-1.25	0.00E+00
Apr	1994	35.00	9.96	0.38	3.41	1.62	3.3	8.11	-6.38	7.95E-06
May	1994	35.00	11.53	0.44	3.95	1.47	4.4	8.11	-7.09	7.95E-06
Jun	1994	35.00	6.29	0.24	2.16	1.22	5.76	8.11	-10.50	7.95E-06
Jul	1994	35.00	12.06	0.46	4.13	2.04	7.08	8.11	-9.02	7.95E-06
Aug	1994	35.00	1.05	0.04	0.38	0.45	6.95	8.11	-14.25	7.95E-06
Sep	1994	35.00	0.00	0	0.00	0.32	5.5	8.11	-13.29	7.95E-06
Oct	1994	35.00	12.84	0.49	4.40	2.19	3.74	8.11	-5.26	7.95E-06
Nov	1994	35.00	0.00	0	0.00	0.3	2.03	8.11	-9.84	7.95E-06
Dec	1994	35.00	0.00	0	0.00	0.71	1.1	0.00	-0.39	0.00E+00
Jan	1995	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1995	35.00	0.00	0	0.00	0.7	1.23	0.00	-0.53	0.00E+00
Mar	1995	35.00	0.00	0	0.00	0.63	1.98	0.00	-1.35	0.00E+00
Apr	1995	35.00	1.31	0.05	0.45	1.36	3.3	8.11	-9.60	7.95E-06
May	1995	35.00	41.41	1.58	14.20	4.42	4.4	8.11	6.10	7.95E-06
Jun	1995	35.00	24.64	0.94	14.55	3.09	5.76	8.11	3.77	7.95E-06
Jul	1995	35.00	0.79	0.03	4.04	1.07	7.08	8.11	-10.08	7.95E-06
Aug	1995	35.00	0.26	0.01	0.09	0.55	6.95	8.11	-14.42	7.95E-06
Sep	1995	35.00	49.80	1.9	17.07	3.61	5.5	8.11	7.07	7.95E-06
Oct	1995	35.00	5.50	0.21	8.96	1.43	3.74	8.11	-1.47	7.95E-06
Nov	1995	35.00	2.36	0.09	0.81	0.61	2.03	8.11	-8.52	7.95E-06
Dec	1995	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	1996	35.00	0.00	0	0.00	0.35	0.92	0.00	-0.57	0.00E+00
Feb	1996	35.00	0.00	0	0.00	0.24	1.23	0.00	-0.99	0.00E+00
Mar	1996	35.00	0.00	0	0.00	0.92	1.98	0.00	-1.06	0.00E+00
Apr	1996	35.00	28.83	1.1	9.88	3	3.3	8.11	1.47	7.95E-06
May	1996	35.00	41.41	1.58	15.67	3.69	4.4	8.11	6.85	7.95E-06
Jun	1996	35.00	9.17	0.35	9.99	1.85	5.76	8.11	-2.03	7.95E-06
Jul	1996	35.00	0.52	0.02	0.18	0.55	7.08	8.11	-14.46	7.95E-06
Aug	1996	35.00	32.76	1.25	11.23	2.72	6.95	8.11	-1.11	7.95E-06
Sep	1996	35.00	3.41	0.13	1.17	1.37	5.5	8.11	-11.07	7.95E-06
Oct	1996	35.00	7.34	0.28	2.52	1.79	3.74	8.11	-7.55	7.95E-06
Nov	1996	35.00	0.00	0	0.00	0.5	2.03	8.11	-9.64	7.95E-06
Dec	1996	35.00	0.00	0	0.00	0.62	1.1	0.00	-0.48	0.00E+00
Jan	1997	35.00	0.00	0	0.00	0.62	0.92	0.00	-0.30	0.00E+00
Feb	1997	35.00	0.00	0	0.00	0.48	1.23	0.00	-0.75	0.00E+00
Mar	1997	35.00	0.00	0	0.00	0.32	1.98	0.00	-1.66	0.00E+00
Apr	1997	35.00	15.73	0.6	5.39	2.52	3.3	8.11	-3.50	7.95E-06
May	1997	35.00	27.26	1.04	9.35	2.84	4.4	8.11	-0.33	7.95E-06
Jun	1997	35.00	22.80	0.87	7.82	3.17	5.76	8.11	-2.89	7.95E-06
Jul	1997	35.00	55.30	2.11	18.96	4.61	7.08	8.11	8.38	7.95E-06
Aug	1997	35.00	5.24	0.2	10.17	1.05	6.95	8.11	-3.84	7.95E-06
Sep	1997	35.00	1.83	0.07	0.63	0.73	5.5	8.11	-12.25	7.95E-06
Oct	1997	35.00	1.05	0.04	0.36	0.7	3.74	8.11	-10.79	7.95E-06
Nov	1997	35.00	2.10	0.08	0.72	0.43	2.03	8.11	-8.99	7.95E-06
Dec	1997	35.00	0.00	0	0.00	0.26	1.1	0.00	-0.84	0.00E+00
Jan	1998	35.00	0.00	0	0.00	0.52	0.92	0.00	-0.40	0.00E+00
Feb	1998	35.00	2.88	0.11	0.99	0.78	1.28	0.00	0.49	0.00E+00
Mar	1998	35.00	18.87	0.72	6.96	2.02	1.98	0.00	7.00	0.00E+00
Apr	1998	35.00	0.00	0	7.00	0.27	3.3	8.11	-4.14	7.95E-06
May	1998	35.00	30.66	1.17	10.51	3.58	4.4	8.11	1.58	7.95E-06
Jun	1998	35.00	44.55	1.7	16.86	3.36	5.76	8.11	6.34	7.95E-06
Jul	1998	35.00	38.00	1.45	19.37	3.38	7.08	8.11	7.56	7.95E-06
Aug	1998	35.00	15.20	0.58	12.77	2.36	6.95	8.11	0.07	7.95E-06
Sep	1998	35.00	32.76	1.25	11.30	2.08	5.5	8.11	-0.23	7.95E-06
Oct	1998	35.00	41.15	1.57	14.11	4.16	3.74	8.11	6.41	7.95E-06
Nov	1998	35.00	5.24	0.2	8.21	1.42	2.03	8.11	-0.51	7.95E-06
Dec	1998	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1999	35.00	0.00	0	0.00	0.55	0.92	0.00	-0.37	0.00E+00
Feb	1999	35.00	0.00	0	0.00	0.12	1.23	0.00	-1.11	0.00E+00
Mar	1999	35.00	0.00	0	0.00	0.55	1.98	0.00	-1.43	0.00E+00
Apr	1999	35.00	26.21	1	8.99	3.76	3.3	8.11	1.33	7.95E-06
May	1999	35.00	2.36	0.09	2.14	1.17	4.4	8.11	-9.20	7.95E-06
Jun	1999	35.00	71.81	2.74	24.62	5.57	5.76	8.11	16.32	7.95E-06
Jul	1999	35.00	3.15	0.12	17.40	0.96	7.08	8.11	3.18	7.95E-06
Aug	1999	35.00	31.45	1.2	13.97	1.96	6.95	8.11	0.86	7.95E-06
Sep	1999	35.00	10.22	0.39	4.37	1.79	5.5	8.11	-7.45	7.95E-06
Oct	1999	35.00	0.00	0	0.00	0.04	3.74	8.11	-11.81	7.95E-06
Nov	1999	35.00	0.79	0.03	0.27	0.56	2.03	8.11	-9.31	7.95E-06
Dec	1999	35.00	0.00	0	0.00	0.12	1.1	0.00	-0.98	0.00E+00
Jan	2000	35.00	0.00	0	0.00	0.16	0.92	0.00	-0.76	0.00E+00
Feb	2000	35.00	0.26	0.01	0.09	1.09	1.23	0.00	-0.05	0.00E+00
Mar	2000	35.00	8.12	0.31	2.79	1.48	1.98	0.00	2.29	0.00E+00
Apr	2000	35.00	69.45	2.65	26.10	4.74	3.3	8.11	19.42	7.95E-06

1988-2002 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
May	2000	35.00	0.52	0.02	19.60	0.78	4.4	8.11	7.67	7.95E-06
Jun	2000	35.00	0.00	0	7.67	0.43	5.76	8.11	-5.57	7.95E-06
Jul	2000	35.00	13.10	0.5	4.49	2.24	7.08	8.11	-8.46	7.95E-06
Aug	2000	35.00	1.57	0.06	0.54	0.69	6.95	8.11	-13.83	7.95E-06
Sep	2000	35.00	3.93	0.15	1.35	1.03	5.5	8.11	-11.23	7.95E-06
Oct	2000	35.00	2.88	0.11	0.99	1.08	3.74	8.11	-9.78	7.95E-06
Nov	2000	35.00	0.00	0	0.00	0.43	2.03	8.11	-9.71	7.95E-06
Dec	2000	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
Jan	2001	35.00	0.00	0	0.00	0.06	0.92	0.00	-0.86	0.00E+00
Feb	2001	35.00	0.00	0	0.00	0.58	1.23	0.00	-0.65	0.00E+00
Mar	2001	35.00	0.00	0	0.00	0.95	1.98	0.00	-1.03	0.00E+00
Apr	2001	35.00	19.66	0.75	6.74	2.46	3.3	8.11	-2.21	7.95E-06
May	2001	35.00	10.75	0.41	3.68	1.67	4.4	8.11	-7.16	7.95E-06
Jun	2001	35.00	31.19	1.19	10.69	3.22	5.76	8.11	0.04	7.95E-06
Jul	2001	35.00	82.82	3.16	28.44	4.98	7.08	8.11	18.20	7.95E-06
Aug	2001	35.00	6.81	0.26	20.54	1.28	6.95	8.11	6.74	7.95E-06
Sep	2001	35.00	0.00	0	6.74	0.33	5.5	8.11	-6.55	7.95E-06
Oct	2001	35.00	6.29	0.24	2.16	1.18	3.74	8.11	-8.52	7.95E-06
Nov	2001	35.00	5.77	0.22	1.98	1.3	2.03	8.11	-6.67	7.95E-06
Dec	2001	35.00	0.00	0	0.00	0.13	1.1	0.00	-0.97	0.00E+00
Jan	2002	35.00	0.00	0	0.00	0.04	0.92	0.00	-0.88	0.00E+00
Feb	2002	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	2002	35.00	0.00	0	0.00	1.44	1.98	0.00	-0.54	0.00E+00
Apr	2002	35.00	4.98	0.19	1.71	1.69	3.3	8.11	-8.02	7.95E-06
May	2002	35.00	6.03	0.23	2.07	1.68	4.4	8.11	-8.77	7.95E-06
Jun	2002	35.00	6.03	0.23	2.07	1.23	5.76	8.11	-10.58	7.95E-06
Jul	2002	35.00	1.57	0.06	0.54	0.74	7.08	8.11	-13.91	7.95E-06
Aug	2002	35.00	30.93	1.18	10.60	2.38	6.95	8.11	-2.08	7.95E-06
Sep	2002	35.00	16.77	0.64	5.75	2.47	5.5	8.11	-5.39	7.95E-06
Oct	2002	35.00	2.62	0.1	0.90	0.82	3.74	8.11	-10.13	7.95E-06
Nov	2002	35.00	0.26	0.01	0.09	0.33	2.03	8.11	-9.72	7.95E-06
Dec	2002	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
				4.86		16.82	44.00		26.41	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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2002-1988 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Jan	2002	35.00	0.00	0	0.00	0.04	0.92	0.00	-0.88	0.00E+00
Feb	2002	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	2002	35.00	0.00	0	0.00	1.44	1.98	0.00	-0.54	0.00E+00
Apr	2002	35.00	4.98	0.19	1.71	1.69	3.3	8.11	-8.02	7.95E-06
May	2002	35.00	6.03	0.23	2.07	1.68	4.4	8.38	-9.04	7.95E-06
Jun	2002	35.00	6.03	0.23	2.07	1.23	5.76	8.11	-10.58	7.95E-06
Jul	2002	35.00	1.57	0.06	0.54	0.74	7.08	8.38	-14.18	7.95E-06
Aug	2002	35.00	30.93	1.18	10.60	2.38	6.95	8.38	-2.35	7.95E-06
Sep	2002	35.00	16.77	0.64	5.75	2.47	5.5	8.11	-5.39	7.95E-06
Oct	2002	35.00	2.62	0.1	0.90	0.82	3.74	8.38	-10.40	7.95E-06
Nov	2002	35.00	0.26	0.01	0.09	0.33	2.03	8.11	-9.72	7.95E-06
Dec	2002	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
Jan	2003	35.00	0.00	0	0.00	0.47	0.92	0.00	-0.45	0.00E+00
Feb	2003	35.00	0.00	0	0.00	0.43	1.23	0.00	-0.80	0.00E+00
Mar	2003	35.00	6.81	0.26	2.34	1.92	1.98	0.00	2.28	0.00E+00
Apr	2003	35.00	15.46	0.59	7.56	1.96	3.3	8.11	-1.87	7.95E-06
May	2003	35.00	12.32	0.47	4.22	1.95	4.4	8.38	-6.61	7.95E-06
Jun	2003	35.00	11.01	0.42	3.77	2.8	5.76	8.11	-7.30	7.95E-06
Jul	2003	35.00	0.00	0	0.00	0.05	7.08	8.38	-15.41	7.95E-06
Aug	2003	35.00	21.23	0.81	7.28	1.89	6.95	8.38	-6.16	7.95E-06
Sep	2003	35.00	10.75	0.41	3.68	1.58	5.5	8.11	-8.35	7.95E-06
Oct	2003	35.00	0.52	0.02	0.18	0.6	3.74	8.38	-11.34	7.95E-06
Nov	2003	35.00	0.26	0.01	0.09	0.44	2.03	8.11	-9.61	7.95E-06
Dec	2003	35.00	2.10	0.08	0.72	0.6	1.1	0.00	0.22	0.00E+00
Jan	2004	35.00	0.00	0	0.22	0.3	0.92	0.00	-0.40	0.00E+00
Feb	2004	35.00	0.00	0	0.00	1.3	1.28	0.00	0.02	0.00E+00
Mar	2004	35.00	0.00	0	0.02	0.06	1.98	0.00	-1.90	0.00E+00
Apr	2004	35.00	0.00	0	0.00	0.32	3.3	8.11	-11.09	7.95E-06
May	2004	35.00	1.31	0.05	0.45	0.97	4.4	8.38	-11.36	7.95E-06
Jun	2004	35.00	1.05	0.04	0.36	1.26	5.76	8.11	-12.25	7.95E-06
Jul	2004	35.00	9.44	0.36	3.23	2.21	7.08	8.38	-10.02	7.95E-06
Aug	2004	35.00	1.57	0.06	0.54	0.98	6.95	8.38	-13.81	7.95E-06
Sep	2004	35.00	18.35	0.7	6.29	2.61	5.5	8.11	-4.71	7.95E-06
Oct	2004	35.00	18.08	0.69	6.20	1.69	3.74	8.38	-4.03	7.95E-06
Nov	2004	35.00	0.00	0	0.00	0.2	2.03	8.11	-9.94	7.95E-06
Dec	2004	35.00	0.00	0	0.00	0.08	1.1	0.00	-1.02	0.00E+00
Jan	2005	35.00	0.00	0	0.00	0.47	0.92	0.00	-0.45	0.00E+00
Feb	2005	35.00	0.00	0	0.00	0.1	1.23	0.00	-1.13	0.00E+00
Mar	2005	35.00	13.10	0.5	4.49	1.68	1.98	0.00	4.19	0.00E+00
Apr	2005	35.00	27.52	1.05	13.63	2.73	3.3	8.11	4.95	7.95E-06
May	2005	35.00	16.25	0.62	10.52	2.66	4.4	8.11	0.66	7.95E-06
Jun	2005	35.00	109.29	4.17	38.13	6.24	5.76	8.11	30.50	7.95E-06
Jul	2005	35.00	23.59	0.9	38.59	2.07	7.08	8.11	25.47	7.95E-06
Aug	2005	35.00	13.89	0.53	30.23	1.91	6.95	8.11	17.08	7.95E-06
Sep	2005	35.00	0.00	0	17.08	0.37	5.5	8.11	3.83	7.95E-06
Oct	2005	35.00	13.63	0.52	8.51	1.49	3.74	8.11	-1.86	7.95E-06
Nov	2005	35.00	0.00	0	0.00	0.04	2.03	8.11	-10.10	7.95E-06
Dec	2005	35.00	0.00	0	0.00	0.4	1.1	0.00	-0.70	0.00E+00
Jan	2006	35.00	0.00	0	0.00	0.26	0.92	0.00	-0.66	0.00E+00
Feb	2006	35.00	0.00	0	0.00	0.51	1.23	0.00	-0.72	0.00E+00
Mar	2006	35.00	0.00	0	0.00	0.93	1.98	0.00	-1.05	0.00E+00
Apr	2006	35.00	6.03	0.23	2.07	1.35	3.3	8.11	-8.00	7.95E-06
May	2006	35.00	18.08	0.69	6.20	2.11	4.4	8.11	-4.20	7.95E-06
Jun	2006	35.00	6.29	0.24	2.16	1.35	5.76	8.11	-10.37	7.95E-06
Jul	2006	35.00	45.06	1.72	15.46	3.15	7.08	8.11	3.41	7.95E-06
Aug	2006	35.00	5.24	0.2	5.21	1.34	6.95	8.11	-8.51	7.95E-06
Sep	2006	35.00	4.72	0.18	1.62	0.91	5.5	8.11	-11.09	7.95E-06
Oct	2006	35.00	1.57	0.06	0.54	0.69	3.74	8.11	-10.62	7.95E-06
Nov	2006	35.00	0.00	0	0.00	0.26	2.03	8.11	-9.88	7.95E-06
Dec	2006	35.00	0.00	0	0.00	0.36	1.1	0.00	-0.74	0.00E+00
Jan	2007	35.00	0.00	0	0.00	0.14	0.92	0.00	-0.78	0.00E+00
Feb	2007	35.00	0.00	0	0.00	0.44	1.23	0.00	-0.79	0.00E+00
Mar	2007	35.00	26.21	1	8.99	1.74	1.98	0.00	8.75	0.00E+00
Apr	2007	35.00	2.88	0.11	9.73	1.09	3.3	8.11	-0.59	7.95E-06
May	2007	35.00	15.99	0.61	5.48	1.72	4.4	8.11	-5.31	7.95E-06
Jun	2007	35.00	1.31	0.05	0.45	0.67	5.76	8.11	-12.75	7.95E-06
Jul	2007	35.00	46.13	1.76	15.81	3.5	7.08	8.11	4.12	7.95E-06
Aug	2007	35.00	9.44	0.36	7.38	2.05	6.95	8.11	-5.66	7.95E-06
Sep	2007	35.00	1.31	0.05	0.45	0.83	5.5	8.11	-12.33	7.95E-06
Oct	2007	35.00	13.10	0.5	4.49	1.72	3.74	8.11	-5.64	7.95E-06
Nov	2007	35.00	0.00	0	0.00	0.06	2.03	8.11	-10.08	7.95E-06
Dec	2007	35.00	0.00	0	0.00	0.37	1.1	0.00	-0.73	0.00E+00
Jan	1980	35.00	0.00	0	0.00	0.59	0.92	0.00	-0.33	0.00E+00
Feb	1980	35.00	0.00	0	0.00	0.77	1.28	0.00	-0.51	0.00E+00

2002-1988 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
Mar	1980	35.00	18.35	0.7	6.29	2.82	1.98	0.00	7.13	0.00E+00
Apr	1980	35.00	22.28	0.85	14.77	1.72	3.3	8.11	5.08	7.95E-06
May	1980	35.00	36.69	1.4	17.66	3.33	4.4	8.11	8.47	7.95E-06
Jun	1980	35.00	23.85	0.91	18.65	1.99	5.76	8.11	4.77	7.95E-06
Jul	1980	35.00	3.15	0.12	5.84	0.97	7.08	8.11	-8.38	7.95E-06
Aug	1980	35.00	14.94	0.57	5.12	1.85	6.95	8.11	-8.09	7.95E-06
Sep	1980	35.00	0.28	0.01	0.09	0.39	5.5	8.11	-13.13	7.95E-06
Oct	1980	35.00	5.77	0.22	1.98	1.01	3.74	8.11	-8.87	7.95E-06
Nov	1980	35.00	3.67	0.14	1.28	0.62	2.03	8.11	-8.28	7.95E-06
Dec	1980	35.00	0.00	0	0.00	0.68	1.1	0.00	-0.42	0.00E+00
Jan	1981	35.00	0.00	0	0.00	0.08	0.92	0.00	-0.84	0.00E+00
Feb	1981	35.00	0.00	0	0.00	0.27	1.23	0.00	-0.98	0.00E+00
Mar	1981	35.00	5.77	0.22	1.98	0.66	1.98	0.00	0.66	0.00E+00
Apr	1981	35.00	1.31	0.05	1.11	0.74	3.3	8.11	-9.57	7.95E-06
May	1981	35.00	27.26	1.04	9.35	3.22	4.4	8.11	0.05	7.95E-06
Jun	1981	35.00	14.94	0.57	5.17	1.73	5.76	8.11	-6.97	7.95E-06
Jul	1981	35.00	22.80	0.87	7.82	2.54	7.08	8.11	-4.84	7.95E-06
Aug	1981	35.00	3.41	0.13	1.17	1	6.95	8.11	-12.89	7.95E-06
Sep	1981	35.00	0.00	0	0.00	0.16	5.5	8.11	-13.45	7.95E-06
Oct	1981	35.00	34.60	1.32	11.86	2.92	3.74	8.11	2.93	7.95E-06
Nov	1981	35.00	0.00	0	2.93	0.04	2.03	8.11	-7.17	7.95E-06
Dec	1981	35.00	0.00	0	0.00	0.1	1.1	0.00	-1.00	0.00E+00
Jan	1982	35.00	0.00	0	0.00	0.18	0.92	0.00	-0.74	0.00E+00
Feb	1982	35.00	0.00	0	0.00	0.05	1.23	0.00	-1.18	0.00E+00
Mar	1982	35.00	0.00	0	0.00	1.34	1.98	0.00	-0.64	0.00E+00
Apr	1982	35.00	2.36	0.09	0.81	1	3.3	8.11	-9.60	7.95E-06
May	1982	35.00	50.06	1.91	17.16	4.18	4.4	8.11	8.83	7.95E-06
Jun	1982	35.00	56.61	2.16	28.24	4.45	5.76	8.11	18.82	7.95E-06
Jul	1982	35.00	11.79	0.45	22.88	2.2	7.08	8.11	9.87	7.95E-06
Aug	1982	35.00	25.42	0.97	18.58	3.29	6.95	8.11	6.81	7.95E-06
Sep	1982	35.00	12.06	0.46	10.94	2.42	5.5	8.11	-0.25	7.95E-06
Oct	1982	35.00	7.08	0.27	2.43	1.27	3.74	8.11	-8.18	7.95E-06
Nov	1982	35.00	12.58	0.48	4.31	1.3	2.03	8.11	-4.53	7.95E-06
Dec	1982	35.00	0.00	0	0.00	0.2	1.1	0.00	-0.90	0.00E+00
Jan	1983	35.00	0.00	0	0.00	0.22	0.92	0.00	-0.70	0.00E+00
Feb	1983	35.00	0.00	0	0.00	0.21	1.23	0.00	-1.02	0.00E+00
Mar	1983	35.00	4.46	0.17	1.53	0.89	1.98	0.00	0.44	0.00E+00
Apr	1983	35.00	1.05	0.04	0.80	0.75	3.3	8.11	-9.87	7.95E-06
May	1983	35.00	11.27	0.43	3.86	1.95	4.4	8.11	-6.70	7.95E-06
Jun	1983	35.00	48.49	1.85	16.62	4.25	5.76	8.11	7.00	7.95E-06
Jul	1983	35.00	6.29	0.24	9.16	1.05	7.08	8.11	-4.99	7.95E-06
Aug	1983	35.00	33.81	1.29	11.59	3.31	6.95	8.11	-0.16	7.95E-06
Sep	1983	35.00	0.26	0.01	0.09	0.28	5.5	8.11	-13.24	7.95E-06
Oct	1983	35.00	4.46	0.17	1.53	1.6	3.74	8.11	-8.73	7.95E-06
Nov	1983	35.00	12.58	0.48	4.31	1.8	2.03	8.11	-4.23	7.95E-06
Dec	1983	35.00	0.00	0	0.00	0.05	1.1	0.00	-1.05	0.00E+00
Jan	1984	35.00	0.00	0	0.00	1.37	0.92	0.00	0.45	0.00E+00
Feb	1984	35.00	0.00	0	0.45	0.28	1.28	0.00	-0.55	0.00E+00
Mar	1984	35.00	0.26	0.01	0.09	0.8	1.98	0.00	-1.09	0.00E+00
Apr	1984	35.00	28.04	1.07	9.61	3.59	3.3	8.11	1.79	7.95E-06
May	1984	35.00	35.91	1.37	14.10	2.93	4.4	8.11	4.52	7.95E-06
Jun	1984	35.00	5.77	0.22	6.50	1.91	5.76	8.11	-5.47	7.95E-06
Jul	1984	35.00	9.70	0.37	3.32	2.38	7.08	8.11	-9.49	7.95E-06
Aug	1984	35.00	8.85	0.33	2.97	1.68	6.95	8.11	-10.42	7.95E-06
Sep	1984	35.00	0.00	0	0.00	0.4	5.5	8.11	-13.21	7.95E-06
Oct	1984	35.00	0.52	0.02	0.18	0.63	3.74	8.11	-11.04	7.95E-06
Nov	1984	35.00	4.48	0.17	1.53	0.57	2.03	8.11	-8.05	7.95E-06
Dec	1984	35.00	0.00	0	0.00	0.35	1.1	0.00	-0.75	0.00E+00
Jan	1985	35.00	0.00	0	0.00	0.17	0.92	0.00	-0.75	0.00E+00
Feb	1985	35.00	0.00	0	0.00	0.57	1.23	0.00	-0.66	0.00E+00
Mar	1985	35.00	0.00	0	0.00	0.77	1.98	0.00	-1.21	0.00E+00
Apr	1985	35.00	47.44	1.81	16.26	3.15	3.3	8.11	8.00	7.95E-06
May	1985	35.00	2.62	0.1	8.90	1.05	4.4	8.11	-2.56	7.95E-06
Jun	1985	35.00	1.57	0.06	0.54	1.03	5.76	8.11	-12.30	7.95E-06
Jul	1985	35.00	2.36	0.09	0.81	1.2	7.08	8.11	-13.18	7.95E-06
Aug	1985	35.00	0.00	0	0.00	0.5	6.95	8.11	-14.56	7.95E-06
Sep	1985	35.00	12.32	0.47	4.22	1.99	5.5	8.11	-7.40	7.95E-06
Oct	1985	35.00	1.05	0.04	0.36	0.68	3.74	8.11	-10.81	7.95E-06
Nov	1985	35.00	0.00	0	0.00	0.22	2.03	8.11	-9.92	7.95E-06
Dec	1985	35.00	0.00	0	0.00	0.41	1.1	0.00	-0.69	0.00E+00
Jan	1986	35.00	0.00	0	0.00	1.63	0.92	0.00	0.71	0.00E+00
Feb	1986	35.00	0.00	0	0.71	1.06	1.23	0.00	0.54	0.00E+00
Mar	1986	35.00	0.00	0	0.54	0.52	1.98	0.00	-0.92	0.00E+00
Apr	1986	35.00	32.24	1.23	11.05	3.27	3.3	8.11	2.91	7.95E-06

2002-1988 Estimated Monthly Water Balance for Evap Pond--Burdock Site (XB Run)

		Assumed Pond Area (ac)	Mon. Runoff Vol (ac-ft)	Mon. Runoff (in)	Beg. Mon. Pond Depth (in/mo)	Mon. Precip. (in/mo)	Mo. PET (in/mo)	Mo. Seepage (in/mo)	End Mon. Pond Depth (in/mo)	Burdock Perm. (cm/sec)
May	1986	35.00	8.39	0.32	5.79	1.07	4.4	8.11	-5.88	7.95E-06
Jun	1986	35.00	68.40	2.61	23.45	4.87	5.76	8.11	14.45	7.95E-06
Jul	1986	35.00	5.24	0.2	18.25	1.83	7.08	8.11	2.68	7.95E-06
Aug	1986	35.00	6.81	0.26	5.02	1.19	6.95	8.11	-8.85	7.95E-06
Sep	1986	35.00	18.08	0.69	6.20	3.52	5.5	8.11	-3.89	7.95E-06
Oct	1986	35.00	50.84	1.94	17.43	3.88	3.74	8.11	9.46	7.95E-06
Nov	1986	35.00	2.10	0.08	10.18	0.86	2.03	8.11	0.90	7.95E-06
Dec	1986	35.00	0.00	0	0.90	0.09	1.1	0.00	-0.11	0.00E+00
Jan	1987	35.00	0.00	0	0.00	0.13	0.92	0.00	-0.79	0.00E+00
Feb	1987	35.00	0.00	0	0.00	0.87	1.23	0.00	-0.36	0.00E+00
Mar	1987	35.00	3.15	0.12	1.08	2.22	1.98	0.00	1.32	0.00E+00
Apr	1987	35.00	4.98	0.19	3.03	0.69	3.3	8.11	-7.70	7.95E-06
May	1987	35.00	25.16	0.96	8.63	2.97	4.4	8.11	-0.92	7.95E-06
Jun	1987	35.00	0.79	0.03	0.27	0.59	5.76	8.11	-13.01	7.95E-06
Jul	1987	35.00	15.73	0.6	5.39	1.71	7.08	8.11	-8.09	7.95E-06
Aug	1987	35.00	2.36	0.09	0.81	1.04	6.95	8.11	-13.21	7.95E-06
Sep	1987	35.00	1.83	0.07	0.63	0.76	5.5	8.11	-12.22	7.95E-06
Oct	1987	35.00	0.26	0.01	0.09	0.42	3.74	8.11	-11.34	7.95E-06
Nov	1987	35.00	5.50	0.21	1.89	0.71	2.03	8.11	-7.55	7.95E-06
Dec	1987	35.00	0.26	0.01	0.09	0.25	1.1	0.00	-0.76	0.00E+00
Jan	1988	35.00	0.00	0	0.00	0.63	0.92	0.00	-0.29	0.00E+00
Feb	1988	35.00	0.00	0	0.00	0.21	1.28	0.00	-1.07	0.00E+00
Mar	1988	35.00	0.00	0	0.00	1.17	1.98	0.00	-0.81	0.00E+00
Apr	1988	35.00	1.57	0.06	0.54	0.63	3.3	8.11	-10.24	7.95E-06
May	1988	35.00	20.18	0.77	6.92	2.64	4.4	8.11	-2.95	7.95E-06
Jun	1988	35.00	40.36	1.54	13.84	2.78	5.76	8.11	2.75	7.95E-06
Jul	1988	35.00	23.33	0.89	10.74	2.18	7.08	8.11	-2.27	7.95E-06
Aug	1988	35.00	25.42	0.97	8.72	1.87	6.95	8.11	-4.48	7.95E-06
Sep	1988	35.00	1.05	0.04	0.36	0.84	5.5	8.11	-12.41	7.95E-06
Oct	1988	35.00	0.00	0	0.00	0.09	3.74	8.11	-11.78	7.95E-06
Nov	1988	35.00	0.26	0.01	0.09	0.52	2.03	8.11	-9.53	7.95E-06
Dec	1988	35.00	0.00	0	0.00	0.23	1.1	0.00	-0.87	0.00E+00
				4.29		15.62	44.00		30.50	

Assumes seepage is 0.00 for January, February, March and December due to frozen soils
Trial is for bare soil, 314.5 acres irrigated area

Permeability value is geometric mean of three available permeability values from Burdock test pits, see
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Powertech (USA) Inc.

APPENDIX 4.4-A

RECLAMATION COST ESTIMATE

Powertech (USA) Inc.

LAND APPLICATION

Powertech (USA) Inc.

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

Powertech (USA), Inc.	2010	2011	2012	2013	2014	2015	2016	Total
Production (lbs U3O8)		**500,000**	**8,411**	**-**	**-**	**-**	**-**	
Restoration Flow - Dewey (gpm)			250					
Restoration Flow - Burdock (gpm)			250					
Capital Cost								
Restoration Equipment	1,330,000	1,330,000						2,660,000
								2,660,000
Operations								
Labor	-	81,000	811,000	189,000	81,000			1,162,000
Electricity			574,320					574,000
Chemicals	-	-	8,500	-	-	-	-	9,000
Maintenance			297,471					297,000
Byproduct Disposal			14,690					15,000
Monitoring	-	-	157,986	183,292				341,000
								2,398,000
Decommissioning								
Labor (included above)								
Well Closure					-	353,000	353,000	706,000
Mob/Site Preparation						25,000		25,000
Demo and Disposal - 11 e(2)						744,500	744,500	1,489,000
Equipment Transferred						121,500	121,500	243,000
Demo and Disposal - Landfill						1,395,000	1,395,000	2,790,000
Other Reclamation						1,057,000	1,057,000	2,114,000
								7,367,000
Contingency								
Contingency at 15%	199,500	211,650	279,595	55,844	12,150	554,400	550,650	1,664,000
								1,664,000
Total Costs	**1,529,500**	**1,622,650**	**2,143,562**	**428,135**	**93,150**	**4,250,400**	**4,221,650**	**14,089,000**

DRAFT 11/11/08

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Preliminary Capital Cost Estimate - CPP Restoration Equipment

Description	Equipment List Number	No./Size	Quantity	Units	Unit Cost	Purchase Cost	Shipping Cost	Estimated Capital Cost
Restoration System								
Restoration IX Vessel (118,600 ea + 15k distributor + 8k delivery)	300-IX-001A, B		2	each	141,600	283,000	16,000	299,000
IX resin - Dowex 21K XLT	NA	2	500	cu ft	221	221,000	4,420	225,000
PC Booster Pump (250 gpm; 90' TDH)	300-P-001 A, B, C		2	each	5,318	11,000	550	12,000
IC Booster Pump	300-P-002 A, B, C		2	each	4,993	10,000	500	11,000
RO Sump Pump	300-P-011, spare		0	each	1,915	0	0	0
RO Skid (Incl pretrmt, filtration and feed pump) 500 gpm	300-RO-001		0	each	413,689	0	0	0
Estimated Restoration Equipment - Subtotal:								**547,000**
	Other Materials (% of Delivered Equipment Cost)	Subcontracts (% of Delivered Equipment Cost)	Direct Labor (% of Delivered Equipment Cost)					
Process Equipment	100	15	5		120.0			656,000
Site Preparation	0	0	0		0.0			0
Site Improvements	0	0	0		0.0			0
Concrete	0	0	0		0.0			0
Structural Steel	0	0	0		0.0			0
Buildings	0	0	0		0.0			0
Underground Piping	0	0	0		0.0			0
Above-ground Piping	17	3	14		34.0			186,000
Underground Electric	0	0	0		0.0			0
Above-ground Electric	10		7.5		17.5			96,000
Instrumentation	7	0.5	3.9		11.4			62,000
Insulation	0	0	0		0.0			0
Painting	0.4		0.4		0.8			4,000
Paving	0	0	0		0.0			0
Proratables	1.5		2.25		3.8			21,000
Totals	135.9	18.5	33.05		187.5			
Discipline Costs	$743,000	$101,000	$181,000		1,025,000			
Estimated Restoration Direct Costs - Subtotal:								**1,025,000**

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Preliminary Capital Cost Estimate - CPP Restoration Equipment

Description	Equipment List Number	No./Size	Quantity	Units	Unit Cost	Purchase Cost	Shipping Cost	Estimated Capital Cost
Field Indirect Costs	(% of Direct Labor)							
Construction Equipment	31							**56,000**
Overhead and Indirects								
Indirect Labor	10							
Temporary Construction Facilities	15							
Burdens and Benefits	20							
Small Tools and Consumables	5							
Other Indirects	5							
Total Overhead and Indirects	55							**100,000**
Estimated Restoration Field Indirect Costs - Subtotal:								**156,000**
Direct and Indirect Costs - Subtotal:								**1,181,000**
Estimated Restoration Direct and Indirect Costs - Subtotal:								**1,181,000**
Engineering	7	%						83,000
Fee (Excluding Delivered Equipment)	5	%						32,000
Spares (% of Delivered Equipment)	5	%						27,350
Estimated Restoration Fixed Capital Investment (Per Site)- Total:								**1,330,000**
Estimated Restoration Fixed Capital Investment (Project)- Total:								**2,660,000**

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

Color Legend

- **Site Management**
- **Capital Labor**
- **Central Plant**
- **Satellite/WF**
- **Restoration/Decom**

			2009	2010	2011	2012	2013	2014	2015	2016
Labor	Geology									
		Senior Project Geologist	1	1	1					
		Project Geologists	2	4	4					
		Drafting Technicians	1	3	3					
		Subtotal								
	Construction/Drilling									
		Construction Superintendent		1	1				0	0
		Drilling Foreman		1	1					
		Drilling Services Leadman		1	1			0	0	0
		Drilling Services Technicians		6	6			0	0	0
		Logging and MIT Technicians		7	7					
		Drilling Supervisor		1	1					
		Wellfield Construction Foreman		1	1					
		General Construction Technicians		8	4		0	0	4	4
		Electrical/Instrumentation		2	2					
		Heavy Equipment		4	2			0	2	2
		Construction Engineer		1	1			0	1	1
		Subtotal								
	Production									
		Production Superintendent			1					
		Wellfield Operations Supervisor			1					
		Wellfield Engineer			1					
		Wellfield/Satellite Operations Leadman			1					
		Wellfield/Satellite Operators			12	4	0			
		Restoration Engineer			1	1	1	1		
		Restoration Operator				1	0	0		
		Groundwater Sampling Technician	1	2	2	0	0	0		
		Groundwater Sampling Technician				2	2	0		
		Central Plant Operations Supervisor			1	1	0	0		
		Central Plant Operations Leadman			1					
		Central Plant Operators			4	1	0	0		
		Central Plant Operators - Day			4					
		Dryer Operators			2					
		Chemist/Lab Supervisor			1					
		Lab Technicians			4	1	0	0		
		Maintenance Supervisor			1					
		General Maintenance Techs			4	1	0	0		
		Mechanics			3					
		Electrical/Instrumentation			2	1	0	0		
		Subtotal								

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

Color Legend
- Site Management
- Capital Labor
- Central Plant
- Satellite/WF
- Restoration/Decom

		2009	2010	2011	2012	2013	2014	2015	2016
Unit Labor Costs									
Geology				0	0	0	0	0	0
Senior Project Geologist	135,000	135000	135000	135000	0	0	0	0	0
Project Geologists	95,000	190000	380000	380000	0	0	0	0	0
Drafting Technicians	54,000	54000	162000	162000	0	0	0	0	0
Subtotal				0	0	0	0	0	0
Construction/Drilling				0	0	0	0	0	0
Construction Superintendent	135,000	0	135000	135000	0	0	0	0	0
Drilling Foreman	95,000	0	95000	95000	0	0	0	0	0
Drilling Services Leadman	81,000	0	81000	81000	0	0	0	0	0
Drilling Services Technicians	54,000	0	324000	324000	0	0	0	0	0
Logging and MIT Technicians	54,000	0	378000	378000	0	0	0	0	0
Drilling Supervisor	68,000	0	68000	68000	0	0	0	0	0
Wellfield Construction Foreman	68,000	0	68000	68000	0	0	0	0	0
General Construction Technicia	41,000	0	328000	164000	0	0	0	164000	164000
Electrical/Instrumentation	81,000	0	162000	162000	0	0	0	0	0
Heavy Equipment	54,000	0	216000	108000	0	0	0	108000	108000
Construction Engineer	81,000	0	81000	81000	0	0	0	81000	81000
Subtotal				0	0	0	0	0	0
Production				0	0	0	0	0	0
Production Superintendent	135,000	0	0	135000	0	0	0	0	0
Wellfield Operations Supervisor	95,000	0	0	95000	0	0	0	0	0
Wellfield Engineer	81,000	0	0	81000	0	0	0	0	0
Wellfield/Satellite Operations Le	68,000	0	0	68000	0	0	0	0	0
Wellfield/Satellite Operators	54,000	0	0	648000	216000	0	0	0	0
Restoration Engineer	81,000	0	0	81000	81000	81000	81000	0	0
Restoration Operator	68,000	0	0	0	68000	0	0	0	0
Groundwater Sampling Tech	54,000	54000	108000	108000	0	0	0	0	0
Groundwater Sampling Tech	54,000	0	0	0	108000	108000	0	0	0
Central Plant Operations Super	122,000	0	0	122000	122000	0	0	0	0
Central Plant Operations Leadn	81,000	0	0	81000	0	0	0	0	0
Central Plant Operators	54,000	0	0	216000	54000	0	0	0	0
Central Plant Operators - Day	54,000	0	0	216000	0	0	0	0	0
Dryer Operators	54,000	0	0	108000	0	0	0	0	0
Chemist/Lab Supervisor	95,000	0	0	95000	0	0	0	0	0
Lab Technicians	47,000	0	0	188000	47000	0	0	0	0
Maintenance Supervisor	61,000	0	0	61000	0	0	0	0	0
General Maintenance Techs	41,000	0	0	164000	41000	0	0	0	0
Mechanics	61,000	0	0	183000	0	0	0	0	0
Electrical/Instrumentation	74,000	0	0	148000	74000	0	0	0	0
Subtotal									

	2009	2010	2011	2012	2013	2014	2015	2016
Restoration and Reclamation Labor Cost			81000	811000	189000	81000	353000	353000

Powertech (USA) Inc.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units
General Operating Assumptions		
1 Production objective	1,000,000	# of U3O8 per year
2 Ave. wellfield design based on # yellowcake per sq ft of ore reserve, equals:	1.60	lb/sq ft
3 ISR recovery efficiency of:	0.75	recovery efficiency
4 First Year production rate	0.91	pounds/yr/sq ft
Average grade of producted water (ppm U3O8)		
5 Area required to meet production objective (online all the time)	911,458	sq ft
	21	acres
6 Area per pattern	10,000	sq ft/pattern
7 Number of online patterns required to meet production objective	91	patterns
8 Number of online Production Wells required to meet production objective	91	production wells
Assuming 20 gpm/production well, total production flow rate equals:	1,823	gpm
Assuming 350 days/yr pumping, average U3O8 grade to meet production objective equals:	130	ppm U3O8
If total flowrate limited to 4,000 gpm, average grade to meet production objective equals:	59	ppm U3O8
9 I/R Ratio	1.6	inj wells/prod wells
10 Number of online Injection Wells required to meet objective	146	injection wells
11 Number of online Production Wells per Header House	18	production wells/HH
12 Number of HH required to meet production objective	5.1	HH
13 Number of Perimeter Monitoring Wells per Header House	2.0	monit wells/HH
14 Number of Internal Monitoring Wells per HH (1 upper +1 lower)	2.0	monit wells/HH
15 Number of Compliance Wells per HH (1300 LF spacing)	0.6	comp wells/HH
16 Subtotal # Monitor wells per HH during production	4.6	total mw/HH
17 Total # Monitoring wells per 1MM # produced during production	23.4	total MW

	Number	Quantity	Units	Rate	Cost ($/yr)
Assumed electricity rate incl demand charge ($/kwh)	0.07				
Wellfields					
Wells (per well)					
Electric utilities:					
Production well pumps - 20 gpm @ 400 ft TDH	1	20,000	kwh	0.070	1,400
Wellhead heaters (0.5 kw, 180 days/yr)	1	2,000	kwh	0.070	100
Subtotal Power					**1,500**
Header House (per HH)					
Replacement flow meters (x%/yr)	10	1	ea	50	500
Replacement pressure gauges/switches	20	1	ea	50	1,000
Equip maintenance (@ 10% of new equipment capital)	1	80,000	%	0.10	8,000
Subtotal Maintenance					**9,500**

Powertech (USA) Inc.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units			
Electric utilities:					
Bldg heating (5 kw, 180 days/yr)	1	22,000	kwh	0.070	1,500
Instrumentation (1 kw)	1	9,000	kwh	0.070	600
Subtotal Power					**2,100**
General well field area					
Pipelines		1	lump sum	50,000	50,000
Road maintenance materials (gravel/culverts)		1	lump sum	10,000	10,000
Wireless telemetry and security systems maintenance		1	lump sum	2,000	2,000
Subtotal Maintenance					**62,000**
Oxygen/Carbon Dioxide Injection					
Oxygen gas per year		0	tons/yr	1,100	0
Carbon dioxide gas per year		0	tons/yr	1,160	0
Subtotal Chemicals					**0**
Satellite Plant					
Ion exchange resin replacement - DOWEX 21K XLT		0	cu ft	221	0
Electric utilities:					
PC Booster Pump	2	605,491	kwh	0.070	42,400
IC Booster Pump	2	605,491	kwh	0.070	42,400
Resin Transfer Pump	1	8,830	kwh	0.070	600
Utility Water Pump	1	11,773	kwh	0.070	800
HVAC		105,120	kwh	0.070	7,400
Lighting (0.8 W/ft^2)	10000	52,560	kwh	0.070	3,700
Instrumentation (2 kw)	1	18,000	kwh	0.070	1,300
Subtotal Power					**12,400**
Resin Transport to CPP		6	R/T per yr	50	**300**
Land Application (assume 20% to wellfield production)					
Electric utilities 136 days/year (growing season May 11 - Sept 24):					
Land app pumps Dewey (849 gpm at assume 200' TDH)	1	207,509	kwh	0.07	14,500
Land app pumps Dewey (849 gpm at assume 200' TDH)	1	207,509	kwh	0.07	14,500
Center pivot hydraulic pump; 10 hp for 25 ac areas (use 8 RHP)	7	137,000	kwh	0.07	67,100
Center pivot hydraulic pump; 15 hp for 50 ac areas (use 13 RHP)	14	444,000	kwh	0.07	435,100
Sump pump at 25 ac land app site (return irrigation tailwater/runoff)	7	3,000	kwh	0.07	1,500
Sump pump at 50 ac land app site (return irrigation tailwater/runoff)	14	10,000	kwh	0.07	9,800
Subtotal Power					**543,000**
Assume 81% to Well Field Restoration					**439,830**
Equipment Maintenance:					
Center pivot machines	26	1	year	500	13,000
Equip Maintenance (@ 3% of new equipment capital) - pumps only		78,000	%	3	2,300
Equipment Replacement (@ 3% of new equipment capital)		1,464,000	%	3	43,900
Subtotal Maintenance					**59,000**
Assume 81% to Well Field Restoration					**47,790**

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units			
Water Supply Power @65 gpm					
Groundwater extraction (65 gpm; 400 TDH; 24 hr/day)	1	64,000	kwh	0.070	**4,000**
Offsite Deep Disposal Well(s) @ 12 gpm					
Trucking to Burns, WY (214 gal/day = 6 trips/year)	2	412	miles/RT	3.50	**17,000**
Injection pump maintenance and repair (assume 6% of cap cost)	1	150,000	Cap cost	0.06	**9,000**
Electric utilities:					
Deep disposal well PD pump (4, but only one operating)					
12 gpm@300 psi = 130 gpm @1000 TDH	1	1,000	kwh	0.070	100
Bldg heating (1 kw, 180 days/yr)	1	4,000	kwh	0.070	300
Subtotal					**0**
Storage and Radium Settling Ponds					
Electrical for transfer pumps (120 gpm @ 300" TDH)	1	88,000	kwh	0.07	**6,160**
Pond Maintenance ($2,800/pond/yr)	1	11	year	2,800	**30,800**
Subtotal					**36,960**
Equipment When Restoration Operations are underway (in addition to production)					
Header Houses					
Equip maintenance (@ 3 % of new equipment capital)		0	%	0.03	0
Subtotal					**0**
Electric utilities:					
Bldg heating (5 kw, 180 days/yr)	5.0	108,000	kwh	0.070	7,600
Instrumentation (1 kw)	5.0	44,000	kwh	0.070	3,100
Subtotal					**10,700**
Restoration					
Restoration Assumptions					
Reclamation consists of 10 PV of activity		10	PVs		
Assume PV = area/1M pounds U3O8 recovered (see operating assumptions above) x 10 ft thick x 20% porosity x 1.5 flare factor x 7.48 gal/cu ft		20,453,125	gallons/M# recovered		
Unit volume required per 1M # recovered per year		1.14			
Volume of flush water required per year		233,165,625	gallons/yr		
Nomical restoration design flow rate (both sites)		500	gpm		
Years to Reclaim 1M pounds of U3O8 recovered		0.89	years		
Treatment Chemicals	**Number**	**Quantity**	**Units**	**Rate**	**Cost ($/yr)**
IX Cost (see KC Restoration Treatment Cost 10_9_08)			LS	1.000	8,500
Subtotal					**8,500**
Treatment Maintenance					
IX Resin Replacement - assume 4% of cap cost		225,000	cap cost	0.040	9,000
Process hardware maintenance + replmt @ 4% of Capital		994,000	cap cost	0.040	39,760
Subtotal					**49,000**

Powertech (USA) Inc.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units			
Booster Pumps from CPP to Storage Ponds					
Booster Pumps (2 - 250 gpm; 200 TDH; 24 hr/day)	2	245,000	kwh	0.070	**17,000**
Water Supply Power					
Groundwater extraction (500 gpm; 500 TDH; 24 hr/day)	1	612,000	kwh	0.070	**43,000**
Well Field Power					
Groundwater extraction (500 gpm; 400 TDH; 24 hr/day)	1	489,000	kwh	0.070	34,000
Treated water reinjection (500 gpm; 200 TDH; 24 hr/day)	1	245,000	kwh	0.070	17,000
Subtotal					**51,000**
SubTotal Treatment and Power Cost					**168,500**
Land Application (see RTJ Estimate 10_19_08) (assume 81% to Restoration)					
- Land Appication design 620 gpm of annual flow (restoration = 500 gpm or 81% of design)					
Electric utilities 136 days/year (growing season May 11 - Sept 24):					
Land app pumps Dewey (849 gpm at assume 200' TDH)	1	415,000	kwh	0.07	29,100
Land app pumps Dewey (849 gpm at assume 200' TDH)	1	415,000	kwh	0.07	29,100
Center pivot hydraulic pump; 10 hp for 25 ac areas (use 8 RHP)	7	137,000	kwh	0.07	67,100
Center pivot hydraulic pump; 15 hp for 50 ac areas (use 13 RHP)	14	444,000	kwh	0.07	435,100
Sump pump at 25 ac land app site (return irrigation tailwater/runoff)	7	3,000	kwh	0.07	1,500
Sump pump at 50 ac land app site (return irrigation tailwater/runoff)	14	10,000	kwh	0.07	9,800
Subtotal Power					**572,000**
Assume 81% to Well Field Restoration					**463,320**
Equipment Maintenance:					
Center pivot machines	26	1	year	500	13,000
Equip Maintenance (@ 3% of new equipment capital) - pumps only		78,000	%	3	2,300
Equipment Replacement (@ 3% of new equipment capital)		1,464,000	%	3	43,900
Subtotal Maintenance					**59,000**
Assume 81% to Well Field Restoration					**47,790**

Powertech (USA) Inc.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.

			100x100 Grid			
Wellfield Maintenance (per MM # produced)						
# Production wells			91	prod wells		
# Injection wells			146	inj wells		
Well maintenance (assume $500/well)			119,000	$/yr		
Replacement of submersible pumps (say 10%/yr @ 2,000 each)			18,000	$/yr		
# Header houses (per MM # produced)			5.1	#HH/yr		
Header House maintenance	9,500	per HH	48,450	$/yr		
Restoration Assumptions and Cost						
Years to Reclaim wellfields per 1M pounds of U3O8 recovered (see Operating Cost)			0.89	years		
Well Field and Treatment Operating Cost					Electricity	574,320
Treatment Chemicals (see Operating Cost)			8,500	$/yr	Chem	8,500
Treatment Maintenance (see Operating Cost)			49,000	$/yr	Maint	297,471
Treatment Power (see Operating Cost)			17,000	$/yr		
Water Supply Power (see Operating Cost)			43,000	$/yr		
Water Supply pump replacement (10% of supply pump costs)	75000		7,500	$/yr		
Well Field Power (extraction and injection) (see Operating Cost)			51,000	$/yr		
Well maintenance ($300/well)	300		71,000	$/yr		
Submersible pump replacement (10% of well field pump costs)			18,000	$/yr		
Well Field Piping Maintenance (assume 50,000/yr)			50,000	$/yr		
Header House						
Replacement meters, gages, and equip (see Operating Cost)	10,700	/HH	54,181	$/yr		
Land Application						
Power Cost (see Operating Cost)			463,320	$/yr		
Maintenance Cost (see Operating Cost)			47,790	$/yr		
Restoration Operating Cost			**511,110**	**$/yr**		
Stability Monitoring/Decommissioning						
Equipment Decommissioning (see Decommissioning worksheet)						
Wellfield Decommissioning						
Unit cost per well (assume ave depth of 650 feet)						
5" diameter casing =			0.136	CF/LF		
Average well depth =			650	LF		
Cubic ft per well =			88.4	CF		
Cement grout cost =			9.00	$/CF		
Cement grout cost/well			795.60	$/well		
contractor labor w/ equipment = 4 crew-hr/well @ $125/hr = $500.			500	$/well		
Total abandonment cost/well (rounded) =			1,300	$/well	Expend	338,500
Monitoring wells	#wells =	140	182,000	$LS		
Production and Injection wells	#wells =	1422	1,848,600	$LS		
Piping, power, and HH (see Decommissioning worksheet)			-	$LS		
Total Wellfield Decommissioning			**2,031,000**	**$LS**		
Well Decomm Cost per 1M# U			**338,500**	**$/M# U**		

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.

Chemicals:			
Hydrogen peroxide - 50% solution	lb	0.30	$/lb
Sulfuric acid - 98%	lb	0.135	$/lb
Sodium hydroxide - 50% solution	lb	0.145	$/lb
Sodium chloride - all purpose food grade granular	lb	0.09	$/lb
Sodium carbonate	lb	0.135	$/lb
Barium chloride - dry powder	lb dihydrate	0.67	$/lb
Flocculant	gal	1	$/lb
O2	ton of gas	1,100	$/ton
CO2	ton of gas	1,160	$/ton
Restoration Assumptions:			
Flowrate:		500	gpm
Uranium Concentration		5	ppm
Uranium Concentration in IX tails		1	ppm
Annual Production of Restoration Activities		8411	lb U3O8

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cost of Chemicals										
Hydrogen peroxide - 50% solution			900							
Sulfuric acid - 98%			1100							
Sodium hydroxide - 50% solution			1100							
Sodium chloride			3400							
Sodium carbonate			1,000							
Barium chloride - dry powder			1,000							
Flocculant			0							
Subtotal			8,500	-	-	-	-	-	-	-

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Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Byproduct Waste During Operations

Restoration					-		
RO waste and IX waste	Assume costs included in CPP	0			-		
Well Field waste	Assume 1 drum/wk = 7.5 CF/wk	390	CF/yr	7.00	2,730	2,167	4,897
PPE	Assume 1 drum/wk = 7.5 CF/wk	390	CF/yr	7.00	2,730	2,167	4,897
Decon waste	Assume 1 drum/wk = 7.5 CF/wk	390	CF/yr	7.00	2,730	2,167	4,897
					-	**Subtotal**	**14,690**

* Assume Transport to Andrews, Texas @ 710 miles from Site. Assume $3.50/loaded mile with 20 CY load, and $1.85 /unloaded mile. Thus, $2,485 per 20 CY.
Therefore, use $5.35 * 710 = $3,000 per 20 CY.

POWERTECH (USA) INC.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Environmental Monitoring

		Number	Quantity	Units	Rate ($)	Cost ($/yr)	
Met Station	Assume 1 met station for Site	1	12	visits/yr	200	2400	
Water Qual							
	20 metals, mercury, alk, Cl, SO4, NO3, Fl, EC, pH, and TDS (Test America) @ $350 (w/shipping)						
	spec, Th, U, and gross A/B (Test America) @ $550 (w/ shipping)						
	Baseline: Six quarterly samples from each perimerer + interior well + 1 production well per 8 acres for 1 year. Add 20% for QA/QC. Assume full analyte list (see above) at $900/sample, plus $100/sample for data packages, shipping, and expendibles - $1,000/sample.	6	24	wells/yr	1000	145,833	$/MM#
	Production A: Sem-Annual sampling from each perimeter + interior well during production. Add 20% for QA/QC. Assume 50% of full analyte list = $500/sample.	2	24	wells/yr	500	24,306	$/yr-production
	Production B: Bi-weekly sampling from all perimeter + interior wells, plus 20% for QA/QC. Analytes are parameters that can be tested in CPP lab, so only cost is for expendible supplies - say $10/sample.	26	24	wells/yr	10	6,319	$/yr-production
	Period between end of production and start of restoration: Assume same as Production A and Production B.					30,625	$/yr-transition
	Restoration A: Same and Production A.	2	24	wells/yr	500	24,306	$/yr-restoration
	Restoration B: At end of restoration, production, perimeter, and interior wells, plus 20% for QA/QC, are sampled for full analyte list.	1	134	wells	1000	133,681	$/MM#
	Stability A: Same as Restoration A for one year.	2	24	wells/yr	1000	48,611	$/yr-stability
	Stability B: Same as Restoration B following Stability monitoring.	1	134	wells	1000	133,681	$/MM#

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Environmental Monitoring

		Number	Quantity	Units	Rate ($)	Cost ($/yr)	
	Compliance: Assume annual sampling from all compliance wells in mined areas until closure is certified. Use 6 wells per 1M# recovered. Assume analytical cost is $800/sample.	1	6	wells/yr/M#	800	4,800	$/yr-cumulative
Radon	CPP (10 dose buttons quarterly)	4	10	buttons/qtr	50	2,000	$/year
	Satell/Well Field (5 dose buttons/quarter)	4	5	buttons/qtr	50	1,000	$/year
	Restor/Decom (5 buttons quarterly)	4	5	buttons/qtr	50	1,000	$/year

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Restoration/Stability												
Restoration A				24,306								
Restoration B				133,681								
Stability A					48,611							
Stability B					133,681							
Radon					1,000							
TOTAL				157,986	183,292	-	-	-	-	-	-	-

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Dewey-Burdock Project

Description	cf, gals, dimensions	No./Size	Quantity	Units	Unit Cost	Estimated Demo Cost		Volume (cf) to Load on Trucks	Notes:
Misc Upfront Demo Costs									
Mobilization/demobilization for project demo			1	LS	25,000	25,000			
Subtotal Misc Upfront Demo:						**25,000**		**0**	
						Mob/Site Prep	**25,000**		
Materials to Demo and Send to 11e(2) Disposal Site									
CPP Pond (liner and leak detection system)									
80 mil HDPE primary liner			166,295	sq ft	0.05	8,300		6,396	
Radium Settling Ponds (liner and leak detection system)									
80 mil HDPE primary liner			2,772,480	sq ft	0.05	138,600		106,634	
Subtotal Materials to Demo and Send to Rad Waste Disposal Site:						**146,900**		**113,000**	cu ft
Subtotal - Volume of Material to be Disposed in Rad Waste Landfill:								**113,000**	cu ft
Transportation/Disposal of 11e(2) Waste									
Load 30 cy rolloffs at site w/ FE loader			4,185	cy	2	8,400			
30 cy rolloff haul (710 mi one-way to Andrews, TX)	$3.50/mi x $710 mi RT+$1.98/mi x $1.98		140	30 cy	3,891	542,800			
Disposal at Waste Control Specialists Andrews, TX			113,000	cf	7	791,000			
Subtotal Transportation/Disposal Rad Waste:						**1,342,200**			
						By-Product Disposal	**1,489,000**		
Equipment/Materials to be Sold or Recycled (demolition and transport to recycling facility)									
Pad or pole-mounted transformers (one per Header Hse) - 10 per truckload		31	3	LS	500	1,600			
Haul transformers to Rapid City (100 mi one-way)		3	200	mile	3.50	2,200			
Wire in OHE lines - 47,000' of OHE at Dewey; 54,000' at Burdock - 4 wires			404,000	lf	0	0			
Valve vaults: cut off lid and dispose of lid	200	31	0.5	hrs	50	775			
Valve vaults: truck haul to recycler			200	mile	3.50	700			
Chain-link fencing									
Around CPP site			2,240	lf	3.43	7,700			
Around Satellite site			1,440	lf	3.43	4,900			
Around CPP pond (380' sq)		440' per side	1,760	lf	3.43	6,000			
Around radium settling ponds; CPP			9,700	lf	3.43	33,300			
Around radium settling ponds; Satellite			8,200	lf	3.43	28,100			
Barbed wire fencing in wellfields - 3 strand			87,000	lf	1.75	152,300			
Support steel in Drying area	4,500	1	1	LS	5,000	5,000		4,500	
Equipment at DDW		0	0	LS	1,000	0		0	
Subtotal Demolition and Transportation/Disposal Equip/Mat'ls to be Sold or Recycled						**243,000**			
						Equipment sold/recycled	**243,000**		
Equipment to other use (Powertech operation)									**Semi-loads**
Ion Exchange columns, incl resin: assume 12' dia x 15'H	1,700	12	12	LS	1,000	12,000		20,400	6
Process Pumps in buildings	16	60	60	LS	200	12,000		960	1
Shaker screens: 10'x7'x5'H	400	2	2	LS	2,000	4,000		800	1
Elution columns: 7' dia x 15'H	600	4	4	LS	1,000	4,000		2,400	2
13 ft diameter tanks x 16'H	2,100	22	22	LS	500	11,000		46,200	11
11 ft diameter tanks x 16'H	1,500	2	2	LS	1,000	2,000		3,000	1
10 ft diameter tanks x 16'H	1,300	1	1	LS	1,000	1,000		1,300	1
RO units	400	4	4	LS	1,000	4,000		1,600	1
Thickeners	10,600	2	2	LS	10,000	20,000		21,200	5
Screw conveyors	100	2	2	LS	1,000	2,000		200	6
Filter Presses	2000	2	2	LS	5,000	10,000		4,000	1
Vacuum Dryers and Appurtenances									
Dryers	1071	2	2	LS	10,000	20,000		2,142	2
Vacuum pump/condensor skids, hot oil boiler skids, cooling towe	480	2	2	LS	2,000	4,000		960	1
Chemical storage tanks outside CPP - assume 20,000 gal	2674	3	3	LS	500	1,500		8,021	3
Drum conveying system	2,900	1	1	LS	1,000	1,000		2,900	0.5
Drum washer and drying system	1,200	1	1	LS	1,000	1,000		1,200	0.5
Paint booth	400	1	1	LS	500	500		400	0
Resin transfer truck and trailers (1 truck; 2 trailers)			1	LS	0	0			2
Fire suppression pump system	512	1	1	LS	500	500		512	0.5
Land application center pivot machines	4,000	5	5	LS	1,000	5,000		20,000	5
Standby generator	512	1	1	each	500	500		512	0.5
Diesel fuel tank - above ground, assume 15,000 gal	2005	1	1	each	500	500		2,005	1
Gasoline fuel tank - above ground, assume 15,000 gal	2005	1	1	each	500	500		2,005	1
Subtotal Equipment to Demo and Transport to other Powertech mine site:						**117,000**		**142,718**	**53**
Bldgs/Equipment/Materials to Demo and Dispose at Construction and Demolition Landfill									
Building Structures									
Office bldg	60x90x20+roof		148,500	cu ft	0.15	22,300		18,600	
Maintenance/Warehouse	140x120x20		462,000	cu ft	0.15	69,300		33,800	
Fire suppression tank	240,000 gal		30,968	cu ft	0.15	4,600			
CPP Pond (liner and leak detection system)									

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Dewey-Burdock Project

Description	cf, gals, dimensions	No./Size	Quantity	Units	Unit Cost	Estimated Demo Cost		Volume (cf) to Load on Trucks	Notes:
60 mil HDPE secondary liner			166,295	sq ft	0.05	8,300		4,751	
Geonet			166,295	sq ft	0.05	8,300		4,751	
Radium Settling Ponds (liner and leak detection system)									
60 mil HDPE secondary liner			11,089,920	sq ft	0.05	554,500		316,855	
Geonet			11,089,920	sq ft	0.05	554,500		316,855	
Power poles: one every 200' (40'H buried 5' in grnd); pull + cut in 1/2 and place pole and cross arms in roll-off	47+54K' OHE	505	505	each	297	150,000		27,874	
Pumps/wellhead appurtenances/cover from prod/inj wells	64	1,404	1,404	LS	200	280,800		89,856	
Subtotal Bldgs/Equipment/Materials to Demo and Dispose in Landfill:						**1,652,600**		**846,820**	
Buildings Demo to Dispose of at Subtitle D Construction and Demolition Landfill									
Building Structure									
CPP, includes loading dock area	392'x130'x20'+roof		1,486,840	cu ft	0.15	223,000		77,560	
Lab/control rm/break rm/showers/restrooms w/in CPP	30x90x20'		54,000	cu ft	0.15	8,100		10,200	
Rad container bldg	30x24x15		10,800	cu ft	0.15	1,600		2,340	
Header houses - assume equip/piping inside demo'd w/ bldg	10x40x8	31	3,200	cu ft	0.15	14,880		24,800	
Satellite bldg, incl interior wall	124x156x20		396,552	cu ft	0.15	59,500		39,448	
Lab/control rm/break rm/showers/restrooms w/in Satellite	45x45x20		40,500	cu ft	0.15	6,100		4,950	
Subtotal Bldgs Demo:						**313,180**		**278,700**	
Transportation/Disposal									
Loading 30 cy rolloffs at site w/ FE loader			41,686	cy	2	83,400			
Loading process equipment			53	semi load	1,000	53,000			
Transportation to Custer, WY	$3.50/mi x 16 mi + $1.98/mi x 16 mi		1,390	semi-load	88	121,800			
Transportation to Aladdin, WY	$3.50/mi x 111 mi + $1.98/mi x 111 m		53	semi load	608	32,200			
Disposal fee at Custer Subtitle D landfill			41,686	cy	10	416,900			
Subtotal Transportation/Disposal - Subtitle D Material:						**707,300**			
Transportation/Disposal in Landfill							**2,790,000**		
Other Misc Demo Activities									
Rinse piping and treat rinsewater - assume 3 piping volumes	2,263,486 x .6 gal/pipe vol		4,074	1,000 gal	3	12,200			
Valve vaults at mining units - leave in place fill with soil		31	11	cu yd	20	6,900			
Septic tank - CPP: 15,000 gal (fill with soil and leave in place)	15,000 gal	1	2,005	cu yd	10	20,100			
Septic tank - Satellite: 10,000 gal (fill with soil and leave in place)	10,000 gal	1	1,337	cu yd	10	13,400			
Backfill excavation and compact CPP pond volume			41,704	cu yd	1	41,700			
Backfill excavation and compact Radium settling ponds volume (Dewey)			401,165	cu yd	1	401,200			
Backfill excavation and compact Radium settling ponds volume (Burdock)			1,275,263	cu yd	1	1,275,300			
Reseed wellfield areas (fertilize, seeding, mulching)			116	acre	1,500	174,000			
Reseed CPP site and CPP pond area			11	acre	1,500	16,600			
Reseed CPP radium settling ponds			48	acre	1,500	71,300			
Reseed Satellite Plant area and radium settling ponds at Satellite			35	acre	1,500	52,300			
Reseed access road to CPP			11	acre	1,500	16,500			
Reseed access road to Satellite			8	acre	1,500	12,000			
Subtotal Other Misc Demo Activities:						**2,113,500**			
Other Reclamation:							**2,114,000**		
Total - Estimated Demo, Transportation, and Disposal Costs:						**6,661,000**			

POWERTECH (USA) INC.

WASTE DISPOSAL WELL

POWERTECH (USA) INC.

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration and Reclamation Costs

	2010	2011	2012	2013	2014	2015	2016	Total
Production (lbs U3O8)		**1,000,000**	**8,411**	**-**	**-**	**-**	**-**	
Restoration Flow - Dewey (gpm)			250					
Restoration Flow - Burdock (gpm)			250					
Capital Cost								
Restoration Equipment	-	-						-
								-
Operations								
Labor	-	81,000	811,000	189,000	81,000			1,162,000
Electricity			111,000					111,000
Chemicals	-	-	8,500	-	-	-	-	9,000
Maintenance			249,681					250,000
Byproduct Disposal			4,206					4,000
Monitoring	-	-	157,986	183,292				341,000
								1,877,000
Decommissioning								
Well Closure					-	245,000	245,000	490,000
Labor					-	353,000	353,000	706,000
Mob/Site Preparation						25,000		25,000
Demo and Disposal - 11 e(2)						351,000	351,000	702,000
Equipment Transferred						119,500	119,500	239,000
Demo and Disposal - Landfill						614,000	614,000	1,228,000
Other Reclamation						457,500	457,500	915,000
								4,305,000
Contingency								
Contingency at 15%	-	12,150	201,356	55,844	12,150	324,750	321,000	927,000
								927,000
Total Costs	**-**	**93,150**	**1,543,729**	**428,135**	**93,150**	**2,489,750**	**2,461,000**	**7,109,000**

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POWERTECH (USA) INC.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Preliminary Capital Cost Estimate - CPP Restoration Equipment

Description	Equipment List Number	No./Size	Quantity	Units	Unit Cost	Purchase Cost	Shipping Cost	Capital Cost
Restoration System								
Restoration IX Vessel (118,600 ea + 15k distributor + 8k delivery)	300-IX-001A, B		2	each	0	0	0	0
IX resin - Dowex 21K XLT	NA	2	500	cu ft	0	0	0	0
PC Booster Pump (250 gpm; 90' TDH)	300-P-001 A, B, C		2	each	0	0	0	0
IC Booster Pump	300-P-002 A, B, C		2	each	0	0	0	0
RO Sump Pump	300-P-011, spare		1	each	0	0	0	0
RO Skid (Incl pretrmt, filtration and feed pump) 500 gpm	300-RO-001		1	each	0	0	0	0
Estimated Restoration Equipment - Subtotal:								**0**

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

POWERTECH (USA) INC.

Color Legend	
	Site Management
	Capital Labor
	Central Plant
	Satellite/WF
	Restoration/Decom

Labor	2009	2010	2011	2012	2013	2014	2015	2016
Geology								
Senior Project Geologist	1	1	1					
Project Geologists	2	4	4					
Drafting Technicians	1	3	3					
Subtotal								
Construction/Drilling								
Construction Superintendent		1	1				0	0
Drilling Foreman		1	1					
Drilling Services Leadman		1	1			0	0	0
Drilling Services Technicians		6	6			0	0	0
Logging and MIT Technicians		7	7					
Drilling Supervisor		1	1					
Wellfield Construction Foreman		1	1					
General Construction Technicians		8	4		0	0	4	4
Electrical/Instrumentation		2	2					
Heavy Equipment		4	2			0	2	2
Construction Engineer		1	1			0	1	1
Subtotal								
Production								
Production Superintendent			1					
Wellfield Operations Supervisor			1					
Wellfield Engineer			1					
Wellfield/Satellite Operations Leadman			1					
Wellfield/Satellite Operators			12	4	0			
Restoration Engineer			1	1	1	1		
Restoration Operator				1	0	0		
Groundwater Sampling Technician	1	2	2	0	0	0		
Groundwater Sampling Technician				2	2	0		
Central Plant Operations Supervisor			1	1	0	0		
Central Plant Operations Leadman			1					
Central Plant Operators			4	1	0	0		
Central Plant Operators - Day			4					
Dryer Operators			2					
Chemist/Lab Supervisor			1					
Lab Technicians			4	1	0	0		
Maintenance Supervisor			1					
General Maintenance Techs			4	1	0	0		
Mechanics			3					
Electrical/Instrumentation			2	1	0	0		
Subtotal								

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POWERTECH (USA) INC.

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

Color Legend

- **Site Management**
- **Capital Labor**
- **Central Plant**
- **Satellite/WF**
- **Restoration/Decom**

Unit Labor Costs		2009	2010	2011	2012	2013	2014	2015	2016
Geology				0	0	0	0	0	0
Senior Project Geologist	135,000	135000	135000	135000	0	0	0	0	0
Project Geologists	95,000	190000	380000	380000	0	0	0	0	0
Drafting Technicians	54,000	54000	162000	162000	0	0	0	0	0
Subtotal				0	0	0	0	0	0
Construction/Drilling				0	0	0	0	0	0
Construction Superintendent	135,000	0	135000	135000	0	0	0	0	0
Drilling Foreman	95,000	0	95000	95000	0	0	0	0	0
Drilling Services Leadman	81,000	0	81000	81000	0	0	0	0	0
Drilling Services Technicians	54,000	0	324000	324000	0	0	0	0	0
Logging and MIT Technicians	54,000	0	378000	378000	0	0	0	0	0
Drilling Supervisor	68,000	0	68000	68000	0	0	0	0	0
Wellfield Construction Foreman	68,000	0	68000	68000	0	0	0	0	0
General Construction Technicia	41,000	0	328000	164000	0	0	0	164000	164000
Electrical/Instrumentation	81,000	0	162000	162000	0	0	0	0	0
Heavy Equipment	54,000	0	216000	108000	0	0	0	108000	108000
Construction Engineer	81,000	0	81000	81000	0	0	0	81000	81000
Subtotal				0	0	0	0	0	0
Production				0	0	0	0	0	0
Production Superintendent	135,000	0	0	135000	0	0	0	0	0
Wellfield Operations Supervisor	95,000	0	0	95000	0	0	0	0	0
Wellfield Engineer	81,000	0	0	81000	0	0	0	0	0
Wellfield/Satellite Operations Le	68,000	0	0	68000	0	0	0	0	0
Wellfield/Satellite Operators	54,000	0	0	648000	216000	0	0	0	0
Restoration Engineer	81,000	0	0	81000	81000	81000	81000	0	0
Restoration Operator	68,000	0	0	0	68000	0	0	0	0
Groundwater Sampling Tech	54,000	54000	108000	108000	0	0	0	0	0
Groundwater Sampling Tech	54,000	0	0	0	108000	108000	0	0	0
Central Plant Operations Super	122,000	0	0	122000	122000	0	0	0	0
Central Plant Operations Leadm	81,000	0	0	81000	0	0	0	0	0
Central Plant Operators	54,000	0	0	216000	54000	0	0	0	0
Central Plant Operators - Day	54,000	0	0	216000	0	0	0	0	0
Dryer Operators	54,000	0	0	108000	0	0	0	0	0
Chemist/Lab Supervisor	95,000	0	0	95000	0	0	0	0	0
Lab Technicians	47,000	0	0	188000	47000	0	0	0	0
Maintenance Supervisor	61,000	0	0	61000	0	0	0	0	0
General Maintenance Techs	41,000	0	0	164000	41000	0	0	0	0
Mechanics	61,000	0	0	183000	0	0	0	0	0
Electrical/Instrumentation	74,000	0	0	148000	74000	0	0	0	0
Subtotal									
Restoration and Reclamation Labor Cost				81000	811000	189000	81000	353000	353000

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POWERTECH (USA) INC.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units
General Operating Assumptions		
1 Production objective	1,000,000	# of U3O8 per year
2 Ave. wellfield design based on # yellowcake per sq ft of ore reserve, equals:	1.60	lb/sq ft
3 ISR recovery efficiency of:	0.75	recovery efficiency
4 First Year production rate	0.91	pounds/yr/sq ft
Average grade of producted water (ppm U3O8)		
5 Area required to meet production objective (online all the time)	911,458	sq ft
	21	acres
6 Area per pattern	10,000	sq ft/pattern
7 Number of online patterns required to meet production objective	91	patterns
8 Number of online Production Wells required to meet production objective	91	production wells
Assuming 20 gpm/production well, total production flow rate equals:	1,823	gpm
Assuming 350 days/yr pumping, average U3O8 grade to meet production objective equals:	130	ppm U3O8
If total flowrate limited to 4,000 gpm, average grade to meet production objective equals:	59	ppm U3O8
9 I/R Ratio	1.6	inj wells/prod wells
10 Number of online Injection Wells required to meet objective	146	injection wells
11 Number of online Production Wells per Header House	18	production wells/HH
12 Number of HH required to meet production objective	5.1	HH
13 Number of Perimeter Monitoring Wells per Header House	2.0	monit wells/HH
14 Number of Internal Monitoring Wells per HH (1 upper +1 lower)	2.0	monit wells/HH
15 Number of Compliance Wells per HH (1300 LF spacing)	0.6	comp wells/HH
16 Subtotal # Monitor wells per HH during production	4.6	total mw/HH
17 Total # Monitoring wells per 1MM # produced during production	23.4	total MW

Description	Number	Quantity	Units	Rate	Cost ($/yr)
Assumed electricity rate incl demand charge ($/kwh)	0.07				
Wellfields					
Wells (per well)					
Electric utilities:					
Production well pumps - 20 gpm @ 400 ft TDH	1	20,000	kwh	0.070	1,400
Wellhead heaters (0.5 kw, 180 days/yr)	1	2,000	kwh	0.070	100
Subtotal Power					**1,500**
Header House (per HH)					
Replacement flow meters (x%/yr)	10	1	ea	50	500
Replacement pressure gauges/switches	20	1	ea	50	1,000
Equip maintenance (@ 10% of new equipment capital)	1	80,000	%	0.10	8,000
Subtotal Maintenance					**9,500**
Electric utilities:					
Bldg heating (5 kw, 180 days/yr)	1	22,000	kwh	0.070	1,500
Instrumentation (1 kw)	1	9,000	kwh	0.070	600
Subtotal Power					**2,100**
General well field area					
Pipelines		1	lump sum	50,000	50,000
Road maintenance materials (gravel/culverts)		1	lump sum	10,000	10,000
Wireless telemetry and security systems maintenance		1	lump sum	2,000	2,000
Subtotal Maintenance					**62,000**
Oxygen/Carbon Dioxide Injection					
Oxygen gas per year		0	tons/yr	1,100	0
Carbon dioxide gas per year		0	tons/yr	1,160	0
Subtotal Chemicals					**0**

POWERTECH (USA) INC.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units			
Satellite Plant					
Ion exchange resin replacement - DOWEX 21K XLT		0	cu ft	221	0
Electric utilities:					
PC Booster Pump	2	605,491	kwh	0.070	42,400
IC Booster Pump	2	605,491	kwh	0.070	42,400
Resin Transfer Pump	1	8,830	kwh	0.070	600
Utility Water Pump	1	11,773	kwh	0.070	800
HVAC		105,120	kwh	0.070	7,400
Lighting (0.8 W/ft^2)	10000	52,560	kwh	0.070	3,700
Instrumentation (2 kw)	1	18,000	kwh	0.070	1,300
Subtotal Power					**12,400**
Resin Transport to CPP		6	R/T per yr	50	**300**
Land Application (assume 20% to wellfield production)					
Electric utilities 136 days/year (growing season May 11 - Sept 24):					
Land app pumps Dewey (849 gpm at assume 200' TDH)	0	207,509	kwh	0.07	0
Land app pumps Dewey (849 gpm at assume 200' TDH)	0	207,509	kwh	0.07	0
Center pivot hydraulic pump; 10 hp for 25 ac areas (use 8 RHP)	0	137,000	kwh	0.07	0
Center pivot hydraulic pump; 15 hp for 50 ac areas (use 13 RHP)	0	444,000	kwh	0.07	0
Sump pump at 25 ac land app site (return irrigation tailwater/runoff)	0	3,000	kwh	0.07	0
Sump pump at 50 ac land app site (return irrigation tailwater/runoff)	0	10,000	kwh	0.07	0
Subtotal Power					**0**
Assume 81% to Well Field Restoration					**0**
Equipment Maintenance:					
Center pivot machines	0	1	year	500	0
Equip Maintenance (@ 3% of new equipment capital) - pumps only		0	%	3	0
Equipment Replacement (@ 3% of new equipment capital)		0	%	3	0
Subtotal Maintenance					**0**
Assume 81% to Well Field Restoration					**0**
Water Supply Power @65 gpm					
Groundwater extraction (65 gpm; 400 TDH; 24 hr/day)	1	64,000	kwh	0.070	**4,000**
Offsite Deep Disposal Well(s) @ 12 gpm					
Trucking to Burns, WY (214 gal/day = 6 trips/year)	2	412	miles/RT	3.50	**0**
Injection pump maintenance and repair (assume 6% of cap cost)	4	150,000	Cap cost	0.06	**9,000**
Electric utilities:					
Deep disposal well PD pump (4, but only one operating)					
50 gpm@300 psi = 200 gpm @1000 TDH	4	1,957,400	kwh	0.070	137,000
Bldg heating (1 kw, 180 days/yr)	1	4,000	kwh	0.070	300
Subtotal					**137,000**
Surge Pond					
Electrical for transfer pumps (120 gpm @ 300" TDH)	1	88,000	kwh	0.07	**6,160**
Pond Maintenance ($2,800/pond/yr)	1	1	year	2,800	**2,800**
Subtotal					**8,960**
Equipment When Restoration Operations are underway (in addition to production)					
Header Houses					
Equip maintenance (@ 3 % of new equipment capital)		0	%	0.03	0
Sutbotal					**0**
Electric utilities:					
Bldg heating (5 kw, 180 days/yr)	5.0	108,000	kwh	0.070	7,600

Powertech (USA) Inc.

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.
Restoration Operating Assumptions

Description	Quantity	Units			
Instrumentation (1 kw)	5.0	44,000	kwh	0.070	3,100
Subtotal					**10,700**
Restoration					
Restoration Assumptions					
Reclamation consists of 10 PV of activity		10	PVs		
Assume PV = area/1M pounds U3O8 recovered (see operating assumptions above) x 10 ft thick x 20% porosity x 1.5 flare factor x 7.48 gal/cu ft		20,453,125	gallons/M# recovered		
Unit volume required per 1M # recovered per year		1.14			
Volume of flush water required per year		233,165,625	gallons/yr		
Nomical restoration design flow rate (both sites)		500	gpm		
Years to Reclaim 1M pounds of U3O8 recovered		0.89	years		
Treatment Chemicals	**Number**	**Quantity**	**Units**	**Rate**	**Cost ($/yr)**
IX Cost (see KC Restoration Treatment Cost 10_9_08)			LS	1.000	8,500
Subtotal					**8,500**
Treatment Maintenance					
IX Resin Replacement - assume 4% of cap cost		225,000	cap cost	0.040	9,000
Process hardware maintenance + replmt @ 4% of Capital		994,000	cap cost	0.040	39,760
Subtotal					**49,000**
Booster Pumps from CPP to Surge Ponds					
Booster Pumps (2 - 250 gpm; 200 TDH; 24 hr/day)	2	245,000	kwh	0.070	**17,000**
Water Supply Power					
Groundwater extraction (500 gpm; 500 TDH; 24 hr/day)	1	612,000	kwh	0.070	**43,000**
Well Field Power					
Groundwater extraction (500 gpm; 400 TDH; 24 hr/day)	1	489,000	kwh	0.070	34,000
Treated water reinjection (500 gpm; 200 TDH; 24 hr/day)	1	245,000	kwh	0.070	17,000
Subtotal					**51,000**
SubTotal Treatment and Power Cost					**168,500**
Land Application (assume 81% to Restoration)					
- Land Appication design 620 gpm of annual flow (restoration = 500 gpm or 81% of design)					
Electric utilities 136 days/year (growing season May 11 - Sept 24):					
Land app pumps Dewey (849 gpm at assume 200' TDH)	0	0	kwh	0.07	0
Land app pumps Dewey (849 gpm at assume 200' TDH)	0	0	kwh	0.07	0
Center pivot hydraulic pump; 10 hp for 25 ac areas (use 8 RHP)	0	0	kwh	0.07	0
Center pivot hydraulic pump; 15 hp for 50 ac areas (use 13 RHP)	0	0	kwh	0.07	0
Sump pump at 25 ac land app site (return irrigation tailwater/runoff)	0	0	kwh	0.07	0
Sump pump at 50 ac land app site (return irrigation tailwater/runoff)	0	0	kwh	0.07	0
Subtotal Power					**0**
Assume 81% to Well Field Restoration					**0**
Equipment Maintenance:					
Center pivot machines	0	0	year	500	0
Equip Maintenance (@ 3% of new equipment capital) - pumps only		0	%	3	0
Equipment Replacement (@ 3% of new equipment capital)		0	%	3	0
Subtotal Maintenance					**0**
Assume 81% to Well Field Restoration					**0**

Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.

		100x100 Grid			
Wellfield Maintenance (per MM # produced)					
# Production wells		91	prod wells		
# Injection wells		146	inj wells		
Well maintenance (assume $500/well)		119,000	$/yr		
Replacement of submersible pumps (say 10%/yr @ 2,000 each)		18,000	$/yr		
# Header houses (per MM # produced)		5.1	#HH/yr		
Header House maintenance	9,500 per HH	48,450	$/yr		
Restoration Assumptions and Cost					
Years to Reclaim wellfields per 1M pounds of U3O8 recovered (see Operating Cost)		0.89	years		
Well Field and Treatment Operating Cost				Electricity	111,000
Treatment Chemicals (see Operating Cost)		8,500	$/yr	Chem	8,500
Treatment Maintenance (see Operating Cost)		49,000	$/yr	Maint	249,681
Treatment Power (see Operating Cost)		17,000	$/yr		
Water Supply Power (see Operating Cost)		43,000	$/yr		
Water Supply pump replacement (10% of supply pump costs)	75000	7,500	$/yr		
Well Field Power (extraction and injection) (see Operating Cost)		51,000	$/yr		
Well maintenance ($300/well)	300	71,000	$/yr		
Submersible pump replacement (10% of well field pump costs)		18,000	$/yr		
Well Field Piping Maintenance (assume 50,000/yr)		50,000	$/yr		
Header House					
Replacement meters, gages, and equip (see Operating Cost)	10,700 /HH	54,181	$/yr		
Land Application					
Power Cost (see Operating Cost)		-	$/yr		
Maintenance Cost (see Operating Cost)		0	$/yr		
Restoration Operating Cost		**-**	**$/yr**		
Stability Monitoring/Decommissioning					
Equipment Decommissioning (see Decommissioning worksheet)					
Wellfield Decommissioning					
Unit cost per well (assume ave depth of 650 feet)					
5" diameter casing =		0.136	CF/LF		
Average well depth =		650	LF		
Cubic ft per well =		88.4	CF		
Cement grout cost =		9.00	$/CF		
Cement grout cost/well		795.60	$/well		
contractor labor w/ equipment = 4 crew-hr/well @ $125/hr = $500.		500	$/well		
Total abandonment cost/well (rounded) =		1,300	$/well	Expend	81,667
Monitoring wells	#wells = 140	182,000	$LS		
Production and Injection wells	#wells = 237	308,100	$LS		
Piping, power, and HH (see Decommissioning worksheet)		-	$LS		
Total Wellfield Decommissioning		**490,000**	**$LS**		
Well Decomm Cost per 1M# U		**81,667**	**$/M# U**		

Powertech (USA) Inc.

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

Chemicals:			
Hydrogen peroxide - 50% solution	lb	0.30	$/lb
Sulfuric acid - 98%	lb	0.135	$/lb
Sodium hydroxide - 50% solution	lb	0.145	$/lb
Sodium chloride - all purpose food grade granular	lb	0.09	$/lb
Sodium carbonate	lb	0.135	$/lb
Barium chloride - dry powder	lb dihydrate	0.67	$/lb
Flocculant	gal	1	$/lb
O2	ton of gas	1,100	$/ton
CO2	ton of gas	1,160	$/ton

Restoration Assumptions:		
Flowrate:	500	gpm
Uranium Concentration	5	ppm
Uranium Concentration in IX tails	1	ppm
Annual Production of Restoration Activities	8411	lb U3O8

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cost of Chemicals										
Hydrogen peroxide - 50% solution			900							
Sulfuric acid - 98%			1100							
Sodium hydroxide - 50% solution			1100							
Sodium chloride			3400							
Sodium carbonate			1,000							
Barium chloride - dry powder			1,000							
Flocculant			0							
Subtotal			8,500	-	-	-	-	-	-	-

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Restoration Costs
Dewey-Burdock Project
Powertech (USA), Inc.

Byproduct Waste During Operations							
Restoration					-		
RO waste and IX waste	Assume costs included in CPP	0			-		
Well Field waste	Assume 1 drum/4 weeks = 2 CF/wk	104	CF/yr	7.00	728	674	1,402
PPE	Assume 1 drum/4 weeks = 2 CF/wk	104	CF/yr	7.00	728	674	1,402
Decon waste	Assume 1 drum/4 weeks = 2 CF/wk	104	CF/yr	7.00	728	674	1,402
					-	**Subtotal**	**4,206**
* Assume Transport to Andrews, Texas @ 710 miles from Site. Assume $3.50/loaded mile with 20 CY load, and $1.85 /unloaded mile. Thus, $2,485 per 20 CY. Therefore, use $5.35 * 710 = $3,000 per 20 CY. Decon truck cost = $500/20 CY							

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.

	Environmental Monitoring	Number	Quantity	Units	Rate ($)	Cost ($/yr)	
Met Station	Assume 1 met station for Site	1	12	visits/yr	200	2400	
Water Qual							
	20 metals, mercury, alk, Cl, SO4, NO3, Fl, EC, pH, and TDS (Test America) @ $350 (w/shipping) spec, Th, U, and gross A/B (Test America) @ $550 (w/ shipping)						
	Baseline: Six quarterly samples from each perimerer + interior well + 1 production well per 8 acres for 1 year. Add 20% for QA/QC. Assume full analyte list (see above) at $900/sample, plus $100/sample for data packages, shipping, and expendibles - $1,000/sample.	6	24	wells/yr	1000	145,833	$/MM#
	Production A: Sem-Annual sampling from each perimeter + interior well during production. Add 20% for QA/QC. Assume 50% of full analyte list = $500/sample.	2	24	wells/yr	500	24,306	$/yr-production
	Production B: Bi-weekly sampling from all perimeter + interior wells, plus 20% for QA/QC. Analytes are parameters that can be tested in CPP lab, so only cost is for expendible supplies - say $10/sample.	26	24	wells/yr	10	6,319	$/yr-production
	Period between end of production and start of restoration: Assume same as Production A and Production B.					30,625	$/yr-transition
	Restoration A: Same and Production A.	2	24	wells/yr	500	24,306	$/yr-restoration
	Restoration B: At end of restoration, production, perimeter, and interior wells, plus 20% for QA/QC, are sampled for full analyte list.	1	134	wells	1000	133,681	$/MM#
	Stability A: Same as Restoration A for one year.	2	24	wells/yr	1000	48,611	$/yr-stability
	Stability B: Same as Restoration B following Stability monitoring.	1	134	wells	1000	133,681	$/MM#
	Compliance: Assume annual sampling from all compliance wells in mined areas until closure is certified. Use 6 wells per 1M# recovered. Assume analytical cost is $800/sample.	1	6	wells/yr/M#	800	4,800	$/yr-cumulative
Radon	CPP (10 dose buttons quarterly)	4	10	buttons/qtr	50	2,000	$/year
	Satell/Well Field (5 dose buttons/quarter)	4	5	buttons/qtr	50	1,000	$/year
	Restor/Decom (5 buttons quarterly)	4	5	buttons/qtr	50	1,000	$/year

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Restoration/Stability												
Restoration A				24,306								
Restoration B				133,681								
Stability A					48,611							
Stability B					133,681							
Radon					1,000							
TOTAL				157,986	183,292	-	-	-	-	-	-	-

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.
Preliminary Demolition Cost Estimate

Description	cf, gals, dimensions	No./Size	Quantity	Units	Unit Cost	Estimated Demo Cost		Volume (cf) to Load on Trucks	Notes:
Misc Upfront Demo Costs									
Mobilization/demobilization for project demo			1	LS	25,000	25,000			
Subtotal Misc Upfront Demo:						**25,000**		**0**	
Mob/Site Prep							**25,000**		
Materials to Demo and Send to 11e(2) Disposal Site									
CPP Pond (liner and leak detection system)									
80 mil HDPE primary liner			0	sq ft	0.05	0		0	
Radium Settling Ponds (liner and leak detection system)									
80 mil HDPE primary liner			1,386,240	sq ft	0.05	69,300		53,317	
Subtotal Materials to Demo and Send to Rad Waste Disposal Site:						**69,300**		**53,300**	cu ft
Subtotal - Volume of Material to be Disposed in Rad Waste Landfill:								**53,300**	cu ft
Transportation/Disposal of 11e(2) Waste									
Load 30 cy rolloffs at site w/ FE loader			1,974	cy	2	3,900			
30 cy rolloff haul (710 mi one-way to Andrews, TX)	$3.50/mi x $710 mi RT+$1.98/mi x $1.98		66	30 cy	3,891	256,000			
Disposal at Waste Control Specialists Andrews, TX			53,300	cf	7	373,100			
Subtotal Transportation/Disposal Rad Waste:						**633,000**			
By-Product Disposal							**702,000**		
Equipment/Materials to be Sold or Recycled (demolition and transport to recycling facility)									
Pad or pole-mounted transformers (one per Header Hse) - 10 per truckload		5	1	LS	500	300			
Haul transformers to Rapid City (100 mi one-way)		1	200	mile	3.50	400			
Wire in OHE lines - 47,000' of OHE at Dewey; 54,000' at Burdock - 4 wires			404,000	lf	0	0			
Valve vaults: cut off lid and dispose of lid	200	5	0.5	hrs	50	125			
Valve vaults: truck haul to recycler			200	mile	3.50	700			
Chain-link fencing									
Around CPP site			2,240	lf	3.43	7,700			
Around Satellite site			1,440	lf	3.43	4,900			
Around CPP pond (380' sq)		440' per side	1,760	lf	3.43	6,000			
Around radium settling ponds; CPP			9,700	lf	3.43	33,300			
Around radium settling ponds; Satellite			8,200	lf	3.43	28,100			
Barbed wire fencing in wellfields - 3 strand			87,000	lf	1.75	152,300			
Support steel in Drying area	4,500	1	1	LS	5,000	5,000		4,500	
Equipment at DDW		0	0	LS	1,000	0		0	
Subtotal Demolition and Transportation/Disposal Equip/Mat'ls to be Sold or Recycled						**239,000**			
Equipment sold/recycled							**239,000**		
Equipment to other use (Powertech operation)									**Semi-loads**
Ion Exchange columns, incl resin: assume 12' dia x 15'H	1,700	12	12	LS	1,000	12,000		20,400	6
Process Pumps in buildings	16	60	60	LS	200	12,000		960	1
Shaker screens: 10'x7'x5'H	400	2	2	LS	2,000	4,000		800	1
Elution columns: 7' dia x 15'H	600	4	4	LS	1,000	4,000		2,400	2
13 ft diameter tanks x 16'H	2,100	22	22	LS	500	11,000		46,200	11
11 ft diameter tanks x 16'H	1,500	2	2	LS	1,000	2,000		3,000	1
10 ft diameter tanks x 16'H	1,300	1	1	LS	1,000	1,000		1,300	1
RO units	400	4	4	LS	1,000	4,000		1,600	1
Thickeners	10,600	2	2	LS	10,000	20,000		21,200	5
Screw conveyors	100	2	2	LS	1,000	2,000		200	6
Filter Presses	2000	2	2	LS	5,000	10,000		4,000	1
Vacuum Dryers and Appurtenances									
Dryers	1071	2	2	LS	10,000	20,000		2,142	2
Vacuum pump/condensor skids, hot oil boiler skids, cooling tower sy:	480	2	2	LS	2,000	4,000		960	1
Chemical storage tanks outside CPP - assume 20,000 gal	2674	3	3	LS	500	1,500		8,021	3
Drum conveying system	2,900	1	1	LS	1,000	1,000		2,900	0.5
Drum washer and drying system	1,200	1	1	LS	1,000	1,000		1,200	0.5
Paint booth	400	1	1	LS	500	500		400	0
Resin transfer truck and trailers (1 truck; 2 trailers)			1	LS	0	0			2
Fire suppression pump system	512	1	1	LS	500	500		512	0.5
Land application center pivot machines	4,000	5	5	LS	1,000	5,000		20,000	5
Standby generator	512	1	1	each	500	500		512	0.5
Diesel fuel tank - above ground, assume 15,000 gal	2005	1	1	each	500	500		2,005	1
Gasoline fuel tank - above ground, assume 15,000 gal	2005	1	1	each	500	500		2,005	1
Subtotal Equipment to Demo and Transport to other Powertech mine site:						**117,000**		**142,718**	**53**
Bldgs/Equipment/Materials to Demo and Dispose at Construction and Demolition Landfill									
Building Structures									
Office bldg	60x90x20+roof		148,500	cu ft	0.15	22,300		18,600	
Maintenance/Warehouse	140x120x20		462,000	cu ft	0.15	69,300		33,800	
Fire suppression tank	240,000 gal		30,968	cu ft	0.15	4,600			
CPP Pond (liner and leak detection system)									
60 mil HDPE secondary liner			0	sq ft	0.05	0		0	
Geonet			0	sq ft	0.05	0		0	
Radium Settling Ponds (liner and leak detection system)									

Restoration Costs by Year
Dewey-Burdock Project
Powertech (USA), Inc.
Preliminary Demolition Cost Estimate

Description	cf, gals, dimensions	No./Size	Quantity	Units	Unit Cost	Estimated Demo Cost		Volume (cf) to Load on Trucks	Notes:
60 mil HDPE secondary liner			1,386,240	sq ft	0.05	69,300		39,607	
Geonet			1,386,240	sq ft	0.05	69,300		39,607	
Power poles: one every 200' (40'H buried 5' in grnd); pull + cut in 1/2 and place pole and cross arms in roll-off	47+54K' OHE	505	505	each	297	150,000		27,874	
Pumps/wellhead appurtenances/cover from prod/inj wells	64	377	377	LS	200	75,400		24,128	
Subtotal Bldgs/Equipment/Materials to Demo and Dispose in Landfill:						**460,200**		**217,093**	
Buildings Demo to Dispose of at Subtitle D Construction and Demolition Landfill									
Building Structure									
CPP, includes loading dock area	392'x130'x20'+roof		1,486,840	cu ft	0.15	223,000		77,560	
Lab/control rm/break rm/showers/restrooms w/in CPP	30x90x20'		54,000	cu ft	0.15	8,100		10,200	
Rad container bldg	30x24x15		10,800	cu ft	0.15	1,600		2,340	
Header houses - assume equip/piping inside demo'd w/ bldg	10x40x8	11	3,200	cu ft	0.15	5,280		8,800	
Satellite bldg, incl interior wall	124x156x20		396,552	cu ft	0.15	59,500		39,448	
Lab/control rm/break rm/showers/restrooms w/in Satellite	45x45x20		40,500	cu ft	0.15	6,100		4,950	
Subtotal Bldgs Demo:						**303,580**		**256,700**	
Transportation/Disposal									
Loading 30 cy rolloffs at site w/ FE loader			17,548	cy	2	35,100			
Loading process equipment			53	semi load	1,000	53,000			
Transportation to Custer, WY	$3.50/mi x 16 mi + $1.98/mi x 16 mi		585	semi-load	88	51,300			
Transportation to Aladdin, WY	$3.50/mi x 111 mi + $1.98/mi x 111 mi		53	semi load	608	32,200			
Disposal fee at Custer landfill			17,548	cy	10	175,500			
Subtotal Transportation/Disposal - Subtitle D Material:						**347,100**			
Transportation/Disposal in Landfill							**1,228,000**		
Other Misc Demo Activities									
Rinse piping and treat rinsewater - assume 3 piping volumes	2,263,486 gal/pipe vol		6,790	1,000 gal	3	20,400			
Valve vaults at mining units - leave in place fill with soil		5	11	cu yd	20	1,100			
Septic tank - CPP: 15,000 gal (fill with soil and leave in place)	15,000 gal	1	2,005	cu yd	10	20,100			
Septic tank - Satellite: 10,000 gal (fill with soil and leave in place)	10,000 gal	1	1,337	cu yd	10	13,400			
Backfill excavation and compact Surge Pond (Dewey)			59,259	cu yd	1	59,300			
Backfill excavation and compact Radium settling ponds volume (Dewey)			185,185	cu yd	1	185,200			
Abandon Deep Injection Wells			4	wells	100,000	400,000			
Reseed wellfield areas (fertilize, seeding, mulching)			31	acre	1,500	47,000			
Reseed CPP site			11	acre	1,500	16,600			
Reseed CPP radium settling ponds			48	acre	1,500	71,300			
Reseed Satellite Plant area			35	acre	1,500	52,300			
Reseed access road to CPP			11	acre	1,500	16,500			
Reseed access road to Satellite			8	acre	1,500	12,000			
Subtotal Other Misc Demo Activities:						**915,200**			
Other Reclamation:							**915,000**		
Total - Estimated Demo, Transportation, and Disposal Costs:						**3,109,000**			

POWERTECH (USA) INC.

APPENDIX 5.2-A

WELL DATA

POWERTECH (USA) INC.

Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 1 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
1	7	1	9	SESE	996095.098	429227.773	3,624	Lakota
2	7	1	16	SESE	995122.6159	423922.589	3,554	Lakota
3	7	1	22	SWNW	ND	ND	ND	Lakota
4	7	1	15	SESE	1000915.012	423080.6142	3,580	unknown
5	7	1	14	NENW	1003580.429	427284.2174	3,643	Lakota
6	7	1	14	NESE	1005616.918	425012.4771	3,671	unknown
7	7	1	23	NWNW	1001702.774	422416.855	3,574	Fall River
8	7	1	23	SWSE	1004451.179	418514.8505	3,558	Fall River
9	7	1	23	NENE	ND	ND	ND	Fall River
10	7	1	13	NENE	ND	ND	ND	Lakota
11	7	1	24	NWSW	ND	ND	ND	Sundance/Unkpapa
12	7	1	4	SESE	995376.7972	434378.5136	3,641	Lakota
13	7	1	4	NENE	996758.8703	438470.3951	3,673	Lakota
14	7	1	2	NWSW	1002098.748	434723.4041	3,672	Lakota
15	7	1	2	NENW	1003703.016	438317.4124	3,713	Lakota
16	7	1	1	NESW	1009827.637	434446.9008	3,869	Lakota
17	7	1	12	SENW	1008622.303	431329.1544	3,789	Fall River
18	7	1	9	SWSW	991210.5573	428960.1458	3,566	Fall River
19	7	1	18	SWNW	ND	ND	ND	Fall River
20	7	1	17	SWSW	986070.6362	424628.3007	3,563	Fall River
21	7	1	19	SWNW	980440.6072	421760.0599	3,569	Fall River
22	40	60	27	NWSW	ND	ND	ND	unknown
23	7	1	29	NWNW	985974.1188	416755.5806	3,590	Fall River
24	7	1	28	NWNE	993100.2648	417036.9282	3,563	Fall River
25	7	1	27	NWSE	ND	ND	ND	Fall River
26	7	1	35	SWNE	1003612.929	410375.132	3,549	Fall River
27	7	1	33	SWSE	ND	ND	ND	Lakota
28	8	2	22	NESW	ND	ND	ND	unknown
29	8	2	16	NENW	ND	ND	ND	unknown
30	7	2	31	SESE	ND	ND	ND	unknown
31	7	2	31	SWNW	ND	ND	ND	Lakota
32	7	2	30	SWSW	ND	ND	ND	Lakota
33	7	1	25	NWSE	ND	ND	ND	Fall River
34	7	2	30	NWNW	ND	ND	ND	unknown
35	7	2	19	NWSE	ND	ND	ND	Lakota
36	7	2	30	NWNE	ND	ND	ND	Lakota

POWERTECH (USA) INC.

Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 2 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
37	7	2	18	NWSW	1012581.749	423947.5161	3,689	unknown
38	6	1	33	NWNW	992726.8917	442289.5946	3,634	Lakota
39	6	1	29	NENE	ND	ND	ND	unknown
40	6	1	30	SWNW	981813.9304	447183.2347	3,635	Other Inyan Kara
41	6	1	31	SWNE	983783.722	442081.4368	3,611	Alluvial
42	7	1	5	SWNE	989542.8678	436481.4222	3,596	Lakota
43	6	1	34	SWSE	999521.6678	439436.2184	3,672	Lakota
44	7	2	31	NWSE	ND	ND	ND	Fall River
45	8	2	5	NWNW	ND	ND	ND	Fall River
46	7	2	31	SWNE	ND	ND	ND	Fall River
47	7	2	32	SWSW	ND	ND	ND	Fall River
48	6	1	19	SENW	ND	ND	ND	Lakota
49	6	1	32	NWNW	987330.6151	444022.8154	3,628	Fall River
50	41	60	28	SWNW	ND	ND	ND	Lakota
51	7	1	9	SENE	995810.3298	431486.9525	3,615	Lakota
52	7	2	30	NESE	ND	ND	ND	unknown
53	7	2	30	SWNE	ND	ND	ND	unknown
54	7	1	25	NWSE	ND	ND	ND	Fall River
55	7	1	36	NWNE	ND	ND	ND	Fall River
56	7	2	32	SESE	ND	ND	ND	Lakota
57	8	2	5	NESE	ND	ND	ND	Lakota
58	7	1	31	NWNE	ND	ND	ND	Fall River
59	8	2	5	NENW	ND	ND	ND	Fall River
60	7	2	33	NWSE	ND	ND	ND	unknown
61	7	1	11	NWSE	1005230.856	429987.4356	3,740	Lakota
62	7	1	25	SWSW	ND	ND	ND	unknown
63	7	1	36	NESW	ND	ND	ND	Fall River
64	8	2	9	SWNE	ND	ND	ND	unknown
65	8	2	9	NWNE	ND	ND	ND	unknown
66	8	2	8	NENW	ND	ND	ND	unknown
67	8	2	8	SENW	ND	ND	ND	unknown
68	8	2	8	NENE	ND	ND	ND	Lakota
69	7	1	25	SWSE	ND	ND	ND	Fall River
70	7	1	25	NESW	ND	ND	ND	Other Inyan Kara
71	8	2	6	NWSE	ND	ND	ND	Fall River
72	8	2	6	NWSE	ND	ND	ND	Fall River

Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 3 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
73	8	2	6	NESW	ND	ND	ND	Lakota
74	8	2	6	NESW	ND	ND	ND	Fall River
75	8	2	17	SWSW	ND	ND	ND	Fall River
76	8	2	17	SENW	ND	ND	ND	Fall River
77	8	2	17	NWNE	ND	ND	ND	Fall River
78	8	2	20	NWSE	ND	ND	ND	Fall River
79	8	2	27	NESE	ND	ND	ND	Fall River
80	8	2	35	SWNW	ND	ND	ND	Lakota
81	8	2	14	SWNW	ND	ND	ND	Lakota
82	8	2	10	SWSW	ND	ND	ND	Fall River
83	8	2	14	NESW	ND	ND	ND	Fall River
84	8	2	10	SWNW	ND	ND	ND	Fall River
85	8	2	28	NESE	ND	ND	ND	Fall River
86	8	2	6	NWSW	ND	ND	ND	Fall River
87	8	1	1	SENE	ND	ND	ND	Fall River
88	7	1	35	SESE	1005216.386	408176.9195	3,554	Fall River
89	8	1	11	NWNE	ND	ND	ND	Lakota
90	8	2	23	SENW	1033574.095	387507.8887	3,572	unknown
91	8	2	12	SENW	ND	ND	ND	Fall River
92	8	2	23	SESW	ND	ND	ND	Fall River
93	8	2	2	SWNE	ND	ND	ND	Lakota
94	7	2	34	SWSW	ND	ND	ND	Lakota
95	40	61	25	SESE	ND	ND	ND	Fall River
96	41	60	22	SWSW	980028.4941	451854.1002	3664	Lakota
98	41	60	17	SWNW	ND	ND	ND	unknown
99	41	60	17	NENE	ND	ND	ND	Lakota
100	41	60	7	NWSE	ND	ND	ND	Lakota
102	6	1	18	SWNE	ND	ND	ND	Lakota
103	41	60	10	NWNW	ND	ND	ND	Lakota
104	41	60	10	NWSW	ND	ND	ND	Lakota
105	41	60	9	SENW	ND	ND	ND	Lakota
106	6	1	18	NENE	ND	ND	ND	unknown
107	6	1	18	SWNE	ND	ND	ND	Fall River
108	6	1	18	SWNE	ND	ND	ND	Fall River
109	6	1	17	NENW	ND	ND	ND	Lakota
110	6	1	17	NENE	ND	ND	ND	Lakota

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Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 4 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
111	6	1	17	NWNE	ND	ND	ND	Fall River
112	6	1	16	NWSE	ND	ND	ND	Fall River
113	7	2	6	NESW	1014835.904	434417.4002	3,844	unknown
114	7	2	7	SESW	1013809.661	428653.8989	3,764	Sundance/Unkpapa
115	6	1	18	SENE	986095.9548	457641.2997	3,720	Lakota
116	6	1	18	SENE	ND	ND	ND	Fall River
117	6	1	8	SWSE	ND	ND	ND	unknown
118	6	1	7	NESE	ND	ND	ND	unknown
119	6	1	8	NWNW	ND	ND	ND	unknown
120	6	1	5	NWSW	ND	ND	ND	unknown
121	5	1	31	SWSW	ND	ND	ND	Lakota
122	5	1	30	NENW	ND	ND	ND	unknown
123	42	60	21	NENW	ND	ND	ND	unknown
124	5	1	18	NWSW	ND	ND	ND	unknown
125	6	1	6	SWSW	ND	ND	ND	Fall River
126	41	60	16	SESW	ND	ND	ND	Lakota
127	41	60	7	SWNE	ND	ND	ND	Lakota
131	8	2	4	NWSE	ND	ND	ND	Fall River
132	8	2	4	NWSE	ND	ND	ND	Lakota
134	40	60	29	SWNW	ND	ND	ND	unknown
135	8	2	1	SENW	1039467.842	403141.0347	3,803	Lakota
136	8	2	5	NWNW	ND	ND	ND	unknown
137	7	2	17	SENW	ND	ND	ND	unknown
138	6	1	18	NENE	ND	ND	ND	Fall River
139	41	60	18	SESE	968658.3552	457463.919	3,729	Lakota
140	9	3	19	SWNW	ND	ND	ND	unknown
142	7	2	35	SENW	ND	ND	ND	Fall River
143	8	1	30	SWSE	ND	ND	ND	Fall River
144	9	3	21	SWNE	ND	ND	ND	unknown
145	8	2	3	SWSE	ND	ND	ND	unknown
146	9	2	21	NENW	ND	ND	ND	unknown
147	6	1	17	NESW	989277.4441	456567.2543	3,729	Lakota
200	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
201	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
202	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
203	7	2	12	SWSW	ND	ND	ND	Sundance/Unkpapa

POWERTECH (USA) INC.

Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 5 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
204	7	2	12	NWSW	ND	ND	ND	Sundance/Unkpapa
205	7	2	12	SWNE	ND	ND	ND	Sundance/Unkpapa
206	7	2	12	SWNE	ND	ND	ND	Sundance/Unkpapa
207	7	2	12	NENE	ND	ND	ND	unknown
208	7	2	2	SWNW	ND	ND	ND	Sundance/Unkpapa
209	7	2	3	NESE	ND	ND	ND	Sundance/Unkpapa
210	7	2	2	SENW	ND	ND	ND	Sundance/Unkpapa
211	7	2	12	NENW	ND	ND	ND	Sundance/Unkpapa
212	8	3	8	NWSE	ND	ND	ND	unknown
213	7	3	20	SWSE	ND	ND	ND	Sundance/Unkpapa
214	7	3	18	SESW	ND	ND	ND	Sundance/Unkpapa
215	6	2	27	SESE	ND	ND	ND	unknown
216	6	2	22	NENE	ND	ND	ND	unknown
220	6	1	19	SENE	986271.136	452335.2311	3,680	unknown
230	7	1	26	SESE	1005735.286	412883.2797	3,514	unknown
270	6	1	19	NW SW	982506.8593	451943.3669	3,659	Other Inyan Kara
401	9	2	1	SWNW	ND	ND	ND	Madison
402	9	2	1	SWNE	ND	ND	ND	Madison
403	9	2	1	NENE	ND	ND	ND	Madison
404	9	2	1	NENE	ND	ND	ND	Madison
405	9	2	1	NENE	ND	ND	ND	Madison
406	8	2	36	NESE	ND	ND	ND	Other Inyan Kara
407	8	3	33	NWSE	ND	ND	ND	Fall River
408	8	2	36	SENE	ND	ND	ND	Fall River
409	8	2	36	SENE	ND	ND	ND	Other Inyan Kara
410	8	3	32	SENW	ND	ND	ND	Lakota
411	8	2	36	NENE	ND	ND	ND	Lakota
412	8	2	27	SWSW	ND	ND	ND	Lakota
413	8	1	30	SENW	ND	ND	ND	Sundance/Unkpapa
414	8	3	27	NWNW	ND	ND	ND	Lakota
415	8	2	27	NESE	ND	ND	ND	Lakota
416	8	3	20	NWSE	ND	ND	ND	Other Inyan Kara
417	8	3	20	NWSE	ND	ND	ND	Fall River
418	8	3	20	SENW	ND	ND	ND	Fall River
419	8	2	23	NWNW	ND	ND	ND	Other Inyan Kara
420	8	3	8	NWSE	ND	ND	ND	Other Inyan Kara

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Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 6 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
421	8	2	8	NWNW	ND	ND	ND	Lakota
422	8	2	6	SWSE	ND	ND	ND	Lakota
423	8	2	3	SESW	ND	ND	ND	Sundance/Unkpapa
424	8	3	6	NWSE	ND	ND	ND	Sundance/Unkpapa
425	7	1	14	SENW	ND	ND	ND	Lakota
427	7	2	2	NWNW	ND	ND	ND	Sundance/Unkpapa
429	6	1	20	SENE	ND	ND	ND	Lakota
431	6	1	20	SENE	ND	ND	ND	Lakota
432	6	1	20	SENE	ND	ND	ND	Lakota
433	6	1	20	SENE	ND	ND	ND	Lakota
436	6	1	20	NWNE	990001.6275	454436.5461	3,737	Fall River
440	7	2	3	SWNE	ND	ND	ND	Sundance/Unkpapa
502	6	1	27	NWSE	ND	ND	ND	Alluvial
503	7	1	23	SESE	ND	ND	ND	Sundance/Unkpapa
504	7	1	25	SESE	ND	ND	ND	Fall River
505	7	1	26	NESW	ND	ND	ND	Lakota
506	7	2	8	SWNW	ND	ND	ND	Sundance/Unkpapa
507	7	2	19	NENW	ND	ND	ND	Lakota
508	7	2	19	SWSE	ND	ND	ND	Lakota
510	7	1	12	SESE	1011331.943	428178.1651	3,759	Lakota
601	8	2	23	NWNW	1033082.719	388749.7413	3,615	Fall River
602	8	2	23	NWNW	1033064.956	388798.1063	3,615	Lakota
603	8	2	23	NWNW	1032509.912	388763.8912	3,619	Fall River
605	7	1	10	SWSE	1000213.323	428484.0565	3,642	Other Inyan Kara
606	7	1	11	SWSW	1002111.841	428609.3226	3,668	Lakota
607	7	1	30	SWNW	980219.4441	416377.6182	3,611	Fall River
608	7	1	30	NWNW	980228.9136	416454.5538	3,610	Lakota
609	6	1	29	NWNE	990133.3233	447808.3157	3,702	Lakota
610	6	1	29	NWNE	989998.0402	447969.5677	3,704	Fall River
611	6	1	20	NWNe	990235.5648	453958.8872	3,731	Lakota
612	6	1	20	NWNE	990155.9068	454134.255	3,732	Lakota
613	6	1	20	NWNE	990523.3586	453775.7939	3,738	Fall River
614	6	1	20	NWNE	990583.8178	453770.1565	3,739	Fuson
615	6	1	20	NWNE	990570.9895	453708.8761	3,738	Lakota
616	6	1	20	SWNE	990534.0726	453142.1358	3,745	Lakota
617	6	1	20	NENW	989427.4846	453586.6258	3,723	Lakota

Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 7 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
618	7	1	2	SENE	1006472.742	435906.7583	3,759	unknown
619	7	1	2	NWNW	1003265.119	436729.3703	3,701	Lakota
620	6	1	35	NWNW	1002350.318	443210.0993	3,731	Lakota
621	6	1	27	NWSE	1000329.315	446398.1082	3,717	Alluvial
622	6	1	20	NENE	991174.522	454033.7715	3,747	Fall River
623	6	1	20	NENE	991068.0984	454300.3846	3,750	Lakota
625	41	60	9	SESE	978764.4747	462270.3858	3,816	Fall River
626	41	60	9	SWSE	978610.2151	462329.8362	3,826	Lakota
627	6	1	18	SWNW	983044.3999	458921.5345	3,713	unknown
628	6	1	29	SESE	991052.9337	449402.6524	3,737	Other Inyan Kara
631	6	1	23	SWSW	1002733.997	448993.2386	3,744	Fall River
632	6	1	23	SWNW	1002886.897	453010.3544	3,747	unknown
633	6	1	14	SESW	1004801.912	455118.8232	3,764	unknown
634	6	1	34	NESE	1000900.563	440168.275	3,689	unknown
635	7	1	14	NENW	1004084.632	427130.8303	3,643	Sundance/Unkpapa
636	7	1	11	NESW	1003173.25	429982.3145	3,698	unknown
637	7	1	11	NESE	1006473.976	430320.5883	3,743	unknown
638	7	1	2	NENE	1006668.16	437976.7587	3,791	Fall River
639	7	2	7	SENW	1014103.328	430722.0265	3,771	unknown
640	7	1	12	SESE	1011409.499	427965.0894	3,754	unknown
642	7	1	12	SESE	1011325.121	428042.0134	3,757	unknown
643	7	2	30	SESE	1015635.469	412200.2634	3,575	Lakota
644	7	2	30	SESE	1015632.054	412253.3734	3,575	Fall River
645	7	1	16	NENE	996079.9657	427998.3964	3,609	unknown
646	7	1	15	SWNE	999646.4859	426408.9229	3,611	Fall River
650	7	1	1	SESE	1012338.763	433014.833	3,820	Lakota
651	7	1	14	NWSE	1004407.769	424246.1432	3,600	Lakota
652	7	1	2	NWSE	1004758.754	434742.6477	3,748	Other Inyan Kara
653	7	1	22	NWNE	999078.2979	422487.0492	3,569	unknown
654	6	1	34	NWNE	1000770.962	443410.2383	3,687	Other Inyan Kara
655	6	1	34	NENE	1001852.878	443307.3946	3,719	Other Inyan Kara
656	6	1	31	SENW	982628.247	442000.9299	3,622	unknown
657	6	1	20	NWNE	ND	ND	ND	Lakota
658	7	1	15	SWNE	ND	ND	ND	Lakota
659	7	1	10	SWNE	ND	ND	ND	Fall River
660	7	1	10	SWNE	ND	ND	ND	Lakota

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Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 8 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
661	7	1	12	NENW	ND	ND	ND	Lakota
662	7	1	11	SESW	ND	ND	ND	unknown
663	7	1	10	SWSE	ND	ND	ND	Lakota
664	7	1	10	SWSE	ND	ND	ND	Fall River
665	7	1	10	SESE	ND	ND	ND	Fall River
666	7	1	10	SESE	ND	ND	ND	Lakota
668	7	1	15	NWNE	999428.155	427450.3155	3,622	Other Inyan Kara
669	7	1	15	NWNE	ND	ND	ND	Lakota
670	7	1	15	NWNE	ND	ND	ND	Fuson
671	7	1	15	NWNE	ND	ND	ND	Fall River
672	7	1	15	NWNE	ND	ND	ND	Fall River
673	7	1	15	NWNE	ND	ND	ND	Fuson
674	7	1	15	NWNE	ND	ND	ND	Lakota
675	7	2	31	SESE	1015340.264	406352.2188	3,492	Alluvial
676	6	1	34	SESW	999245.0312	439891.6372	3,662	Alluvial
677	7	1	4	SWSW	991925.5409	434077.2303	3,562	Alluvial
678	7	1	9	SWNE	994921.194	431925.7016	3,595	Alluvial
679	6	1	27	NWSE	1000693.36	446245.4324	3,715	Alluvial
680	7	1	11	NESW	1003476.59	429969.0789	3,688	Lakota
681	6	1	32	NWNE	988728.3431	443725.3264	3,624	Fall River
682	7	1	11	SENW	1003535.474	431259.5932	3,720	Lakota
683	6	1	29	NESW	988607.893	446108.0187	3,669	Fall River
684	7	1	11	NESW	1003586.926	429745.8227	3,691	Lakota
685	6	1	32	NWNE	989085.4868	443415.4025	3,626	Fall River
686	7	1	11	NESW	1003365.421	429751.8227	3,694	Lakota
687	6	1	32	NENW	988476.4049	443730.5899	3,626	Fall River
688	7	1	11	NESW	1003425.818	429974.4313	3,687	Fall River
689	6	1	32	NENW	988715.0026	443789.1861	3,626	Lakota
690	7	1	11	NESW	1003512.176	429971.0682	3,700	Sundance/Unkpapa
691	6	1	32	NENW	988764.8084	443706.8807	3,626	Fall River
692	7	1	11	NESW	1003466.908	429999.5069	3,701	Lakota
693	6	1	32	NENW	988727.3316	443667.2062	3,626	Sundance/Unkpapa
694	7	1	15	NWNW	997116.0514	426836.0704	3,600	Fall River
695	6	1	32	SESE	990783.4225	439312.5055	3,594	Fall River
696	7	1	15	NWNW	997086.1856	426946.4439	3,602	Lakota
697	6	1	32	SESE	990748.4216	439347.3562	3,594	Lakota

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Table 1. Locations of All Wells in the Dewey-Burdock Database (Page 9 of 9)

Well I.D.	Legal Location				SD State Plane 1983		Elevation (ft)	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
698	7	1	2	SENW	1004307.778	435651.0652	3,739	Fall River
703	7	1	1	SWSE	1010020.507	434334.3457	3,877	Sundance/Unkpapa
704	7	1	5	SWNE	989364.5045	436647.6682	3,599	Sundance/Unkpapa
2020	7	1	17	NWSW	986286.6643	424857.9008	3,565	unknown
3002	7	2	31	SESE	ND	ND	ND	unknown
3026	7	1	1	SESE	1012037.43	432833.2349	3,822	Lakota
4002	6	1	30	NWSW	981812.8541	446932.2402	3,621	Other Inyan Kara
5002	41	60	28	SWSW	ND	ND	ND	Other Inyan Kara
7002	7	1	23	NWNW	1001731.47	421930.808	3,571	Lakota
8002	7	1	23	SWSE	1004651.515	418556.4148	3,550	Lakota
8003	7	1	23	SWSE	1004520.892	418530.8085	3,543	Other Inyan Kara
8802	7	1	35	SESE	1005923.05	407436.6955	3,554	Fall River
8803	7	1	35	SESE	1005445.181	407730.2169	3,552	unknown

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Figure 1. All Wells in the Dewey-Burdock Database.

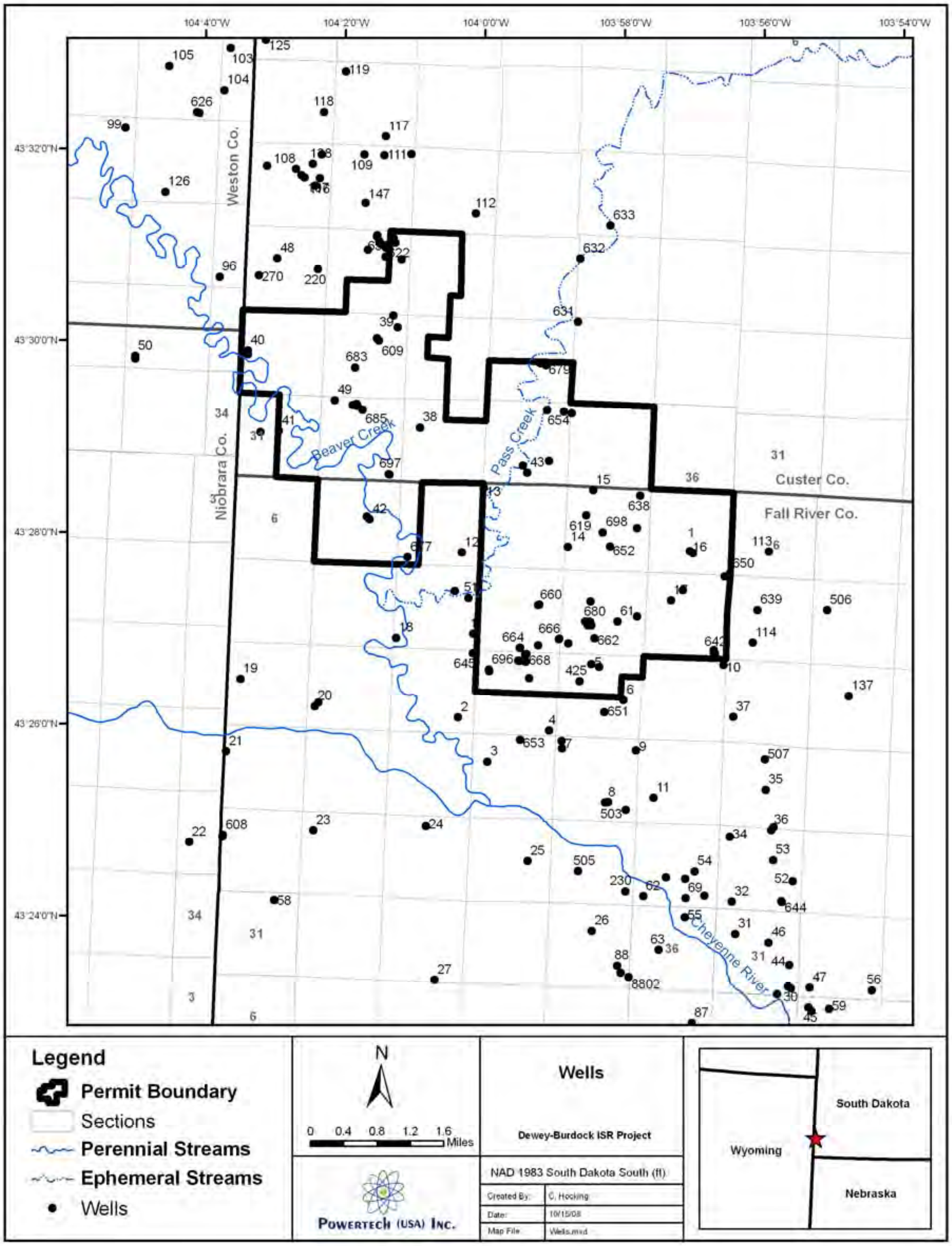

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Table 2. All Abandoned Wells Near the Dewey-Burdock Uranium ISR Project (Page 1 of 2)

Well I.D	Construction Information					Aquifer	Located in Field	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
5	850	UNK	UNK	5	leaky	Lakota	yes	TVA EIS Report
6	UNK	UNK	UNK	12	little rust	unknown	yes	GPS
15	495	UNK	UNK	4	not good	Lakota	yes	TVA EIS Report
40	UNK	UNK	UNK	UNK	UNK	Inyan Kara	yes	GPS
41	UNK	UNK	UNK	6	UNK	Alluvial	yes	TVA EIS Report
43	350	UNK	UNK	4	cant see under tent	Lakota	yes	TVA EIS Report
44	130	UNK	UNK	UNK	UNK	Fall River	no	TVA Data
88	320	UNK	UNK	UNK	UNK	Fall River	yes	TVA EIS Report
113	UNK	UNK	UNK	UNK	windmill	unknown	yes	GPS
502	46	UNK	UNK	UNK	UNK	Alluvial	no	TVA EIS Report
606	UNK	UNK	UNK	UNK	not good	Lakota	yes	TVA EIS Report
621	50	UNK	UNK	UNK	unknown	Alluvial	yes	TVA EIS Report
632	UNK	UNK	UNK	UNK	unknown	unknown	yes	GPS
634	UNK	UNK	UNK	UNK	no	unknown	yes	GPS
636	UNK	UNK	UNK	7	slightly rusty	unknown	yes	GPS
638	180	UNK	UNK	2	little rusty	Fall River	yes	TVA EIS Report
639	UNK	UNK	UNK	UNK	none visible	unknown	yes	GPS
640	UNK	UNK	UNK	1	good	unknown	yes	GPS
642	UNK	UNK	UNK	5	open bad	unknown	yes	GPS
645	UNK	UNK	UNK	UNK	hand pump	unknown	yes	GPS
651	UNK	UNK	UNK	2	moderate	Lakota	yes	TVA EIS Report
652	280	UNK	UNK	UNK	UNK	Inyan Kara	yes	GPS

Table 2. All Abandoned Wells Near the Dewey-Burdock Uranium ISR Project (Page 2 of 2)

Well I.D	Construction Information					Aquifer	Located in Field	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
653	UNK	UNK	UNK	UNK	UNK	unknown	yes	GPS
654	UNK	UNK	UNK	8	UNK	Inyan Kara	yes	GPS
655	UNK	UNK	UNK	12	UNK	Inyan Kara	yes	GPS
659	UNK	UNK	UNK	UNK	UNK	Fall River	no	TVA Data
660	UNK	UNK	UNK	UNK	UNK	Lakota	no	TVA Data

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Figure 2. Abandoned Wells in the Dewey-Burdock Database.

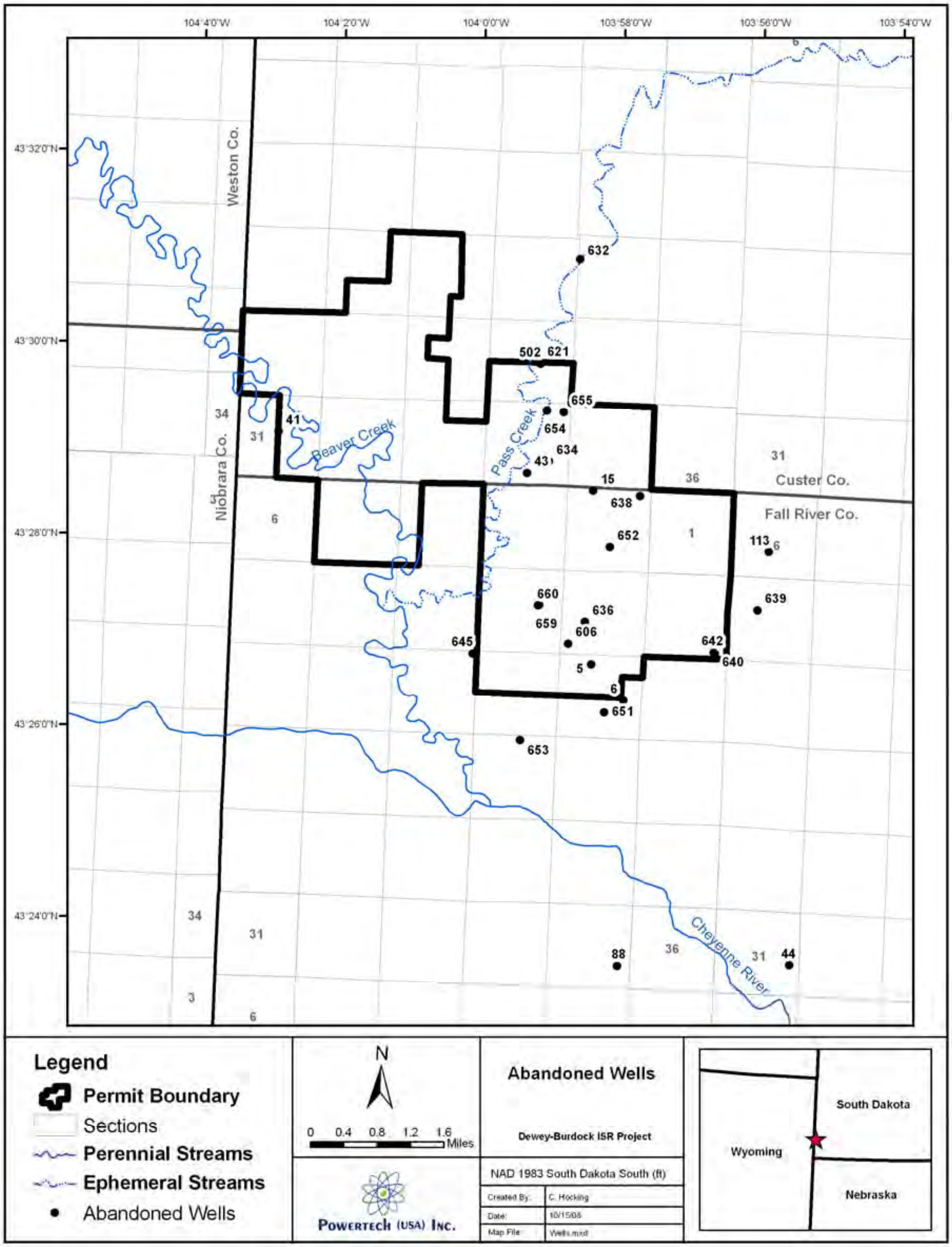

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Table 3. Wells Noted in Data Sources but Not Located in Field (Page 1 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
3	2400	UNK	UNK	4	UNK	Lakota	UNK	TVA EIS Report
9	90	UNK	UNK	6	UNK	Fall River	UNK	TVA EIS Report
10	200	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
11	2480	UNK	UNK	UNK	UNK	Sundance/Unkpapa	UNK	TVA EIS Report
19	740	UNK	UNK	UNK	UNK	Fall River	other	TVA EIS Report
22	UNK	UNK	UNK	UNK	UNK	unknown	other	TVA Data
25	350	UNK	UNK	UNK	UNK	Fall River	stock	TVA EIS Report
27	600	UNK	UNK	UNK	UNK	Lakota	other	TVA EIS Report
28	UNK	UNK	UNK	UNK	UNK	unknown	other	TVA Data
29	UNK	UNK	UNK	UNK	UNK	unknown	other	TVA Data
30	UNK	UNK	UNK	UNK	UNK	unknown	other	TVA Data
31	104	UNK	UNK	UNK	UNK	Lakota	other	TVA EIS Report
32	90	UNK	UNK	UNK	UNK	Lakota	other	TVA EIS Report
33	96	UNK	UNK	UNK	UNK	Fall River	other	TVA EIS Report
34	UNK	UNK	UNK	UNK	UNK	unknown	other	TVA Data
35	148	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
36	330	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
39	UNK	UNK	UNK	50	UNK	unknown	other	TVA Data
44	130	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
45	190	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
46	UNK	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data

Table 3. Wells Noted in Data Sources but Not Located in Field (Page 2 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
47	90	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
48	725	UNK	UNK	3	UNK	Lakota	stock	TVA Data
50	609	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
52	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
53	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
54	90	UNK	UNK	UNK	UNK	Fall River	stock	TVA EIS Report
55	92	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
56	300	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
57	270	UNK	UNK	UNK	UNK	Lakota	garden	TVA Data
58	UNK	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
59	118	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
60	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
62	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
63	100	UNK	UNK	UNK	UNK	Fall River	stock	TVA EIS Report
64	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
65	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
66	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
67	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
68	230	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
69	130	UNK	UNK	UNK	UNK	Fall River	stock	TVA EIS Report
70	375	UNK	UNK	UNK	UNK	Inyan Kara	stock	TVA EIS Report

Table 3. Wells Noted in Data Sources but Not Located in Field (Page 3 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
71	UNK	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
72	212	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
73	560	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
74	305	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
75	430	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
76	420	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
77	400	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
78	410	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
79	337	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
80	650	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
81	440	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
82	200	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
83	270	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
84	155	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
85	415	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
86	360	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
87	92	UNK	UNK	UNK	UNK	Fall River	abandoned	TVA EIS Report
89	860	UNK	UNK	UNK	UNK	Lakota	UNK	TVA Data
91	150	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
92	298	UNK	UNK	UNK	UNK	Fall River	domestic	USGS
93	200	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
94	UNK	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data

Table 3. Wells Noted in Data Sources but Not Located in Field (Page 4 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
95	860	UNK	UNK	UNK	UNK	Fall River	UNK	TVA Data
98	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
99	420	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
100	530	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
102	267	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
103	350	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
104	UNK	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
105	UNK	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
106	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
107	90	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
108	90	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
109	220	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
110	240	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
111	100	UNK	UNK	UNK	UNK	Fall River	other	TVA Data
112	120	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
116	UNK	UNK	UNK	UNK	UNK	Fall River	UNK	TVA Data
117	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
118	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
119	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
120	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
121	430	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
122	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data

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Table 3. Wells Noted in Data Sources but Not Located in Field (Page 5 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
123	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
124	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
125	132	UNK	UNK	UNK	UNK	Fall River	stock	USGS
126	UNK	UNK	UNK	UNK	UNK	Lakota	domestic	TVA Data
127	UNK	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
131	110	UNK	UNK	UNK	UNK	Fall River	stock	TVA Data
132	300	UNK	UNK	UNK	UNK	Lakota	stock	TVA Data
134	860	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
136	UNK	UNK	UNK	UNK	UNK	unknown	domestic	TVA Data
137	UNK	UNK	UNK	UNK	UNK	unknown	stock	TVA Data
138	100	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
140	UNK	UNK	UNK	UNK	UNK	unknown	domestic	TVA Data
142	280	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
143	1640	UNK	UNK	UNK	UNK	Fall River	domestic	TVA Data
144	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
145	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
146	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
200	108	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	domestic	TVA Data
201	110	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	stock	TVA Data
202	200	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	stock	TVA Data

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Table 3. Wells Noted in Data Sources but Not Located in Field (Page 6 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
203	200	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	domestic	TVA Data
204	170	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA Data
205	108	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA Data
206	200	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	domestic	TVA Data
207	UNK	UNK	UNK	UNK	UNK	unknown	domestic	TVA Data
208	179	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	stock	TVA Data
209	220	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
210	125	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	stock	TVA Data
211	170	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	stock	USGS
212	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
213	UNK	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA Data
214	UNK	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA Data
215	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
216	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
401	UNK	UNK	UNK	UNK	UNK	Madison	UNK	USGS

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Table 3. Wells Noted in Data Sources but Not Located in Field (Page 7 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
402	2983	UNK	UNK	UNK	UNK	Madison	UNK	USGS
403	2980	UNK	UNK	UNK	UNK	Madison	UNK	USGS
404	2944	UNK	UNK	UNK	UNK	Madison	UNK	USGS
405	UNK	UNK	UNK	UNK	UNK	Madison	UNK	USGS
406	300	UNK	UNK	UNK	UNK	Inyan Kara	UNK	USGS
407	200	UNK	UNK	UNK	UNK	Fall River	UNK	USGS
408	340	UNK	UNK	UNK	UNK	Fall River	UNK	USGS
409	320	UNK	UNK	UNK	UNK	Inyan Kara	UNK	USGS
410	182	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
411	320	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
412	400	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
413	1627	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
414	500	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
415	410	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
416	400	UNK	UNK	UNK	UNK	Inyan Kara	UNK	USGS
417	160	UNK	UNK	UNK	UNK	Fall River	UNK	USGS
418	160	UNK	UNK	UNK	UNK	Fall River	UNK	USGS
419	630	UNK	UNK	UNK	UNK	Inyan Kara	UNK	USGS

Table 3. Wells Noted in Data Sources but Not Located in Field (Page 8 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
420	500	UNK	UNK	UNK	UNK	Inyan Kara	UNK	USGS
421	245	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
422	360	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
423	380	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
424	240	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
425	237	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
427	145	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
429	800	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
431	815	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
432	800	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
433	835	UNK	UNK	UNK	UNK	Lakota	UNK	USGS
440	247	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	USGS
502	46	UNK	UNK	UNK	UNK	Alluvial	UNK	TVA EIS Report
503	1470	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA EIS Report
504	450	UNK	UNK	UNK	UNK	Fall River	UNK	TVA EIS Report
505	260	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
506	470	UNK	UNK	UNK	UNK	Sundance/ Unkpapa	UNK	TVA EIS Report

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Table 3. Wells Noted in Data Sources but Not Located in Field (Page 9 of 9)

Well I.D	Construction Information					Aquifer	Use Type	Data Origin
	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
507	145	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
508	255	UNK	UNK	UNK	UNK	Lakota	UNK	TVA EIS Report
657	UNK	UNK	UNK	UNK	UNK	Lakota	monitor	TVA EIS Report
658	545	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
659	UNK	UNK	UNK	UNK	UNK	Fall River	monitor	TVA Data
660	UNK	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
661	UNK	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
662	UNK	UNK	UNK	UNK	UNK	unknown	monitor	TVA Data
663	550	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
664	360	UNK	UNK	UNK	UNK	Fall River	monitor	TVA Data
665	252	UNK	UNK	UNK	UNK	Fall River	monitor	TVA Data
666	441	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
669	550	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
670	395	UNK	UNK	UNK	UNK	Fuson	monitor	TVA Data
671	350	UNK	UNK	UNK	UNK	Fall River	monitor	TVA Data
672	376	UNK	UNK	UNK	UNK	Fall River	monitor	TVA Data
673	440	UNK	UNK	UNK	UNK	Fuson	monitor	TVA Data
674	570	UNK	UNK	UNK	UNK	Lakota	monitor	TVA Data
3002	UNK	UNK	UNK	UNK	UNK	unknown	UNK	TVA Data
5002	UNK	UNK	UNK	UNK	UNK	Inyan Kara	UNK	TVA Data

Figure 3. Nonverified Wells
(Wells That Were Not Located at the Site. These Wells May or May Not Still Exist).

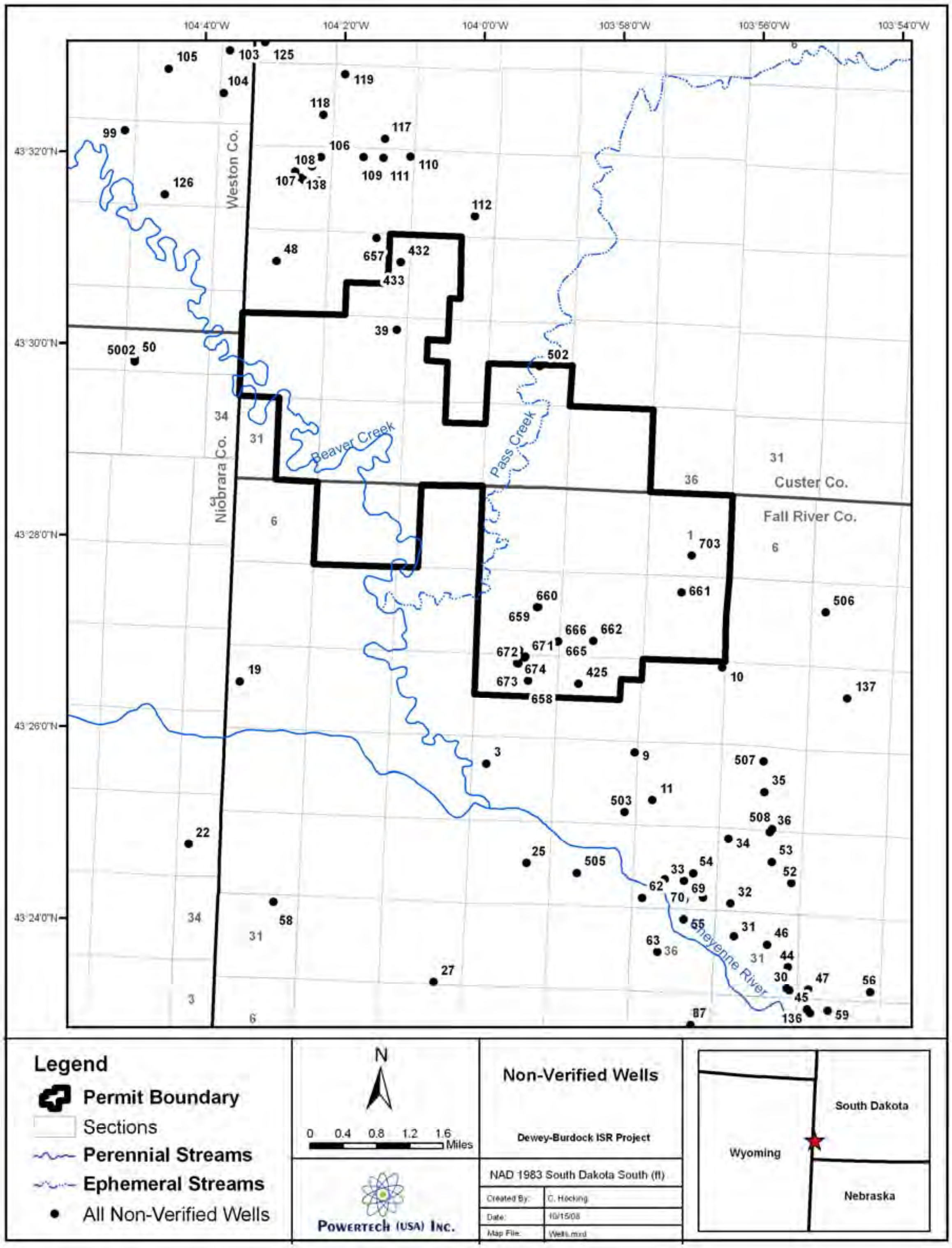

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Figure 4. Wells That Were Field Located and Active (Not Abandoned).

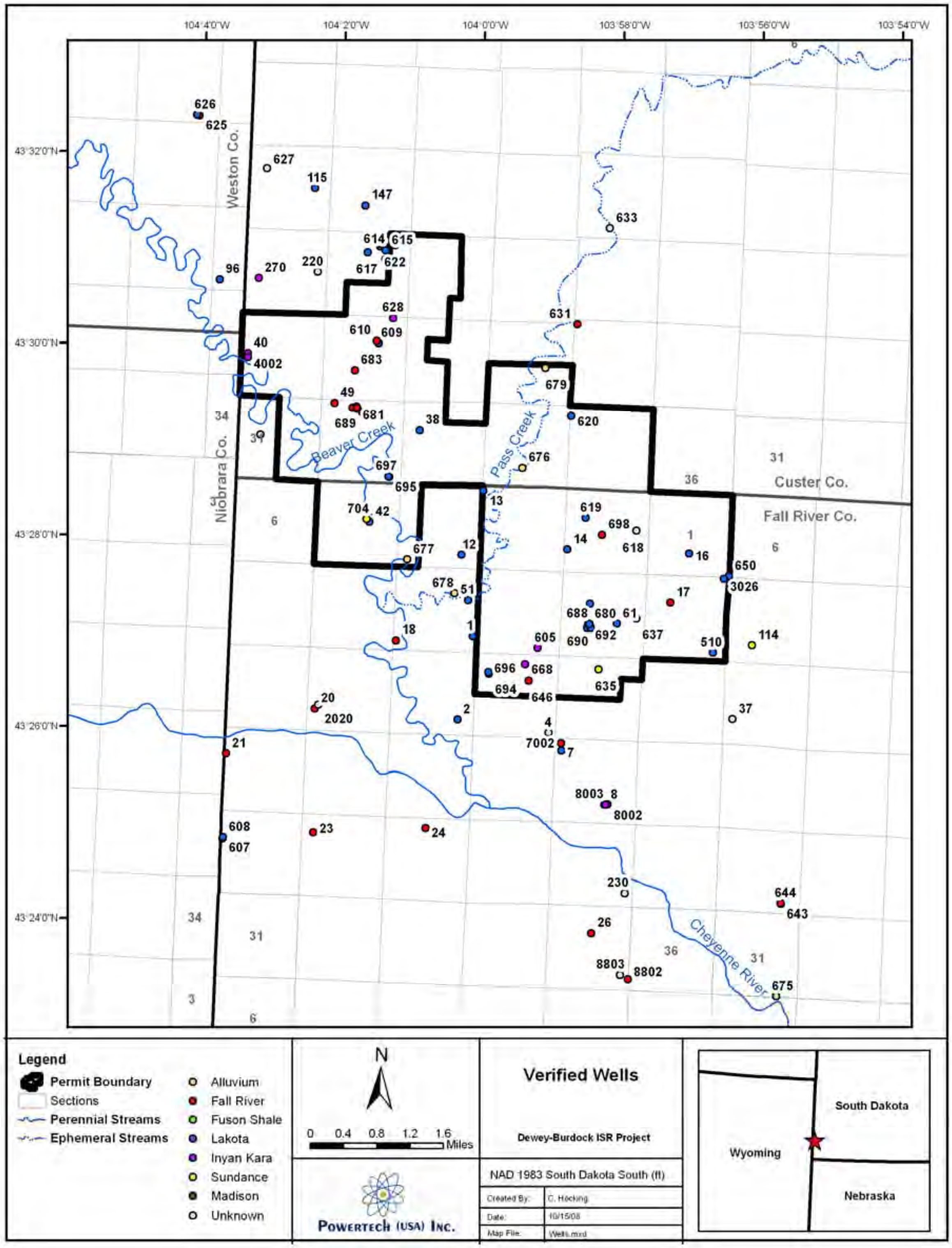

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Table 4. Known Alluvial Wells at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Construction Information						Use Type	Water-Quality Sampling Frequency	Data Origin
		Date Drilled	Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
675	Alluvial on Cheyenne River at Marietta	9/25/07	14.4	4	14	2	new pvc	monitor	Quarterly	Well Completion Report
676	Alluvial on Pass Creek at old Spencer Ranch	9/26/07	22.5	12	22	2	new pvc	monitor	Quarterly	Well Completion Report
677	Alluvial on Beaver Creek near Putnam	9/25/07	14.5	4	14	2	new pvc	monitor	Quarterly	Well Completion Report
678	Alluvial on Pass Creek downstream of Dewey Rd	9/25/07	14.5	4	14	2	new pvc	monitor	Quarterly	Well Completion Report
679	Alluvial on Pass Creek at Doran Ranch	9/26/07	39	29	39	2	new pvc	monitor	Quarterly	Well Completion Report

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Figure 5. Alluvial Wells Near the Dewey-Burdock Site.

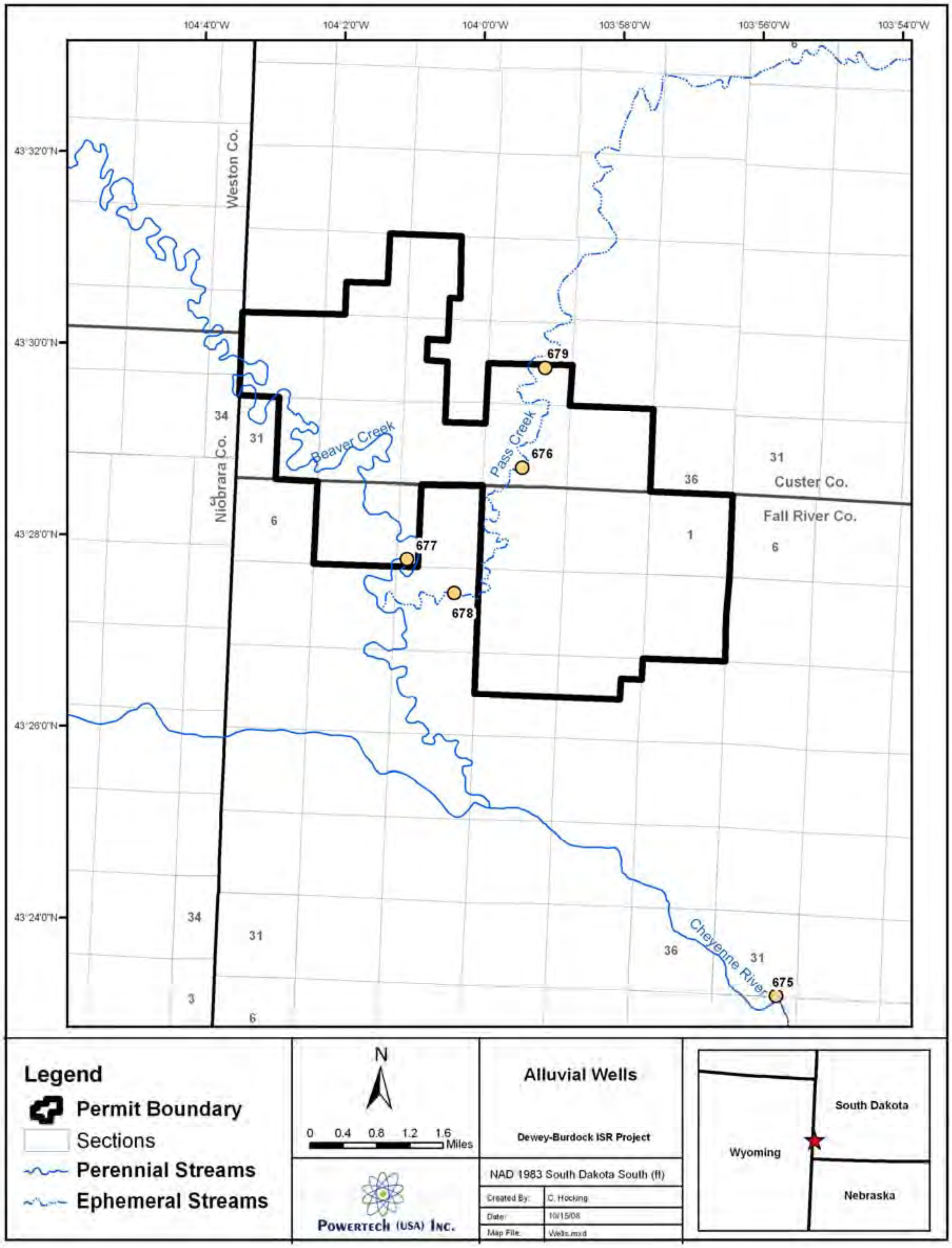

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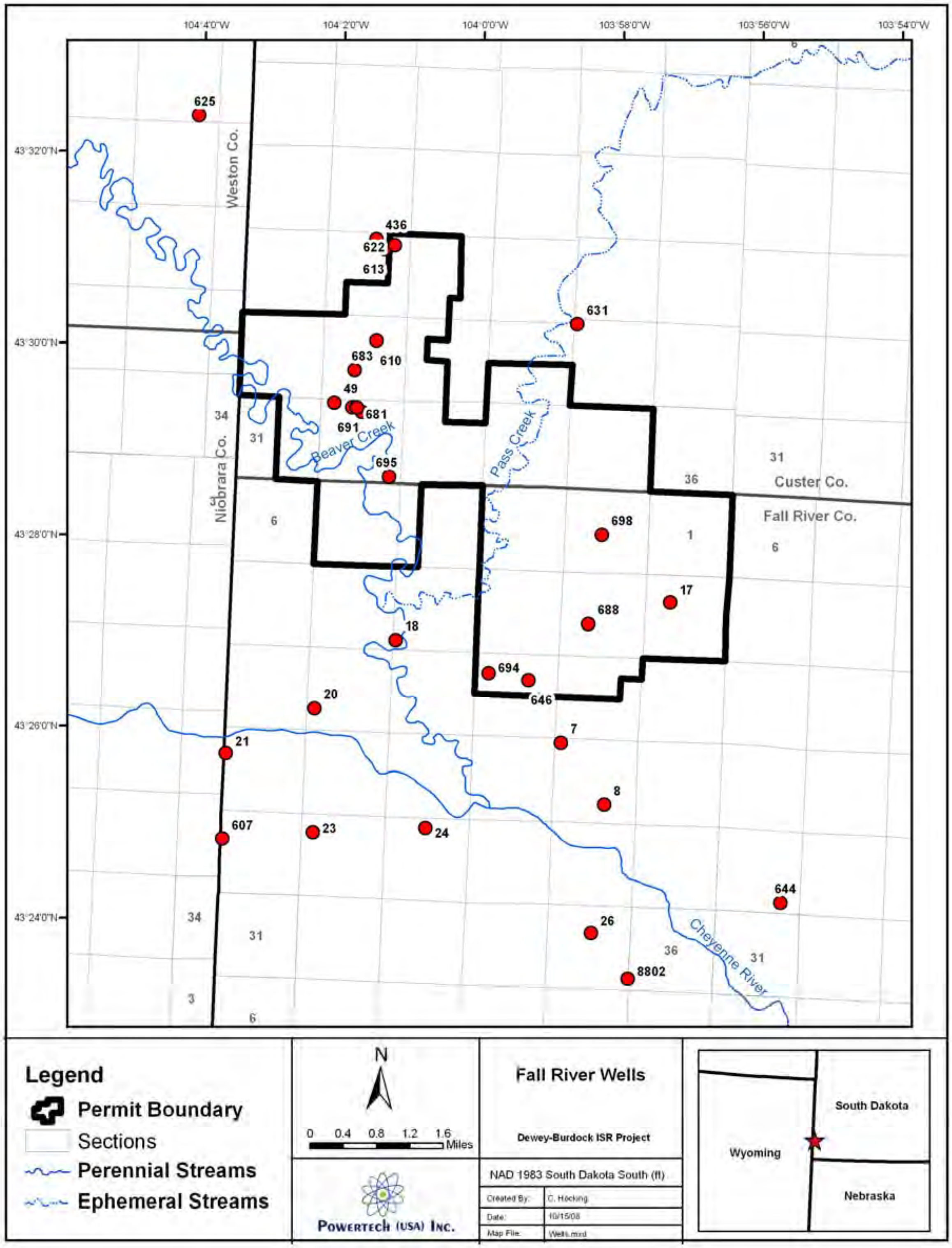
Table 5. Known Fall River Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Date Drilled	Construction Information					Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
			Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)				
7	D-27	UNK	200	UNK	UNK	6	UNK	domestic	UNK	quarterly	TVA EIS Report
8	D-29	UNK	240	UNK	UNK	6	UNK	domestic	yes	quarterly	TVA Data
17	D-13	UNK	156	UNK	UNK	3	little rusty	stock	no	none	Well Completion Report
18	D-10	UNK	527	UNK	UNK	4	UNK	domestic	yes	quarterly	TVA EIS Report
20	D-21	UNK	530	UNK	UNK	UNK	UNK	domestic	UNK	none	TVA EIS Report
21	D-23	UNK	910	UNK	UNK	UNK	UNK	stock	UNK	none	TVA EIS Report
23	D-40	UNK	600	UNK	UNK	UNK	UNK	stock	no	none	TVA EIS Report
24	D-39	UNK	600	UNK	UNK	UNK	UNK	stock	yes	none	TVA EIS Report
26	D-42	UNK	350	UNK	UNK	UNK	UNK	other	no	none	TVA EIS Report
49		UNK	600	UNK	UNK	4	good	stock	yes	water level	TVA Data
436	DPZ-3 FR, 6S 1E20AB2	UNK	590	UNK	UNK	UNK	UNK	monitor	no	none	USGS
601	BPZ 14 FR	6/7/1978	UNK	UNK	UNK	1	okay	monitor	UNK	none	Well Completion Report
603	8S 2E23BBA	UNK	UNK	UNK	UNK	6	UNK	UNK	UNK	none	USGS
607	BPZ 18 FR	UNK	UNK	UNK	UNK	1	okay	monitor	no	water level	TVA Data
610	BPZ 20 FR	6/27/1978	680	630	672	1	good cond capped	monitor	no	water level	Well Completion Report
613	DPZ 1 FR, 6S1E20AD6	8/14/1981	580	504	580	4	okay	monitor	no	water level	Well Completion Report
622	DPZ 4 FR, 6S 1E20AA	8/17/1981	520	503	580	4	okay	monitor	no	monthly	Well Completion Report
625	BPZ 22 FR	UNK	630	UNK	UNK	1	okay	monitor	no	none	TVA Data
631		02/98	80	30	80	5	steel	stock	no	quarterly	Well Completion Report
644	BPZ 16 FR	6/7/1978	UNK	UNK	UNK	1	okay	monitor	no	none	Well Completion Report
646	BPZ-9 FR	UNK	UNK	UNK	UNK	UNK	UNK	monitor	yes	none	GPS
681	DB07-32-3C	1/27/2008	600	585	600	6	new PVC	pump test well	yes	monthly	Well Completion Report
683	DB07-29-7	3/4/2008	650	635	650	4	new	monitor	no	once	Well Completion Report
685	DB07-32-4C	2/4/2008	595	580	595	4	new PVC	monitor	yes	once	Well Completion Report
687	DB07-32-5	2/6/2008	608	590	605	4	new PVC	monitor	yes	once	Well Completion Report
688	DB08-11-17	4/1/2008	255	245	255	6	UNK	monitor	no	monthly	Well Completion Report
691	DB07-32-9C	3/10/2008	505	490	505	6	new pvc	monitor	yes	once	Well Completion Report
694	DB08-15-02	3/22/2008	392	377	392	6	new pvc	monitor	yes	monthly	Well Completion Report
695	DB08-32-13	3/20/2008	508	493	508	6	new pvc	monitor	yes	monthly	Well Completion Report
698	DB08-02-01	3/25/2008	205	180	205	6	new pvc	monitor	no	monthly	Well Completion Report
8802	D-44, 88B	UNK	320	UNK	UNK	UNK	UNK	stock	UNK	none	TVA EIS Report

RSI-1764-08-xxx

Figure 6. Fall River Wells Near the Dewey-Burdock Site.



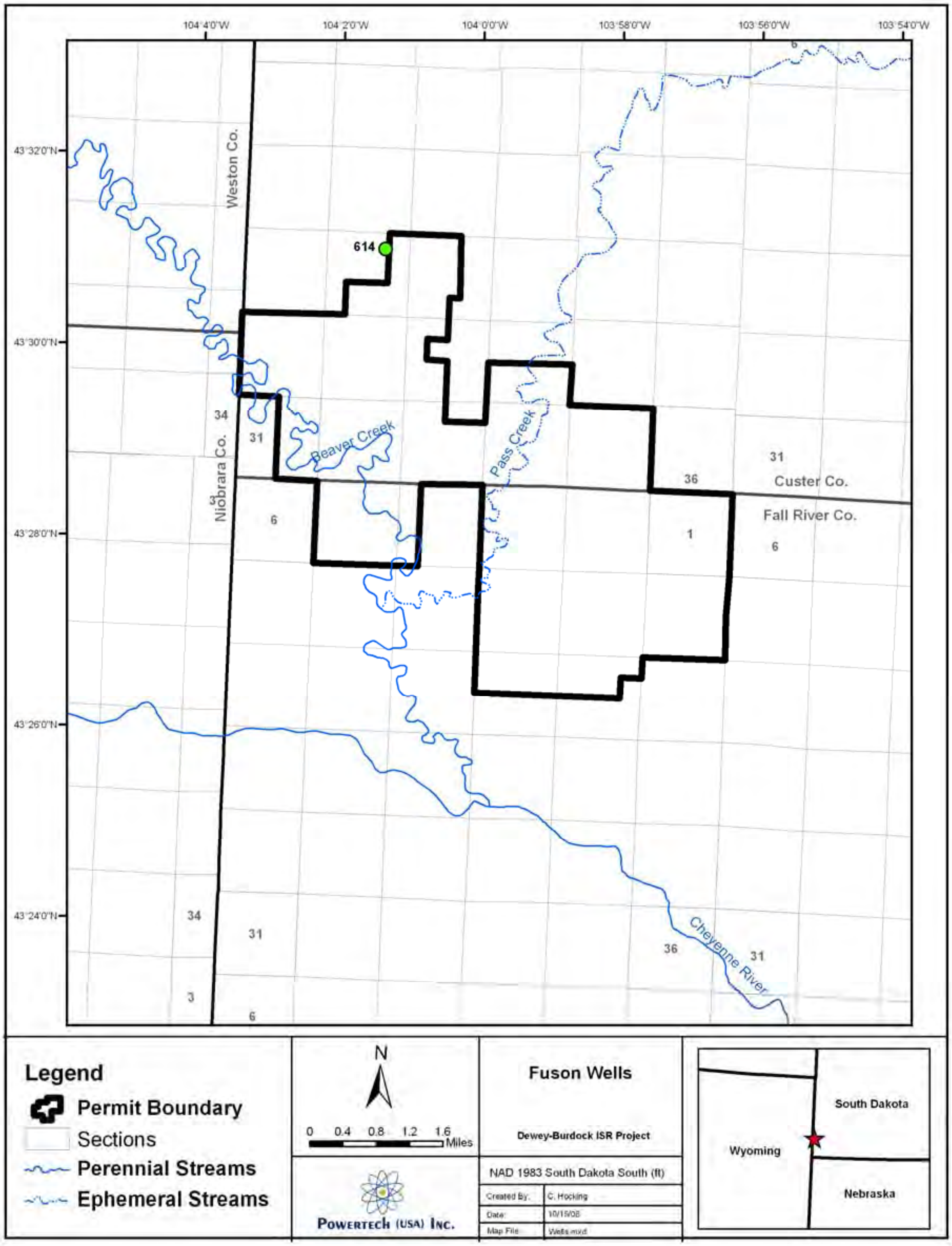
POWERTECH (USA) INC.

Table 6. Known Fuson Wells at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Date Drilled	Construction Information					Use Type	Flowing Artesian	Data Origin
			Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)			
614	DPZ 1 FU, 6S1E20AD2	9/14/81	620	609	620	4	okay	monitor	no	Well Completion Report

RSI-1764-08-xxx

Figure 7. Fuson Wells Near the Dewey-Burdock Site.



Powertech (USA) Inc.

Table 7. Known Lakota Aquifer Wells at the Dewey-Burdock Uranium ISR Project (Page 1 of 2)

Well I.D.	Name Other	Date Drilled	Construction Information					Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
			Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)				
1	D-11	UNK	600	UNK	UNK	4	really rusty	stock	yes	none	TVA EIS Report
2	D-20	11/17/1981	650	566	650	5	UNK	domestic	yes	quarterly	Well Completion Report
12	D-7	UNK	805	UNK	UNK	5	okay ltl rusty	stock	yes	water level	TVA EIS Report
13	D-6	10/22/1980	625	580	625	5	UNK	domestic	no	quarterly	Well Completion Report
14	D-5	UNK	470	UNK	UNK	4	fairly rusty	unknown	no	none	TVA EIS Report
16	D-1	UNK	330	UNK	UNK	5	UNK	domestic	no	quarterly	TVA EIS Report
38	B-4	11/12/1949	494	UNK	UNK	4	slightly rusty	stock	yes	water level	Well Completion Report
42	D-8	UNK	600	UNK	UNK	5	UNK	domestic	yes	quarterly	TVA EIS Report
51	D-9	UNK	550	UNK	UNK	10	UNK	other	yes	none	TVA EIS Report
61	D-12	UNK	525	UNK	UNK	5	UNK	stock	no	none	TVA EIS Report
96		UNK	560	UNK	UNK	5	UNK	domestic	yes	none	TVA Data
115		10/18/1984	UNK	UNK	UNK	UNK	okay	domestic	yes	none	Well Completion Report
135		UNK	360	UNK	UNK	UNK	UNK	domestic	no	none	TVA Data
139		UNK	620	UNK	UNK	UNK	UNK	stock	yes	none	TVA Data
147	DPZ -8 LAK, 6S 1E17CAC	UNK	750	UNK	UNK	1	okay	monitor	no	none	USGS
510	D-14, 7S 1E12DD	6/12/1988	540	300	520	5	PVC	stock	yes	none	Well Completion Report
602	BPZ 14 LAK	6/29/1978	UNK	UNK	UNK	1	okay	monitor	UNK	none	Well Completion Report
608	BPZ 18 LAK	UNK	UNK	UNK	UNK	1	okay	monitor	UNK	water level	TVA Data
609	BPZ 20 LAK, 6S 1E29ABDC	6/26/1978	1000	903	966	4	good capped	monitor	no	water level	Well Completion Report
611	Dewey TVA Pump Well	10/17/1981	815	695	800	UNK	UNK	pump test well	no	none	Well Completion Report
612	DPZ 2 LK, 6S 1E20AB	UNK	UNK	UNK	UNK	4	okay	monitor	no	none	USGS
615	DPZ 1 LK	8/13/1981	800	712	800	4	okay	monitor	no	monthly	Well Completion Report
616	DPZ 5 LK	2/9/1982	795	735	835	4	okay	monitor	no	none	Well Completion Report
617	DPZ 6 LK, 6S 1E20AC	9/15/1981	810	715	810	4	okay	monitor	no	none	Well Completion Report
619	D-4, Daniels West 1, MET	UNK	280	UNK	UNK	4	ok ltl rust	stock	no	quarterly	TVA EIS Report
620	Spencer Mine Well	UNK	UNK	UNK	UNK	UNK	good	stock	no	none	GPS
623	DPZ 4 L, 6S 1E20AA(2)	8/17/1981	765	714	780	4	okay	monitor	no	none	Well Completion Report
626	BPZ 22 LAK	UNK	640	UNK	UNK	4	UNK	UNK	no	none	TVA Data
643	BPZ 16 LAK	6/7/1978	UNK	UNK	UNK	1	okay	monitor	UNK	none	Well Completion Report
650	Daniels Bennet Canyon	UNK	UNK	UNK	UNK	4	rusty	stock	no	quarterly	GPS
680	DB07-11-11C	12/19/2007	436	426	436	6	new PVC	pump test well	no	monthly	Well Completion Report

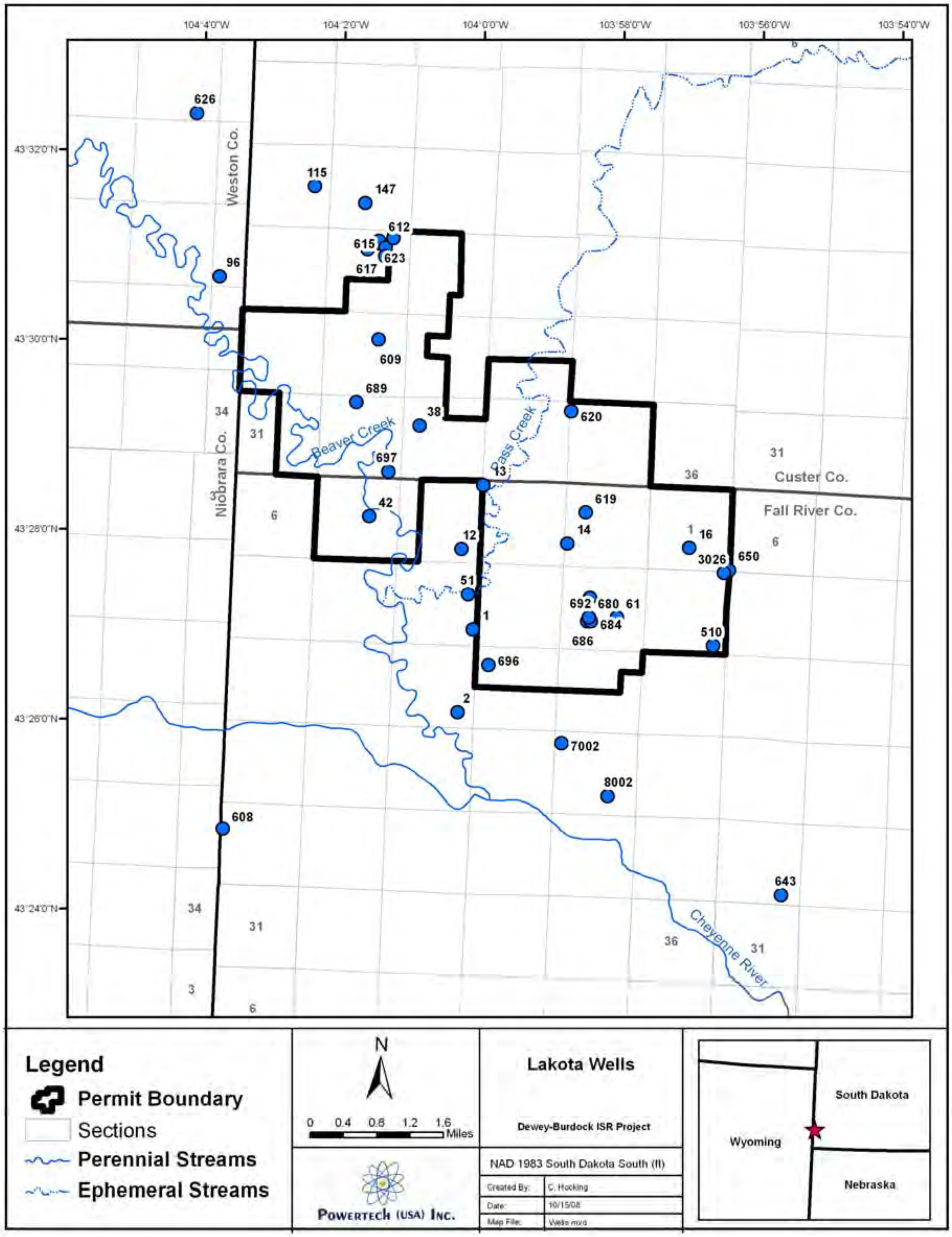
Table 7. Known Lakota Aquifer Wells at the Dewey-Burdock Uranium ISR Project (Page 2 of 2)

Well I.D.	Name Other	Date Drilled	Construction Information					Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
			Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)				
682	DB07-11-2	2/21/2008	460	450	460	4	new PVC	monitor	no	once	Well Completion Report
684	DB07-11-14C	2/13/2008	423	413	423	4	new pvc	monitor	no	once	Well Completion Report
686	DB07-11-15	2/24/2008	428	418	428	4	new PVC	monitor	no	once	Well Completion Report
689	DB07-32-10,	3/11/2008	730	715	730	6	UNK	monitor	yes	monthly	Well Completion Report
692	DB08-11-19	4/16/2008	327	325	335	6	new pvc	monitor	no	once	Well Completion Report
696	DB08-15-03	3/21/2008	587	572	587	6	new pvc	monitor	yes	monthly	Well Completion Report
697	DB08-32-12	3/18/2008	682	667	682	6	new pvc	monitor	yes	monthly	Well Completion Report
3026	DB08-01-06	3/26/2008	196	166	196	6	new	monitor	no	monthly	Well Completion Report
7002	D-26, 7S	UNK	500	UNK	UNK	6	poor	stock	yes	quarterly	TVA EIS Report
8002	D-28, 8S	UNK	500	UNK	UNK	6	poor	stock	yes	water level	TVA EIS Report

POWERTECH (USA) INC.

RSI-1764-08-xxx

Figure 8. Lakota Wells Near the Dewey-Burdock Site.



POWERTECH (USA) INC.

Table 8. Known Inyan Kara Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Date Drilled	Construction Information: Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)	Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
40	40S, 6S 1E30CBB	UNK	680	UNK	UNK	6	UNK	none	yes	none	USGS
270		UNK	UNK	UNK	UNK	0	UNK	stock	yes	none	GPS
605		UNK	UNK	UNK	UNK	1	okay	monitor	UNK	none	GPS
628		UNK	UNK	UNK	UNK	UNK	UNK	stock	no	quarterly	GPS
668	TVA Burdock Test Well	1/31/1977	574	280	555	12	UNK	pump test well	yes	water level	Well Completion Report
4002	40	UNK	UNK	UNK	UNK	6	UNK	domestic	yes	quarterly	TVA Data

Powertech (USA) Inc.

RSI-1764-08-xxx

Figure 9. Wells Completed in the Inyan Kara Aquifer. These Wells Include Those Screened in Either the Fall River or Lakota Formations or Both.

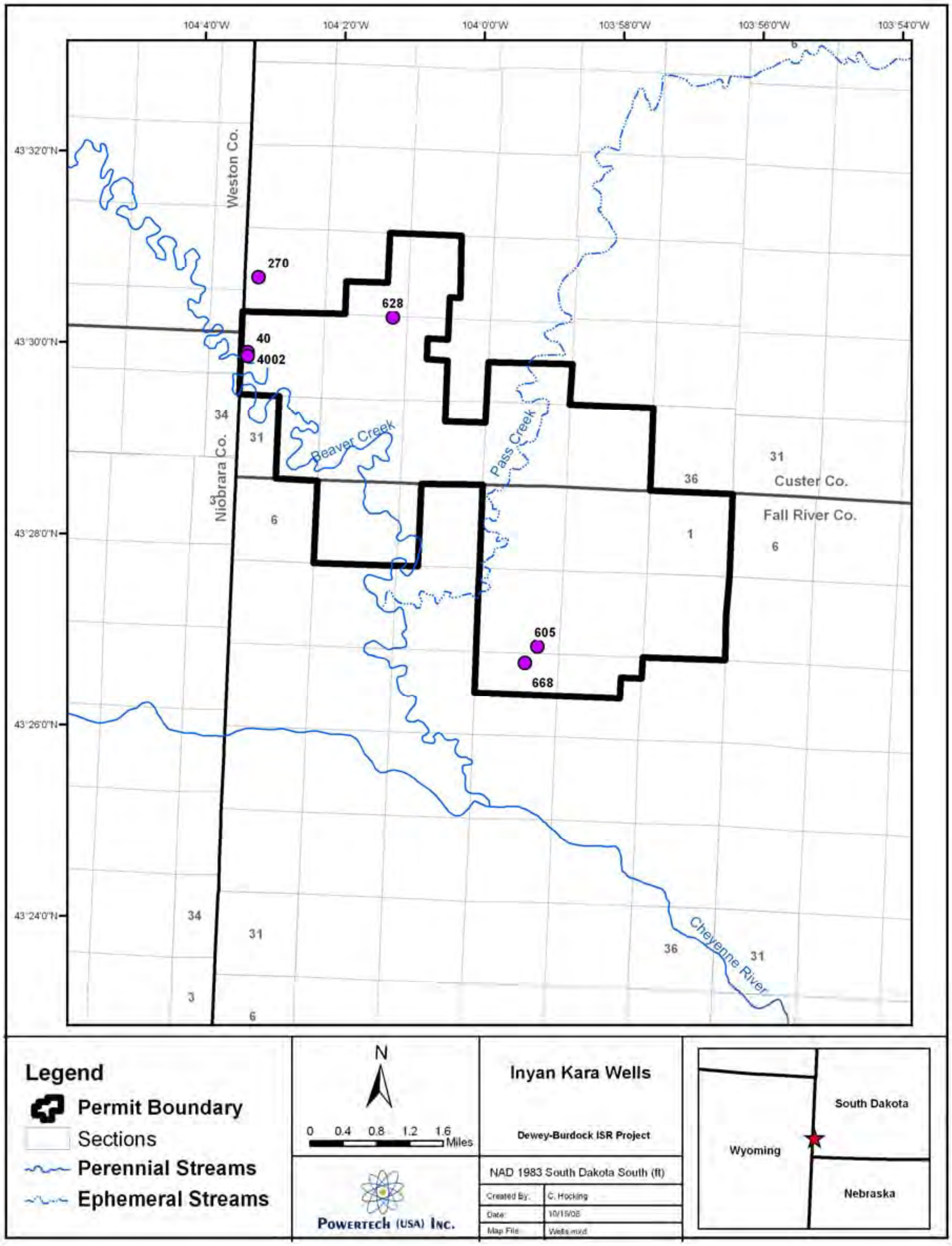


Table 9. Known Sundance or Unkpapa Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Date Drilled	Construction Information: Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)	Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
635	7S 1E14BAAC	UNK	880	666	780	6	leaky	stock	yes	quarterly	well completion report
114	E-2	UNK	365	UNK	UNK	UNK	UNK	stock	no	none	TVA EIS Report
690	DB08-11-18	4/15/2008	623	621	631	6	new pvc	monitor	yes	once	well completion report
704	DB08-05-01	4/29/2008	955	915	955	6	new	other	yes	none	well completion report
693	DB07-32-11	3/8/2008	910	910	930	6	new pvc	monitor	yes	once	well completion report
703	DB08-01-07	4/18/2008	525	475	525	6	new	other	no	none	well completion report

Figure 10. Sundance and Unkpapa Aquifers Near the Dewey-Burdock Site.

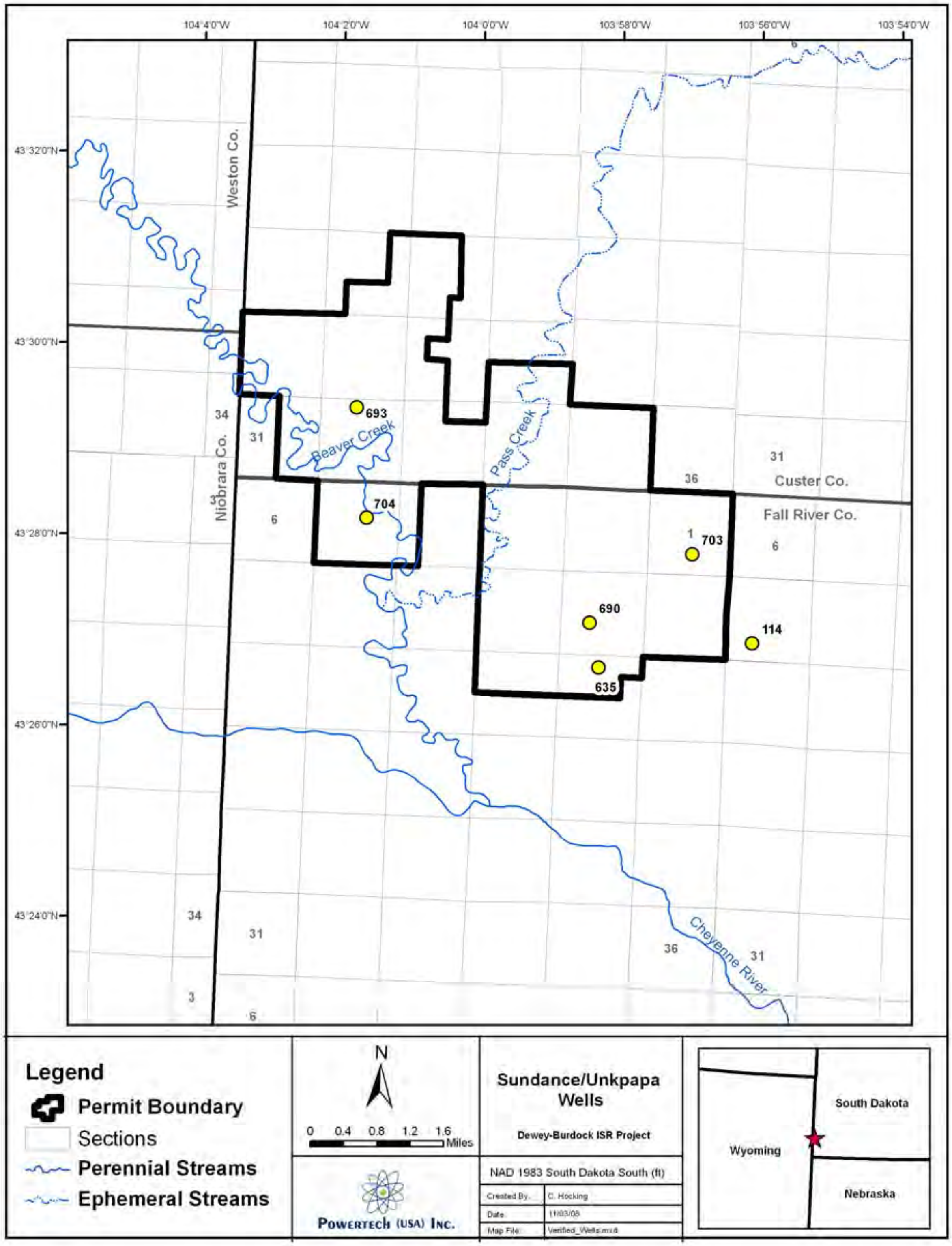


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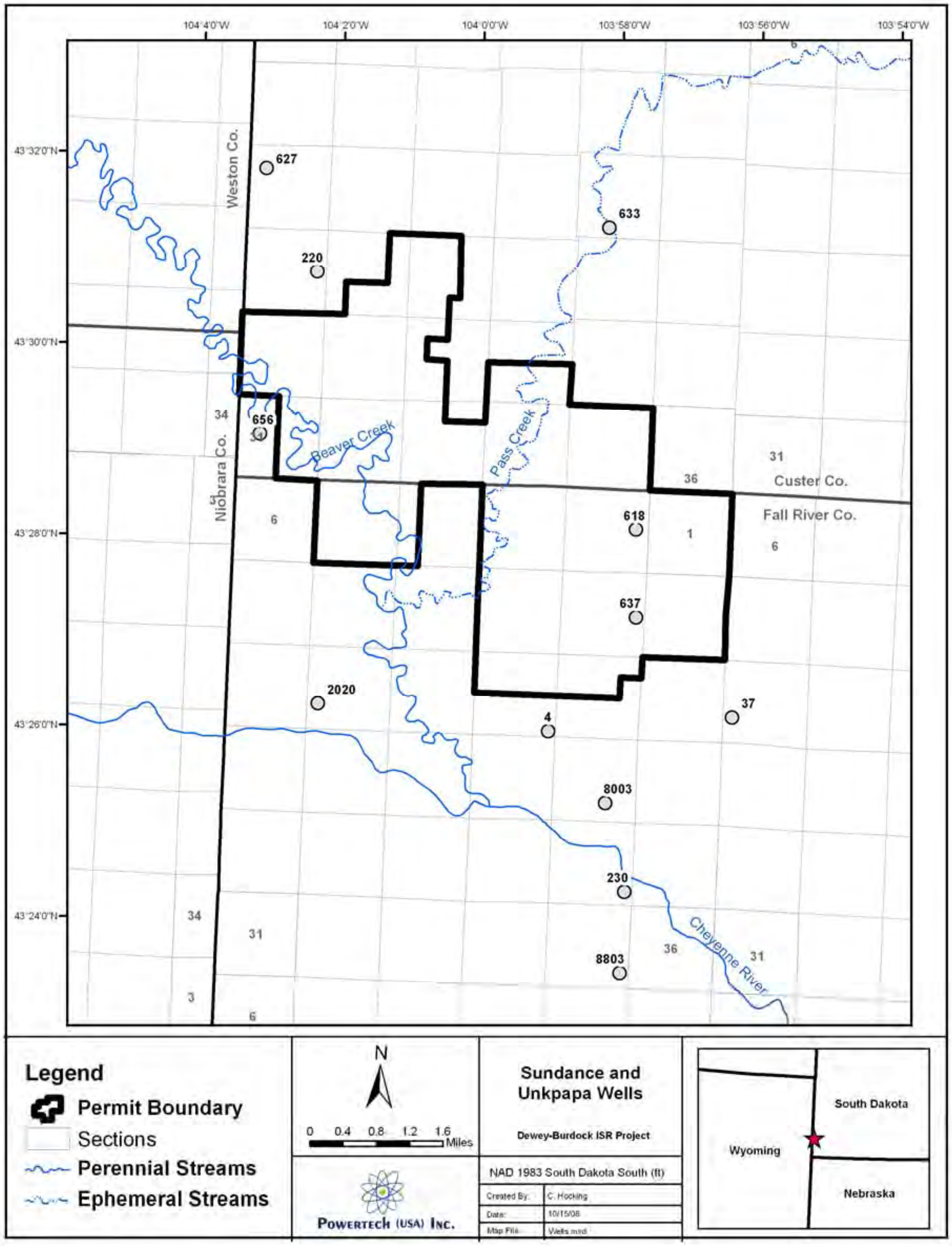
Table 10. Wells With Unknown Aquifer of Complete at the Dewey-Burdock Uranium ISR Project

Well I.D.	Name Other	Date Drilled	Construction Information						Use Type	Flowing Artesian	Water-Quality Sampling Frequency	Data Origin
			Depth (ft)	Depth to Top Screen (ft)	Depth to Bottom Screen (ft)	Casing Diameter (in)	Casing Condition (Surface Observation)					
4	D-19	UNK	2264	UNK	UNK	3	rusty leaky		stock	yes	once	TVA EIS Report
37		UNK	UNK	UNK	UNK	1	okay windmill		stock	no	none	TVA EIS Report
90		UNK	UNK	UNK	UNK	UNK	UNK		stock	UNK	none	GPS
220		UNK	UNK	UNK	UNK	UNK	UNK		stock	yes	none	GPS
230		UNK	UNK	UNK	UNK	UNK	UNK		stock	UNK	none	GPS
618		UNK	UNK	UNK	UNK	UNK	UNK		stock	no	none	GPS
627		UNK	UNK	UNK	UNK	UNK	UNK		UNK	UNK	none	GPS
633	Pass Creek Well 2	UNK	UNK	UNK	UNK	2	okay		stock	no	none	GPS
637	BPZ-5	UNK	UNK	UNK	UNK	2	okay		monitor	no	none	TVA
656		UNK	UNK	UNK	UNK	UNK	UNK		stock	yes	none	GPS
2020	21N	UNK	UNK	UNK	UNK	UNK	UNK		stock	yes	none	GPS
8803	88C	UNK	UNK	UNK	UNK	UNK	UNK		stock	yes	none	GPS

RSI-1764-08-xxx

Figure 11. Wells Completed Within an Unknown Aquifer Near the Dewey-Burdock Site.



POWERTECH (USA) INC.

APPENDIX 5.2-B

WELL COMPLETION REPORTS

POWERTECH WELL COMPLETION REPORTS
(2007–2008)

DB-GW675

Location Marietta

Construction Details

Total Depth	14.4’
Screen Inverval	4.4 – 14.4’
Sand pack	3 – 14.4’
Bentonite	1 – 3’
Cement	0 – 1’
Distance from surface to top of casing	2.5’

Water Level ~9’ below surface

Lithology

0 – 4 ft	fine to med grain sand, tan color, mostly quartz and feldspar, some dark minerals (5%)
4 – 9 ft	poorly sorted, coarse sand, few small pebbles
9 – 12.5 ft	poorly sorted, coarse sand, mostly quartz and feldspar with dark minerals (10%), some pebbles, wet
12.5 -14.4 ft	dark gray, fissile shale

DB-GW677

Location south of Putnam house

Construction Details

Total Depth	14.5’
Screen Inverval	4.5 – 14.5’
Sand pack	3 – 14.5’
Bentonite	1 – 3’
Cement	0 – 1’

Water Level ~9’ below surface

Lithology

0 – 4 ft	med tan, sandy silt
4 – 6 ft	sandy silt
6 – 7.5 ft	cobbles in silty sand, poorly sorted
7.5 – 9 ft	tan, silty sand
9 – 12.5 ft	wet, tan, very fine grained sand
12.5 -14.5 ft	dark gray, fissile shale (Belle Fourche Fm)

DB-GW678

Location along Pass Creek west of Burdock

Construction Details

Total Depth	14.5’
Screen Inverval	4.5 – 14.5’
Sand pack	3 – 14.5’
Bentonite	1 – 3’
Cement	0 – 1’

Water Level ~8’ below surface

Lithology

0 – 9 ft	very fine grained, red, silty sand
9 – 14 ft	dominantly vfg silty sand with 1” beds of med to coarse sand (did not penetrate shale)

4/14-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ SW ¼ Sec 1 Twp 7S Rg 1E

County Fall River

North

Please mark well location with an "X"

W E

X

Well Completion Date 4-18-08

1 Mile

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Fall River	0	100
Fuson	100	150
Lakota	150	305
Morrison	305	410
UNKPAPA	410	525

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? 200 ft. from Septic Tank (identify source).

PROPOSED USE:
☑ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:
Mud of Rotary

CASING DATA: ☒ Steel ☐ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
18 LB/FT	6 IN	0 FT	475 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cmt	82	15.3 lb./gal	0 ft	475 ft
		lb./gal	ft	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 50 FEET
Material PVC
Slot Size .020 Set From 475 Feet to 525 Feet
Other information SIT K Packer

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO
If so, what material? 6' X 3" K Packer
Describe packer(s) and location? Packer SET AT 465'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

STATIC WATER LEVEL 110 Feet
If flowing: closed in pressure ____ PSI
GPM flow ____ through ____ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift AT 410
☐ Bailed
☐ Other

RECEIVED
MAY 20 2008
WATER RIGHTS PROGRAM

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS DEWEY Burdock
8-1-7

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc
Signature of License Representative: Stan Davis
Signature of Well Owner or Equitable Property Holder:
Date: 5/5/08

5-20-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ NW ¼ Sec 32 Twp 6S Rg 1E

County CUSTER

Please mark well location with an "X"

North / W / E — X marked in the upper section grid; 1 Mile

Well Completion Date 1-27-08

Well Owner: Power-tech
Business Name: Power-tech USA Inc
Address: P.O Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	470'
Fall River Sandstone	470'	585'

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING: Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ______

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 21 LB/FT	6 IN	0 FT	585 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	96	15.2 lb./gal	585 ft	0 ft
		lb./gal	ft	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 600 Feet to 585 Feet
Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" K Packer
Describe packer(s) and location? Packer 575'

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ______
✓ NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 6.1 PSI
GPM flow 10 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other ______
Reduced Flowrate ______ GPM
Can well be completely shut in? YES

WELL TEST DATA:
☐ Pumped Describe: Air lift at 575'
☐ Bailed
☒ Other

Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM
If pump installed, pump rate ______ GPM

REMARKS Dewey Burdock 7-32-3C

RECEIVED
FEB 22 2008
WATER RIGHTS PROGRAM

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm DAVIS Drilling Inc
Signature of License Representative: [signature]

Signature of Well-Owner or Equitable Property Holder: [signature] PowerTech
Date: 2/12/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location [redacted] ¼ [redacted] ¼ Sec [redacted] Twp 6S Rg 1E
County NE SW 11 North
Fall River

Please mark well location with an "X"

W E

X

Well Completion Date
2-24-08

1 Mile

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	4 IN	0 FT	418 FT	6 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	70	15.2 lb./gal	0 ft.	418 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 2 IN Length 10 FEET
Material PVC
Slot Size .020 Set From 418 Feet to 428 Feet
Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 4" K Packer
Describe packer(s) and location? Packer 408'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

Well Owner: Power Tech
Business Name: Power Tech USA INC
Address: P.O. Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	120
~~Fuson~~ Fall River SS	120	255
Fuson Shale	255	315
Lakota Sand Stone	315	428

STATIC WATER LEVEL 32.6 Feet
If flowing: closed in pressure ______ PSI
GPM flow ______ through ______ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ______ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 405'
☐ Bailed
☒ Other
Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM
If pump installed, pump rate ______ GPM

REMARKS
Dewey Burdock 7-11-15

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm DAVIS Drilling INC
Signature of License Representative:
Stan Davis

Signature of Well Owner or Equitable Property Holder:
Power Tech

Date: 3/5/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ SW ¼ Sec 11 Twp 7S Rg 1E

County Fall River

North

…e mark well location with an "X"

W X E

1 Mile

Well Completion Date 2 13-08

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P.O. Box 723

Hot Springs SD 57747

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ______

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR17 LB/FT	4 IN	0 FT	413 FT	6¼ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	66	15.2 lb./gal	0 ft.	413 ft
		lb./gal	ft.	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 2 IN Length 10 FEET

Material PVC

Slot Size .020 Set From 423 Feet to 413 Feet

Other information Sil k Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO

If so, what material? 4" K Packer

Describe packer(s) and location? Packer 403'

DISINFECTION: Was well disinfected upon completion?

____ YES, How: ______

✓ NO, Why Not? NA

Laboratory sent to for water quality analysis

Billing

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	102'
Fall River Sandstone	102'	238'
Fuson Shale	238'	300'
Lakota Sandstone	300'	423'

STATIC WATER LEVEL 28.8 Feet

If flowing: closed in pressure ______ PSI

GPM flow ______ through ______ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other ______

Reduced Flowrate ______ GPM

Can well be completely shut in? Yes

WELL TEST DATA:

☐ Pumped Describe: Air lift AT 400

☐ Bailed

☒ Other

Pumping Level Below Land Surface

______ ft. After ______ Hrs. pumped ______ GPM

______ ft. After ______ Hrs. pumped ______ GPM

If pump installed, pump rate ______ GPM

REMARKS Dewey Burdock 11-14 C

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling Inc

Signature of License Representative: Stan Da…

Signature of Well Owner or Equitable Property Holder: Power Tech

Date: 2/27/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SE ¼ NW ¼ Sec 11 Twp 6S Rg 1E

County Fall River

North

Please mark well location with an "X"

W X E

1 Mile

Well Completion Date 7-21-08

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P.O. Box 773
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale		

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE PRESENT (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☑ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☑ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
12 LB/FT	4 IN	0 FT	450 FT	6¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

STATIC WATER LEVEL 54.2 Feet
If flowing: closed in pressure ____ PSI
GPM flow ____ through ____ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	67	15.4 lb./gal	0 ft.	450 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump

WELL TEST DATA:
☐ Pumped Describe: Airlift at 435
☐ Bailed
☑ Other
Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

SCREEN: ☐ Perforated pipe ☑ Manufactured
Diameter 2 IN Length 10 FEET
Material PVC
Slot Size .020 Set From 460 Feet to 450 Feet
Other information Set K Packer

REMARKS
DEWEY Burdock
7-11-2

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO
If so, what material? 4" K Packer
Describe packer(s) and location? Packer 440'

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc
Signature of License Representative: Stan Davis

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? N/A
Laboratory sent to for water quality analysis
Respec

Signature of Well Owner or Equitable Property Holder: Power Tech
Date: 3/5/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ NW ¼ Sec 5 Twp 7S Rg 1E

County Fall River

North

Please mark well location with an "X"

W X E

1 Mile

Well Completion Date 4-29-08

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek	0	455
Fall River	455	600
Fuson	600	655
Lakota	655	735
Morrison	735	890
UNK PAPA	890	955

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☒ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:
Mud & Rotary

CASING DATA: ☒ Steel ☐ Plastic ☐ Other
If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
18 LB/FT	6 IN	0 FT	915 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	205	153 lb./gal	0 ft.	915 ft
		lb./gal	ft.	ft

Describe grouting procedure M+S Cementing

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3" IN Length 40 FEET
Material PVC
Slot Size .020 Set From 915 Feet to 955 Feet
Other information S.S K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 3' x 6" K Packer
Describe packer(s) and location? Packer Set 905

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ____
X NO, Why Not? NA

Laboratory sent to for water quality analysis
RESPEC

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 42 PSI
GPM flow 1/2 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other ____
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift at 900'
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. ____ hrs. pumped ____ GPM
____ ft. ____ hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

RECEIVED
MAY 20 2008
WATER RIGHTS PROGRAM

RECEIVED
MAY 20 2008
WATER RIGHTS PROGRAM

REMARKS
Dewey Burdock
8-5-1

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc
Signature of License Representative: Stan Davis
Signature of Well-Owner or Equitable Property Holder: [signature]
Date: 5/5/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ SE ¼ Sec 29 Twp 6S Rg 1E

County

Please mark well location with an "X"

North / W / E — X marked in section grid

1 Mile

Well Completion Date 3 4 08

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	4 IN	0 FT	635 FT	6 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	77	15.2 lb./gal	0 ft.	635 ft.
		lb./gal	ft.	ft.

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 2 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 650 Feet to 635 Feet
Other information Sit K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 4" K Packer
Describe packer(s) and location? Packer 625

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

Well Owner: Power Tech
Business Name: Powertech USA INC
Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	530
Fall River S.S	530	650

STATIC WATER LEVEL 81.9 Feet
If flowing: closed in pressure ____ PSI
GPM flow ____ through ____ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift on 620
☐ Bailed
☒ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS
Dewey Burdock 7-29-7

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling INC
Signature of License Representative:
Stan Davis

Signature of Well Owner or Equitable Property Holder:
Power Tech

Date: 3/18/08

07-11-11C

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ NW ¼ Sec 11 Twp 7S Rg 1E

County Fall River

Please mark well location with an "X"

North / W / E — X — 1 Mile

Well Completion Date 12-19-07

Well Owner: ~~John Robertson~~ Powertech

Business Name: Powertech USA Inc

Address: P.O. Box 723 Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Sh	0'	122'
Fall River SS	122'	250'
Fuson Sh	250'	317'
Lakota SS	317'	436'

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe ______

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 21 LB/FT	6 IN	0 FT	426 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	95.3	15.1 lb./gal	426 ft.	0 ft
		lb./gal	ft.	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 4½ IN Length 10 FEET
Material PVC
Slot Size .025 Set From 436 Feet to 426 Feet
Other information Set With K Packer

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO
If so, what material? 6" K Packer
Describe packer(s) and location? Packer 406'

DISINFECTION: Was well disinfected upon completion?
______ YES, How: ______
X NO, Why Not? NA
Laboratory sent to for water quality analysis
Respec

STATIC WATER LEVEL 29 Feet
If flowing: closed in pressure NA PSI
GPM flow ______ through ______ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other ______
Reduced Flowrate ______ GPM
Can well be completely shut in? YES

WELL TEST DATA:
☐ Pumped Describe: Airlift at 385
☐ Bailed
☑ Other
Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped 240 cubic Feet GPM
______ ft. After ______ Hrs. pumped ______ GPM
If pump installed, pump rate ______ GPM

REMARKS well DB-07-11-11C
lithology attached.

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm DAVIS Drilling INC
Signature of License Representative: Glen Davis

Signature of Well Owner or Equitable Property Holder: Frank Lichnovsky Powertech (USA) Inc.

Date: 12-31-07

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ NW ¼ Sec 32 Twp 6S Rg 1E

County Custer

North | W | E | X

Please mark well location with an "X"

Well Completion Date 2-6-08

1 Mile

Well Owner: Powertech

Business Name: PowerTech USA Inc

Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	420'
Fall River Sandstone	420'	605'

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☑ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	4 IN	0 FT	590 FT	6 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	60	15.2 lb./gal	590 ft.	0 ft
		lb./gal	ft.	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☑ Manufactured
Diameter 2 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 605 Feet to 590 Feet
Other information Silt K Packer

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO
If so, what material? 4" K Packer
Describe packer(s) and location? Packer 580'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Burgess

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 3 PSI
GPM flow 5 through 2 inch pipe
Controlled by ☑ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 580'
☐ Bailed
☑ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS Dewey Burdock 7-32-5

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc
Signature of License Representative: Sla D...

Signature of Well Owner or Equitable Property Holder: Powa Tech

Date: 2/27/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ NW ¼ Sec 32 Twp 6S Rg 1E

County Custer

North

Please mark well location with an "X"

W E

Well Completion Date

3-11-08

1 Mile

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	715 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	86	15.2 lb./gal	0 ft	715 ft
		lb./gal	ft	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 3 IN Length 15 FEET

Material PVC

Slot Size .020 Set From 730 Feet to 715 Feet

Other information Set K Packer

WAS A PACKER OR SEAL USED? ☐ YES ☐ NO

If so, what material? 6" K Packer

Describe packer(s) and location? Packer Set at 705'

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ____
✓ NO, Why Not? NA

Laboratory sent to for water quality analysis

Prosper

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P.O. Box 723
Hot Springs S.D. 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	475
Fall River S.S	475	620
Fuson Shale	620	665
Lakota S.S	665	715

STATIC WATER LEVEL 0 Feet

If flowing: closed in pressure 23.5 PSI

GPM flow 45 through 2 inch pipe

Controlled by ☒ Valve ☐ Reducers ☐ Other ____

Reduced Flowrate ____ GPM

Can well be completely shut in? Yes

WELL TEST DATA:

☐ Pumped Describe: Air lift at 700'

☐ Bailed

☒ Other

Pumping Level Below Land Surface

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

If pump installed, pump rate ____ GPM

REMARKS

DEWEY Burdock

7-32 10

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling Inc

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Powertech

Date: 3/18/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ SE ¼ Sec 1 Twp 7S Rg 1E

County Fall River

North

Please mark well location with an "X"

W E

Well Completion Date 3-26-08

1 Mile

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR21 LB/FT	6 IN	0 FT	166 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	34	15.2 lb./gal	0 ft	166 ft
		lb./gal	ft	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 30 FEET
Material PVC
Slot Size .020 Set From 166 Feet to 196 Feet
Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" x 3" K Packer
Describe packer(s) and location? Packer Set at 156

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Fall River	0	55
Fuson	55	80
Lakota	80	166

STATIC WATER LEVEL 138 Feet
If flowing: closed in pressure ____ PSI
GPM flow ____ through ____ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift at 150'
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS
Dewey Burdock
8-1-6

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling
Signature of License Representative: Stan Davis

Signature of Well Owner or Equitable Property Holder:

Date: 4/22/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ NE ¼ Sec 2 Twp 7S Rg 1E

County Fall River

North

W | X | E

1 Mile

Please mark well location with an "X"

Well-Completion Date 3-25-08

Well Owner: Power Tech

Business Name: Power Tech USA INC

Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	75
Fall River S.S.	75	205

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ______

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 21 LB/FT	6 IN	0 FT	180 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	35	15.6 lb./gal	0 ft	180 ft
		lb./gal	ft	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 3 IN Length 25 FEET

Material PVC

Slot Size .020 Set From 180 Feet to 205 Feet

Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO

If so, what material? 6" X 3' K Packer

Describe packer(s) and location? Packer Set at 170'

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ______
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

STATIC WATER LEVEL 34.36 Feet

If flowing: closed in pressure ______ PSI

GPM flow ______ through ______ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other ______

Reduced Flowrate ______ GPM

Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 165
☐ Bailed
☐ Other

Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM

If pump installed, pump rate ______ GPM

REMARKS
Dewey Burdock
8-2-1

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling

Signature of License Representative: [illegible]

Signature of Well Owner or Equitable Property Holder: [illegible]

Date: 4/22/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ SW ¼ Sec 11 Twp 6S Rg 1E

County Fall River

Please mark well location with an "X"

North / W / E — X

Well Completion Date 4-1-08

← 1 Mile →

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud & Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	245 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	45	15.2 lb./gal	0 ft.	245 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 10 FEET
Material PVC
Slot Size .020 Set From 245 Feet to 255 Feet
Other information S.L K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6 x 3 K Packer
Describe packer(s) and location? Packer set at 235

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Kesper

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek	0	128
Fall River	128	255

STATIC WATER LEVEL 39 Feet
If flowing: closed in pressure ____ PSI
GPM flow ____ through ____ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift at 230'
☐ Bailed
☐ Other
Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS
Dewey Burdock
8-11-17

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling
Signature of License Representative: Stan Davis
Signature of Well Owner or Equitable Property Holder:
Date: 4/22/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ SW ¼ Sec 11 Twp 6S Rg 1E

County Fall River

North

W | E

X

1 Mile

Please mark well location with an "X"

Well Completion Date

4-15-08

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☒ Steel ☐ Plastic ☐ Other

If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
18 LB/FT	6 IN	0 FT	621 FT	8 ¼ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cmt	104	15.2 lb./gal	0 ft.	621 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 3 IN Length 10 FEET

Material PVC

Slot Size .020 Set From 121 Feet to 631 Feet

Other information SIT K Packer

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO

If so, what material? 6" x 3 K Packer

Describe packer(s) and location? Packer SIT AT 611

DISINFECTION: Was well disinfected upon completion?

____ YES, How: ____

X NO, Why Not? NA

Laboratory sent to for water quality analysis

Recipic

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P.O. Box 723
Hot Springs S.D. 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek	0	115
Fall River	115	245
Fuson	245	310
Lakota	310	455
Morrison	455	560
UNKPAPA	560	621

STATIC WATER LEVEL 0 Feet

If flowing: closed in pressure 1 PSI

GPM flow 1/4 through 2 inch pipe

Controlled by ☒ Valve ☐ Reducers ☐ Other ____

Reduced Flowrate ____ GPM

Can well be completely shut in? Yes

WELL TEST DATA:

☐ Pumped Describe: Airlift at Los

☐ Bailed

☐ Other

Pumping Level Below Land Surface

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

If pump installed, pump rate ____ GPM

REMARKS DEWEY Burdock

8-11-18

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling

Signature of License Representative: [illegible]

Signature of Well Owner or Equitable Property Holder: [illegible]

Date: 5/5/08

4-14-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ SW ¼ Sec 11 Twp 6S Rg 1E

County Fall River

Please mark well location with an "X"

North / W / E — 1 Mile

X

Well Completion Date 4-16-08

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P. O. Box 723 Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek	0	125
Fall River	125	250
Fuson	250	325
Lakota	325	335

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING: Mud & Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ______

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	325 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	58	15.2 lb./gal	0 ft	325 ft
		lb./gal	ft	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 3 IN Length 10 FEET

Material PVC

Slot Size .020 Set From 325 Feet to 335 Feet

Other information SET K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO

If so, what material? 6" X 3" K Packer

Describe packer(s) and location? Packer Set AT 315

DISINFECTION: Was well disinfected upon completion?
______ YES, How: ______
X NO, Why Not? NA

Laboratory sent to for water quality analysis Respec

STATIC WATER LEVEL 39.6 Feet

If flowing: closed in pressure ______ PSI

GPM flow ______ through ______ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other ______

Reduced Flowrate ______ GPM

Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift AT 310
☐ Bailed
☐ Other

Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM

If pump installed, pump rate ______ GPM

REMARKS DEWEY Burdock 8-11-19

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling

Signature of License Representative: Stan Davis

Signature of Well Owner or Equitable Property Holder: [signature]

Date: 5/5/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ NW ¼ Sec 15 Twp 7S Rg 1E

County Fall River

North

X

W E

Please mark well location with an "X"

1 Mile

Well Completion Date

3-21-08

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud of Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	572 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cmt	86	15.1 lb./gal	0 ft.	572 ft
		lb./gal	ft.	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 572 Feet to 587 Feet
Other information Sit K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" x 4" K Packer 4" x 3" bell
Describe packer(s) and location? Packer set at 562'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Kespec

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	295
Fall River S.S	295	425
Fuson Shale	425	475
Lakota	475	587

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 15 PSI
GPM flow 60 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 560
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS Dewey Burdock

8-15-2

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling
Signature of License Representative: Stan Davis
Signature of Well Owner or Equitable Property Holder: [signature]
Date: 4-1-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ NW ¼ Sec 15 Twp 7S Rg 1E

County Fall River

Please mark well location with an "X"

North / W / E — 1 Mile — X marked in NW corner

Well Completion Date 3-22-08

Well Owner: Power Tech

Business Name: Power Tech USA Inc

Address: P.O. Box 723

Hot Springs S.D 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	295
Fall River S.S	295	392

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING: Mud + Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	377 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	59	15.2 lb./gal	0 ft	377 ft
		lb./gal	ft	ft

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 377 Feet to 392 Feet
Other information Salt K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" X 4" K Packer 4" X 3" Bell
Describe packer(s) and location? Packer Set AT 367'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Kaspec

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 7 PSI
GPM flow 2 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift AT 360'
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS Dewit Burdock

8-15-3

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling
Signature of License Representative: Stan Davis
Signature of Well Owner or Equitable Property Holder: [signature]
Date: 4-1-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW ¼ NE ¼ Sec 32 Twp 6S Rg 1E

County Custer

Please mark well location with an "X"

North / W / E — X — 1 Mile

Well-Completion Date 2-4-08

Well Owner: Powertech

Business Name: Powertech USA Inc

Address: P.O. Box 723

Hot Springs S.D. 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	473'
Fall River Sandstone	473'	595'

LOCATION:

Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:

☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:

Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	4 IN	595 FT	580 FT	6¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	77	15.2 lb./gal	0 ft.	580 ft.
		lb./gal	ft.	ft.

Describe grouting procedure pump

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 2 IN Length 15 FEET

Material PVC

Slot Size .020 Set From 595 Feet to 580 Feet

Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO

If so, what material? 4" K Packer

Describe packer(s) and location? Packer 570'

DISINFECTION: Was well disinfected upon completion?

____ YES, How: ____

X NO, Why Not? NA

Laboratory sent to for water quality analysis

Kelpec

STATIC WATER LEVEL 0 Feet

If flowing: closed in pressure 6 PSI

GPM flow 15 through 2 inch pipe

Controlled by ☒ Valve ☐ Reducers ☐ Other ____

Reduced Flowrate ____ GPM

Can well be completely shut in? Yes

WELL TEST DATA:

☐ Pumped Describe: Air lift at 570'
☐ Bailed
☐ Other

Pumping Level Below Land Surface

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

If pump installed, pump rate ____ GPM

REMARKS Dewey Burdock 32-4 C

This well was drilled under license # 745

And this report is true and accurate.

Drilling firm Davis Drilling Inc

Signature of License Representative: Stan Davis

Signature of Well Owner or Equitable Property Holder: PowerTech

Date: 2/27/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT 07-92

Location __NE__ ¼ __NW__ ¼ Sec __32__ Twp __6S__ Rg __1E__

County __Custer__

Please mark well location with an "X"

North / W / E

1 Mile

Well Completion Date __3-10-08__

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from __None Present__ (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☑ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	490 FT	8¾ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	107	15.2 lb./gal	0 ft	490 ft
		lb./gal	ft	ft

Describe grouting procedure __Pump__

SCREEN: ☐ Perforated pipe ☑ Manufactured

Diameter __3__ IN Length __15__ FEET

Material __PVC__

Slot Size __.020__ Set From __490__ Feet to __505__ Feet

Other information __Sit K Packer__

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO

If so, what material? __6" K Packer__

Describe packer(s) and location? __Packer set at 480'__

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ____
__X__ NO, Why Not? __N/A__

Laboratory sent to for water quality analysis
__Rapid__

Well Owner: __Power Tech__

Business Name: __Power Tech USA Inc__

Address: __P.O. Box 723__
__Hot Springs SD 57747__

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	475
Fall River SS	475	505

STATIC WATER LEVEL __0__ Feet

If flowing: closed in pressure __6.5__ PSI

GPM flow __6__ through __2__ inch pipe

Controlled by ☑ Valve ☐ Reducers ☐ Other ____

Reduced Flowrate ____ GPM

Can well be completely shut in? __Yes__

WELL TEST DATA:
☐ Pumped Describe: __Drill Stem Test at 475'__
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM

If pump installed, pump rate ____ GPM

REMARKS
Dewey Burdock
8-32-9C

This well was drilled under license # __245__

And this report is true and accurate.

Drilling firm __Davis Drilling Inc__

Signature of License Representative:
__Glen Davis__

Signature of Well Owner or Equitable Property Holder:
__PowerTech__

Date: __3/17/08__

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE ¼ NW ¼ Sec 32 Twp 6S Rg 1E

County Custer

North

Please mark well location with an "X"

	X	

W E

← 1 Mile →

Well Completion Date 3-8-08

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud Rotary

CASING DATA: ☒ Steel ☒ Plastic ☐ Other
If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
18 LB/FT	6 IN	0 FT	910 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	219	15.7 lb./gal	0 ft.	910 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump M+S cements

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 20' FEET
Material PVC
Slot Size .020 Set From 910 Feet to 930 Feet
Other information Set to Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" K Packer
Describe packer(s) and location? Packer set 890'

DISINFECTION: Was well disinfected upon completion?
____ YES, How: ____
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Respec

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs S.D. 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	475
Fall River S.S	475	620
Fuson Shale	620	670
Lakota S.S	670	765
Morrison Shale	765	865
UNKPAPA S.S	865	910

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 55 PSI
GPM flow 2 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other ____
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 885'
☐ Bailed
☒ Other
Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS
DEWEY Burdock 8-32-11

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling Inc
Signature of License Representative:
Stan Davis

Signature of Well Owner or Equitable Property Holder:
[signature] PowerTech

Date: 3/12/08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ SE ¼ Sec 32 Twp 6S Rg 1E North

County Custer

Please mark well location with an "X"

W E

X

1 Mile

Well-Completion Date 3-19-08

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from NONE Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☐ Steel ☑ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	667 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cmt	112	13.0 lb./gal	0 ft.	667 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump, Bag Mix, Cellophane

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 667 Feet to 682 Feet
Other information Set in Packer

WAS A PACKER OR SEAL USED? ☑ YES ☐ NO
If so, what material? 6" x 4" K Packer 4 x 3" bell
Describe packer(s) and location? Packer set at 657

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? NA

Laboratory sent to for water quality analysis
Rapid

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Skull Creek Shale	0	415
~~Fuson~~ Fall River	415	550
Fuson Shale	550	635
Lakota S.S	635	682

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 40 PSI
GPM flow 30 through 2 inch pipe
Controlled by ☑ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Airlift at 650'
☐ Bailed
☐ Other
Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS Dewey Burdock
8-32-12

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling, Inc
Signature of License Representative: Stan Davis
Signature of Well Owner or Equitable Property Holder: [signature]
Date: 4-1-08

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ SE ¼ Sec 32 Twp 6S Rg 1E

County Custer

North

Please mark well location with an "X"

W E

Well Completion Date 3-20-08

X

1 Mile

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from None Present (identify source).

PROPOSED USE:
☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☒ Monitoring well

METHOD OF DRILLING:
Mud + Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SDR 17 LB/FT	6 IN	0 FT	493 FT	8 3/4 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
CMT	106.4	15.1 lb./gal	0 ft.	493 ft
		lb./gal	ft.	ft

Describe grouting procedure Pump

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 3 IN Length 15 FEET
Material PVC
Slot Size .020 Set From 493 Feet to 508 Feet
Other information Set K Packer

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? 6" x 4" K-Packer 4" x 3" bell
Describe packer(s) and location? Packer Set at 493'

DISINFECTION: Was well disinfected upon completion?
____ YES, How:
X NO, Why Not? N/A

Laboratory sent to for water quality analysis
Respic

Well Owner: Power Tech
Business Name: Power Tech USA Inc
Address: P.O. Box 723
Hot Springs SD 57747

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Shell Creek Shale	0	415
Fall River S.S	415	508

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 13 PSI
GPM flow 3 through 2 inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other
Reduced Flowrate ____ GPM
Can well be completely shut in? Yes

WELL TEST DATA:
☐ Pumped Describe: Air lift AT 480'
☐ Bailed
☐ Other

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
If pump installed, pump rate ____ GPM

REMARKS
Dewey Burdock
8-32-13

This well was drilled under license # 745
And this report is true and accurate.
Drilling firm Davis Drilling
Signature of License Representative:
Stan Davis
Signature of Well Owner or Equitable Property Holder:
[signature]
Date: 4-1-08

SOUTH DAKOTA STATE WELL LOGS
NEAR DEWEY-BURDOCK

6-1-7?

NOTICE OF WELL CONSTRUCTION

Custer

) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 ____ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority
(Name) (Address)

Date well drilling completed 8-13-81 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-435	Blk sh
435-505	Intbd gy clst, ss
505-525	Lt tn & brn ss
525-550	IB gy clst-ss
550-590	IB rd brn & gy sltst & clst
590-600	Rd & brn ss
600-620	IB gy-gn & rd-brn sltst & clst
620-645	Gy-wht sltst
645-685	IB gy-wht sltst & pk sltst
685-695	Pk & brn ss w/gy clst
695-800	Brn, orng, tn, pk, rd & yw ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 712 ft.

Depth to static water level 39.7 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 800 ft.

Depth to bottom of casing 712 ft.

Casing Information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 712-800

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ____ HP ____

Type of pump ____ Capacity of installed pump ____ G.P.M.

Depth of pump placement ____ ft., Date of pump installation ____

(3) WATER SURFACE MEASURING TUBE

- On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 48.4, MINIMUM WELL CONSTRUCTION STANDARDS.
- Show exact vertical length of water surface measuring tube, when installed ____ ft., tube diameter ____ tube material ____.

DEC 1981
DIVISION OF
WATER RIGHTS
Pierre, SD

____
Name of Pump Installation Contractor

NOTICE OF WELL CONSTRUCTION

~~Fall Ri~~

Custer

(1) WELL CONSTRUCTION

Location of well: NW 1/4 NE 1/4 ______ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority
(Name) (Address)

Date well drilling completed 8-18-81 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-430	Blk sh
430-495	1B gy clst & ss
495-520	ln & brn ss
520-530	Gy & brn-gy clst
530-545	Rd-brn & tn ss
545-565	Rd-ppl clst
565-590	Pk, tn & brn ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 505 ft.

Depth to static water level 21.0 ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 590 ft.

Depth to bottom of casing 505 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 505-590

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

DEC 1981
DIVISION OF
WATER RIGHTS
Pierre, SD

______
Name of Pump Installation Contractor

6-1-20

NOTICE OF WELL CONSTRUCTION

~~Fall River~~

Custer

(1) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority (Name) (Address)

Date well drilling completed 10-17-81 Purpose of well Test (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-440	Dk brn-gy shale
440-500	Gy & brn mudstone
500-520	Lt red sandstone
520-565	Dk brn & gy-gn mdst
565-600	Red sandstone
600-625	Dk brn mdst-sltst
625-645	Dk brn mdst
645-690	Gy & brn mdst w/int'd rd sltst
690-725	Red ss w/orng cht
725-755	Red sltst
755-800	Red ss w/wht, orng & gy chert pbl cgl

Attach sheet if more space is needed

Depth to top of water producing aquifer 694 ft

Depth to static water level 34.2 ft

Name of producing aquifer (if known) Lakota

Total depth of drill hole 815 ft

Depth to bottom of casing 694 ft

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

0-25' 20" steel
0-695 10 3/4" steel
730-755 8 5/8" steel

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

695-730 8 5/8" Johnson Well
755-800 .030 Screen slot galvanized

If a flowing well, flow of completed well NA G.P.M.

Forward Drilling Company
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump Pioneer 6" HP 50

Type of pump Submersible Capacity of installed pump 325 G.P.M.

Depth of pump placement 525 ft., Date of pump installation 12-2-81

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed 525 ft., tube diameter 3/4"

tube material poly

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DIVISION OF
WATER RIGHTS
Pierre, SD

Great West Pump, Inc.
Name of Pump Installation Contractor

6-1-20

NOTICE OF WELL CONSTRUCTION

~~Fall River~~ Custer

(1) WELL CONSTRUCTION

Location of well: SW 1/4 NE 1/4 ______ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority (Name) ______ (Address)

Date well drilling completed 9-15-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-450	Blk sh
450-520	lB gy clst & ss
520-555	Rd-brn & gy clst w/gy ss
555-570	Rd & brn ss
570-625	lB gy sltst & gy, gn & rd clst
625-655	Gy ss
655-740	lB gy slst w/gy-gn & brn clst
740-810	Tn, yw & rd-brn ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 715 ft.

Depth to static water level 21.4 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 810 ft.

Depth to bottom of casing 715 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 715-810

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______

tube material ______.

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...SION OF
...RIGHTS

______
Name of Pump Installation Contractor

~~Fall River~~ Custer

DWM-55

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 Section 20 Township 6S Range R1

Well owner: Tennessee Valley Authority (Name) (Address)

Date well drilling completed: 9-15-81 Purpose of well: Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-465	Blk sh
465-530	IB gy clst & ss
530-550	Rd & yw-brn ss
550-605	IB gn sltst & gn-gy clst
605-645	Gy clst w/gy-wht sltst
645-680	Gy ss
680-720	Gy w/gn clst
720-760	IB rd & yw-brn ss, gy sltst & rd-brn & brngy clst
760-835	Tn ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 735 ft.

Depth to static water level 45.8 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 835 ft.

Depth to bottom of casing 735 ft.

Casing information: in the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 735-835

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

DEC 81

______
Name of Pump Installation Contractor

~~Fall River~~ Custer

DWM-50

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NE 1/4 Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority (Name) (Address)

Date well drilling completed 8-17-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-420	Blk sh
420-490	lB gy clst & ss
490-585	lB gy, pk & orng sltsl & rd-brn & gn clst
585-615	Gy-gn & rd-brn clst
615-650	Gy-wht sltst
650-690	Gy & gn clst
690-735	Gy w/rd & ywbrn ss w/brn-gy clst
735-778+	Tn & yw-brn ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 714 ft.

Depth to static water level 49.7 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 780 ft.

Depth to bottom of casing 714 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 714-780

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

DIVISION OF WATER RIGHTS Pierre, SD

DWM-52

Cus-tel

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NE 1/4 ______ Section 20 Township 6S Range R1

Well owner Tennessee Valley Authority (Name) ______ (Address)

Date well drilling completed 8-17-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-420	Blk sh
420-500	IB gy clst & ss
500-580	Gy, rd & tn ss w/gy & brn clst

Attach sheet if more space is needed

Depth to top of water producing aquifer 503 ft.

Depth to static water level . 34.2 ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 580 ft.

Depth to bottom of casing 503 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 503-580

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

6-1-21

NOTICE OF WELL CONSTRUCTION

~~Fall River~~ Custer

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NE 1/4 ______ Section 20 Township 6S Range R1

Well owner Tennessee Valley Authority (Name) ______ (Address)

Date well drilling completed 8-17-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-420	Blk sh
420-500	IB gy clst & ss
500-580	Gy, rd & tn ss w/gy & brn clst

Attach sheet if more space is needed

Depth to top of water producing aquifer 503 ft.

Depth to static water level 34.2 ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 580 ft.

Depth to bottom of casing 503 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 503-580

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

- On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.
- Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

______
Name of Pump Installation Contractor

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Pierre, SD

NOTICE OF WELL CONSTRUCTION

Fall River

WELL CONSTRUCTION

Location of well: NW 1/4 NE 1/4 ______ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority ______
(Name) (Address)

Date well drilling completed 8-18-81 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-430	Blk sh
430-500	lB gy clst & ss
500-550	Gy & rd-brn ss
550-580	Gy wht sltst w/gy-gn clst
580-595	Rd, orng & yw-brn & gy ss
595-605	Gy wht sltst & gy-gn clst
605-660	Gy ss w/gy sltst & gn clst
660-690	Gy wht sltst & gn clst
690-700	Gy w/orng ss
700-745	lB brn & gy, tr yw ss brn & gy clst
745-800	Brn-gy & rd ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 715 ft.

Depth to static water level 42.4 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 800 ft.

Depth to bottom of casing 715 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 715-800

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

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______
Name of Pump Installation Contractor

6 - 1 -

NOTICE OF WELL CONSTRUCTION

~~Fall River~~

(1) WELL CONSTRUCTION

Custer

Location of well: SE 1/4 NE 1/4 ______ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority (Name) ______ (Address)

Date well drilling completed 8-14-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-425	Blk sh
425-495	lB gy clst & ss
495-505	Rd & brn ss
505-525	Gy clst
525-530	Rd & orng -brn clst
530-545	Brn & rd-brn ss
545-555	Gy & wht sltst w/fy-gn clst
555-585	Orng, rd & brn ss
585-610	Gy-wht sltst w/gn clst
610-640	Tn-gy ss
640-650	Gy clst & gy wht sltst
650-700	Gy & gn clst
700-730	Tn, orng & rd-brn ss
730-745	lB Gy ss & sltst
745-800	Tn-brn ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 692

Depth to static water level 26.6

Name of producing aquifer (if known) Lakota

Total depth of drill hole 800

Depth to bottom of casing 692

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 692-800

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______

Type of pump ______ HP ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

______
Name of Pump Installation Contractor

6-1-20

NOTICE OF WELL CONSTRUCTION

Custer

(1) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 Section 20 Township 6S Range R1

Well owner Tennessee Valley Authority (Name) (Address)

Date well drilling completed 9-14-81 Purpose of well Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-440	Blk sh
440-505	lB gy clst & ss
505-565	RD & yw-brn ss w/rd-br & gy clst
565-575	Rd-brn clst
575-600	Rd 7 rd-brn ss-siltstone
600-620	lB gy clst & ss

Attach sheet if more space is needed

Depth to top of water producing aquifer 609 ft.

Depth to static water level 32.2 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 620 ft.

Depth to bottom of casing 609 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 609-620

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

-On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

-Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

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Pierre, SD

______
Name of Pump Installation Contractor

NOTICE OF WELL CONSTRUCTION

Custer

(1) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 ______ Section 20 Township 6S Range 1E

Well owner Tennessee Valley Authority ______
(Name) (Address)

Date well drilling completed 8-14-81 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-430	Blk sh
430-510	IB gy clst & ss
510-600	Tn-gy & rd-brn ss w/ gy, gn & rd clst

Attach sheet if more space is needed

Depth to top of water producing aquifer 504 ft.

Depth to static water level 26.2 ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 580 ft.

Depth to bottom of casing 504 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

open hole 504-580

If a flowing well, flow of completed well NA G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

- On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.
- Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

______
Name of Pump Installation Contractor

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Pierre, SD

9-E-20

6-1-29abc2
Custer

NOTICE OF WELL CONSTRUCTION

led 3705±15 Dewey quad

(1) WELL CONSTRUCTION

Location of well: SW 1/4 NW 1/4 NE Section 29 Township 6S Range 1E

Well owner: Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

LWH 4/79

Date well drilling completed: 6-26-78 Purpose of well: Observation (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Brown Soil
20-530	Gray Shale (Belle Fourche / Mowry / Newcastle / Skull Creek)
530-545	Gray Sandstone
545-620	Lt. Gray & Brown Mudstone & Siltstone
620-690	Lt. Gray Sandstone
690-720	Dark Gray Shale w/Light Gray Siltstone
720-740	Gray Sandstone
740-770	IB Dark Gray Shale, Gray-Green Mudstone
770-820	Gray Sandstone
820-840	Gray Shale
840-955	IB AA & Yellow-Brown Siltstone-Sandstone
955-975	Red & Yellow Sandstone
975-1000	Green w/Variegated Mudstone (Morrison)

Inyan Kara

Attach sheet if more space is needed

Depth to top of water producing aquifer 840 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 1000 ft.

Depth to bottom of casing 966 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 903-966

If a flowing well, flow of completed well ______ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

6S-1-29abc, Custer

NOTICE OF WELL CONSTRUCTION

lsd 3705±15
SCHEDULED
Dewey quad

(1) WELL CONSTRUCTION

Location of well: SW 1/4 NW 1/4 NE Section 29 Township 6S Range 1E

Well owner: Tennessee Valley Authority, P.O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed: 6-27-78 Purpose of well: Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Brown Sandy Soil
20-540	Gray Shale
540-605	Gray Siltstone
605-680	IB Gray Sandstone & Gray Shale

Attach sheet if more space is needed

Depth to top of water producing aquifer: 605 ft

Depth to static water level: ft

Name of producing aquifer (if known): Fall River

Total depth of drill hole: 680 ft

Depth to bottom of casing: 672 ft

Casing information: in the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: in the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 630-672

If a flowing well, flow of completed well: G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump: HP:

Type of pump: Capacity of installed pump: G.P.M.

Depth of pump placement: ft., Date of pump installation:

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed: ft., tube diameter:

tube material:

Name of Pump Installation Contractor

Custer

BPZ-21 FR

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: SW 1/4 NW 1/4 NE Section 29 Township 6S Range 1E

Well owner Tennessee Valley Authority, P.O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 6-27-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Brown Sandy Soil
20-540	Gray Shale
540-605	Gray Siltstone
605-680	IB Gray Sandstone & Gray Shale

Attach sheet if more space is needed

Depth to top of water producing aquifer 605 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 680 ft.

Depth to bottom of casing 672 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 630-672

If a flowing well, flow of completed well ______ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

Z-17 FR

7-2-30 dac
Fall River
Lsd 3570210

NOTICE OF WELL CONSTRUCTION

SCHEDULED

(1) WELL CONSTRUCTION

Location of well: SW 1/4 SE 1/4 SE Section 30 Township 7S Range 2E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 6-8-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-25	Yellow-Brown Sandy Soi
25-30	Gray Mudstone
30-40	Red Shale
40-55	Gray Mudstone w/Gray Sandstone
55-80	Lt. Gray Sandstone
80-100	Dark Gray Shale & Siltstone
100-125	Gray Sandstone
125-127	Lt. Tan-Gray Claystone

Attach sheet if more space is needed

Depth to top of water producing aquifer 50 ft.

Depth to static water level 21.9' ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 127 ft.

Depth to bottom of casing 126' ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 84-126

If a flowing well, flow of completed well ______ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

Fall River

7-2-30ddc (a)
Fall River

NOTICE OF WELL CONSTRUCTION

led 3570±10 Burdock quad

(1) WELL CONSTRUCTION

Location of well: SW 1/4 SE 1/4 SE Section 30 Township 7S Range 2E

Well owner: Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed: 6-7-78 Purpose of well: Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

	Layers, top to top in feet	Description of layer
	0-30	Yellow & Brown Sandy Mudstone
Fall River	30-45	Red Shale
	45-50	Gray Mudstone
	50-90	Lt. Gray & Tan Sandstone
Tryon Kara	90-125	Dark Gray Claystone with Brown-Gray Sandstone
	125-175	IB Gray & Green Claystone
Fuson	175-180	Red Shale
	180-185	Green Claystone
	185-200	Lt. Gray Sandstone
	200-215	Variegated Mudstone
Lakota	215-235	Lt. Gray-White Sandstone
	235-260	Gray-Green Mudstone
	260-280	IB Brown Sandstone & AA
Chilson	280-305	Gray-Brown Mudstone-Siltstone
	305-320	Black Shale
Morrison?	320-325	Gray-Green Shale

Attach sheet if more space is needed

Depth to top of water producing aquifer: 215 ft.

Depth to static water level: +26 ft.

Name of producing aquifer (if known): Lakota

Total depth of drill hole: 325 ft.

Depth to bottom of casing: 294 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 252-294

If a flowing well, flow of completed well: est. 3 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP. ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

B1-15-58

Fall River

lsd 3625±15 Edgemont quad

SCHEDULED

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NW 1/4 NW Section 23 Township 8S Range 2E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 6-7-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-25	Brown Sand
25-260	Gray Shale
260-280	Gray Sandstone
280-315	Gray Claystone
315-335	Gray Sandstone
335-360	IB Gray Sandstone, Gray Claystone
360-390	Gray Sandstone

Skull Creek

Fall River

Inyan Kara

Fuson ??

This log completely disagrees with surrounding logs / Check location

Attach sheet if more space is needed

Depth to top of water producing aquifer 260 ft.

Depth to static water level 47.9 ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 390 ft.

Depth to bottom of casing 378 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

torch slotted 336-378

If a flowing well, flow of completed well ________ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ________ HP. ________

Type of pump ________ Capacity of installed pump ________ G.P.M.

Depth of pump placement ________ ft., Date of pump installation ________

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ________ ft., tube diameter ________, tube material ________.

____
Name of Pump Installation Contractor

Fall River

SCHEDULED

lsd 3625±15

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NW 1/4 NW Section 23 Township 8S Range 2E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 6-29-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

	Layers, top to top in feet	Description of layer
Residuum	0-20	Brown Soil
Graneros Newcastle? Skull Creek	20-340	Gray Shale
Fall River	340-370	IB Brown & Gray Mudstone & Gray Sandstone
	370-420	Brown Mudstone
	420-440	Gray Sandstone
Inyan Kara ?	440-490	Gray Shale w/Gray Sandstone
Lakota Fuson	490-510	Gray Sandstone
	510-520	Green Mudstone & Siltstone
Chilson	520-575	Gray Sandstone
	575-640	Red Sandstone & Conglomerate
	640-650	Red Conglomerate & Dark Gray Shale
Morrison ?	650-660	Gray-Green Shale

Attach sheet if more space is needed

Depth to top of water producing aquifer 520 ft.

Depth to static water level 136.5 ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 660 ft.

Depth to bottom of casing 630 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

1" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 588-630

If a flowing well, flow of completed well ______ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

Fall River

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well SW 1/4 SE 1/4 ______ Section 10 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 11-7-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Weathered Brown Clay and Silt
20-250	Dark Gray Shale
250-375	Interbedded Gray Claystone, Lt. Gray Sandstone
375-410	Dark Gray Claystone
410-505	Lt. Gray-White Siltstone and Green Claystone
505-550	Red-Brown Sandstone w/Gray Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 504 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 550 ft.

Depth to bottom of casing 504 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 504-550

If a flowing well, flow of completed well est. 40 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

1978
RECEIVED
STATE WATER RIGHTS COMM.
Pierre, S.D.

(need better location) Fall River

3620 ± 15 Burdock quad

NOTICE OF WELL CONSTRUCTION

SCHEDULED

(1) WELL CONSTRUCTION

Location of well SW 1/4 SE 1/4 Section 10 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 11-7-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Weathered Brown Clay and Silt
20-250	Dark Gray Shale
250-360	Gray Sandstone w/Lt. Med. Gray Claystone & Lt. Gray Siltstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 315 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 360 ft.

Depth to bottom of casing 315 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 315-360

If a flowing well, flow of completed well est. 2 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

WR-105 (E-10 LAK)

Fall River

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NW 1/4 NE 1/4 ______ Section 15 Township 7S Range 1E

Well owner: Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed: 10-25-78 Purpose of well: Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-25	Brown Weathered Shale
25-235	Gray Shale
235-265	AA with Lt. Gray Sandstone Siltstone
265-335	Brown Mudstone with Gray Sandstone & Gray-Green Mudstone
335-355	Gray Shale & Sandstone Siltstone
355-370	Tan-Gray Siltstone
370-390	Gray & Green Shale
390-405	Dark Brown Mudstone
405-440	Lt. Green Claystone-Siltstone
440-475	White Siltstone, Sandstone
475-485	Green Mudstone
485-495	Tan Mudstone-Siltstone
495-510	Gray Sandstone, Brown Mudstone
510-550	Red-Brown SS

Attach sheet if more space is needed

Skull Creek

Fall River

Depth to top of water producing aquifer 510 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 550 ft.

Depth to bottom of casing 510 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

$4\frac{1}{2}$" Black Iron Schedual 40

Screen information: In the space below show length of screen below bottom casing, diameter and kind of screen or casing perforations.

Open Hole 510-550

If a flowing well, flow of completed well est. 35 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______

tube material ______.

______
Name of Pump Installation Contractor

(… FU)

Fall River

NOTICE OF WELL CONSTRUCTION

SCHEDULED

(1) WELL CONSTRUCTION

Location of well NW 1/4 NE 1/4 ____ Section 15 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 10-19-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Weathered Brown Clay & Silt
20-250	Dark Gray Shale
250-260	Interbedded Gray Claystone & Lt. Gray Sandstone
260-355	Gray Clay Stone
355-375	Lt. Gray-White Siltstone Gray Claystone
375-390	Gray & Green Shale
390-395	Dark Brown Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 377 ft.

Depth to static water level ____ ft.

Name of producing aquifer (if known) Lakota-Fuson

Total depth of drill hole 395 ft.

Depth to bottom of casing 377 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 377-395

If a flowing well, flow of completed well < 1 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ____ HP ____

Type of pump ____ Capacity of installed pump ____ G.P.M.

Depth of pump placement ____ ft., Date of pump installation ____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ____ ft., tube diameter ____ tube material ____.

____
Name of Pump Installation Contractor

Fall River

NOTICE OF WELL CONSTRUCTION

SCHEDULED

(1) WELL CONSTRUCTION

Location of well NW 1/4 NE 1/4 ______ Section 15 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 10-18-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-10	Weathered Brown Clay & Silt
10-250	Dark Gray Shale
250-260	Interbedded Gray Claystone & Lt. Gray Sandstone
260-295	Med. & Lt. Gray Claystone
295-300	AA w/trace green & Red-Brown Claystone
300-335	Lt. Gray Sandstone, Medium & Lt. Gray Claystone
335-350	Gray-Green Mudstone, Gray Shale & Sandstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 300' ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Fall River

Total depth of drill hole 350 ft.

Depth to bottom of casing 300' ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 300-350

If a flowing well, flow of completed well est. 2 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

(1-2 LAK)

Fall River

NOTICE OF WELL CONSTRUCTION

SCHEDULED

(1) WELL CONSTRUCTION

Location of well NW 1/4 NE 1/4 ______ Section 15 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 11-6-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-10	Orange-Brown Weathered Shale
10-270	Dark Gray-Black Shale
270-280	AA w/Lt. Gray Siltstone Sandstone
280-390	Interbedded Dark Gray Carb. mudstone, Gray & Tan Sandstone
390-430	Dark Brown Mudstone w/Green-Gray Claystone
430-455	Green w/Brown & Gray Claystone
455-470	Dark Brown-Gray Mudstone, trace Green Claystone; Tan Sandstone
470-500	Green Claystone w/White Lt. Tan Siltstone-Sandstone
500-525	Gray-Brown Mudstone w/Tan Sandstone
525-570	Gray Sandstone w/Gray-Brown Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 525 ft.

Depth to static water level ______ ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 570 ft.

Depth to bottom of casing 525 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 525-570

If a flowing well, flow of completed well est. 35 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP. ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______

tube material ______ .

______
Name of Pump Installation Contractor

Fall River

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NW 1/4 NE 1/4 ____ Section 15 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 11-6-78 Purpose of well Observation
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-260	Dark Gray Shale
260-280	Gray Shale & Sandstone
280-350	Gray Sandstone-Siltstone
350-355	Dark Brown Shale
355-395	Gray Shale & Sandstone
395-420	Gray-Green Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 400 ft.

Depth to static water level ____ ft.

Name of producing aquifer (if known) Lakota-Fuson

Total depth of drill hole 420 ft.

Depth to bottom of casing 400 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4½" Schedual 40 Black Iron

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Open Hole 400-420

If a flowing well, flow of completed well ____ G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ____ HP. ____

Type of pump ____ Capacity of installed pump ____ G.P.M.

Depth of pump placement ____ ft., Date of pump installation ____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ____ ft., tube diameter ____, tube material ____.

____
Name of Pump Installation Contractor

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well SE 1/4 SW 1/4 ______ Section 11 Township 7S Range 1E

Well owner Tennessee Valley Authority, P. O. Box 49, Edgemont, South Dakota
(Name) (Address)

Date well drilling completed 7-26-78 Purpose of well Test
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-30	Brown & Gray Soil
30-95	Brown-Gray Mudstone, Siltstone
95-135	IB Lt. Gray Sandstone, and Gray Mudstone
135-205	Variegated Mudstone & Siltstone
205-280	Tan & Gray Sandstone
280-305	Gray & Green Mudstone
305-335	Gray Sandstone
335-400	IB Brown-Gray Mudstone, Gray Sandstone
400-665	Gray, Brown & Green Mudstones
665-780	IB Red-Brown Sandstone and Gray & Green Claystone
780-840	Black Shale & Gray-Green Claystone
840-880	Red Siltstone-Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 665 ft.

Depth to static water level + 240 ft.

Name of producing aquifer (if known) Sundance

Total depth of drill hole 880 ft.

Depth to bottom of casing 780 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

5½" 14# Steel Casing

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 666-780

If a flowing well, flow of completed well 4 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

SCIENCE CENTER, UNIVERSITY OF SOUTH DAKOTA CAMPUS,
VERMILLION, 57069, PHONE 624-4471

WESTERN FIELD OFFICE, 507½ STATE ST., BELLE FOURCHE,
BOX 187, 57717, PHONE 892-3121

Western Field Office
August 31, 1967

RECEIVED
SEP 1 1967
STATE WATER RESOURCES COMM.
PIERRE, SOUTH DAKOTA

Mr. George L. Coates
Star Route
Edgemort, South Dakota

Re: ConRoy #1 State
NWSW-24-7S-1E
Fall River County, South Dakota
Permit No. 370

Dear Mr. Coates:

Your August 28 letter has been received in which you mention you want to convert the above oil test to a water well for agricultural use.

The oil test was plugged September 10, 1964. The bond was released January 26, 1965. The State Oil and Gas Board no longer has jurisdiction over the test hole.

Approval to complete the oil test as a water well should be obtained from the Water Resources Commission, State Office Building, Pierre, South Dakota. Their phone number is Capitol 4-5911, Extension 343. Mr. Joe Grimes is the Chief Engineer.

The test was drilled to a depth of 2,467 feet. The surface casing consisted of 487 feet of 8 5/8-inch pipe cemented with 275 sacks of cement. The formation tops as picked by the company geologist are:

Dakota	50	Minnekahta	1397
Lakota	237	Minnelusa	1470
Sundance	540	2nd Converse sand	1525
Basal Sundance sand	854	3rd Converse sand	1655
Spearfish	894	2nd Leo zone	2060

Cement plugs were placed at approximately the following depths:

420-600	1640-1715
835-910	2060-2135
1460-1525	

If I can be of further help, please contact me.

Sincerely,

Earl Cox

Earl Cox
State Geologist

EC:rp

cc: State Geologist
Water Resources Commission

STATE OF SOUTH DAKOTA WELL DRILLERS REPORT

Location SE¼ NE¼ Sec 19 Twp 6S Rg 1E

County
Custer

Please mark well location with an "X"

North / W / E / X / 1 mile

Well Completion Date Oct 16 1984

PROPOSED USE:
[ ] Domestic [ ] Municipal [ ] Test Holes
[ ] Irrigation [ ] Industrial [X] Stock

Method of Drilling:
Rotary mud

WELL CONSTRUCTION: to 520 4" to 900
Diameter of hole 6" inches Depth ____ feet
Casing: [ ] Steel [X] Plastic [ ] Other
6" yellow mine
Specify 4" sch 40 screen

Pipe Weight Diameter From To
____ lb/ft 6 inches 0 feet 520 feet
____ lb/ft 4" inches 500 feet 900 feet

Was a well screen used? [X] Yes [ ] No
If Not Specify ____
Screen Type PVC Slot Size 1/64
Length 60' Diameter 4"
Was Casing left open end? [X] Yes [ ] No
Was a Packer or seal used? [X] Yes [ ] No
If so what material? Rubber
Was well gravel packed? [ ] Yes [X] No
Was well grouted? [X] Yes [ ] No
Describe grouting procedure Pressure Grout
6" Pipe 0 to 520
To what depth? 520 Feet
What was grouting material? Type II Cement
If cement, how many sacks? 100
Location of packer(s) and screen or perforated pipe Packer 780 Screen 780
to 900 + 840 - 880
WAS WELL PLUGGED OR ABANDONED [ ] Yes [X] No
If so how and with what material?

WNR-836 4/82

Well Owner: Moniece Neville Operation
Name Bernard & Lowham Partners
Address Box 567 Casper Wyo 82602

Well Log:

Formation	Depth From	Depth To
Shale	0	480
Fall River	480	600
Fuson	600	740
Lakota	740	885
Morrison	885	900

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 2 PSI
GPM flow 16 through 6" inch pipe
Controlled by [X] Valve [ ] Reducers [ ] Other
If other; specify ____
Can well be completely shut off? yes

WELL TEST DATA:
[ ] Pumped Inyan Kara
[ ] Bailed Describe:
[ ] Other

NOV 1984 DIVISION OF WATER RIGHTS Pierre, SD

Pumping Level Below Land Surface
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM
____ ft. After ____ Hrs. pumped ____ GPM

Remarks: Note this is an offset to old well, old well was cemented off pumped 16 bags cement in 200 ft.

This well was drilled under license # 415
and this report is true and accurate.

Raby Drilling — Drilling Firm
[signature] — Signed by
Oct 18 1984
Date

[signature]
12-6-84

STATE OF SOUTH DAKOTA WELL DRILLERS REPORT

Location NW¼SE¼ Sec 18 Twp 6S Rg 1E

County
Custer

Please mark well location with an "X"

North / W / E / X / 1 mile

Well Completion Date Oct 2 1984

PROPOSED USE:
[X] Domestic [ ] Municipal [ ] Test Holes
[ ] Irrigation [ ] Industrial [X] Stock

Method of Drilling:
ROTARY MUD

WELL CONSTRUCTION: 6" TO 180'
Diameter of hole 4" inches Depth 360 feet
Casing: [ ] Steel [X] Plastic [ ] Other
Specify 6" YELLOW MINE 4" SCH 40

Pipe Weight	Diameter	From	To
SCH 200 lb/ft	6 inches	0 feet	180 feet
SCH 40 lb/ft	4 inches	160 feet	360 feet

Was a well screen used? [X] Yes [ ] No
If Not Specify
Screen Type 4" PVC Slot Size 1/64"
Length 80' Diameter 4"
Was Casing left open end? [X] Yes [ ] No
Was a Packer or seal used? [X] Yes [ ] No
If so what material? RUBBER
Was well gravel packed? [ ] Yes [X] No
Was well grouted? [X] Yes [ ] No
Describe grouting procedure PUMPED 35 BAG MIX DOWN INSIDE & UP OUTSIDE
To what depth? 180 Feet
What was grouting material? TYPE II
If cement, how many sacks? 35
Location of packer(s) and screen or perforated pipe 20 FT SCREEN 200-220 PACKER 280 SCREEN 300-360
WAS WELL PLUGGED OR ABANDONED [ ] Yes [X] No
If so how and with what material?

WNR-836 4/82

Well Owner:
Name BUD HOLLENBECK
Address BEVERLY RT BOX 38 EDGEMONT S.D 57735

Well Log:

Formation	Depth From	Depth To
SHALE	0	80
FALL RIVER	80	220
FUSON	220	240
LAKOTA	240	360

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 6 LBS PSI
GPM flow 65 through 6" inch pipe
Controlled by [X] Valve [ ] Reducers [ ] Other
If other; specify
Can well be completely shut off? YES

WELL TEST DATA: Inyan Kara
[ ] Pumped
[ ] Bailed Describe:
[ ] Other

Pumping Level Below Land Surface
ft. After Hrs. pumped GPM
ft. After Hrs. pumped GPM
ft. After Hrs. pumped GPM

Remarks: THIS IS OFFSET TO OLD WELL THAT WAS LEAKING CEMENTED WELL SHUT. PUMPED 13 BAGS IN AT 160 FT.

This well was drilled under license # 415 and this report is true and accurate.

BABY DRILLING — Russell P Baby
Drilling Firm — Signed by

Oct 18, 1984
Date

ltr sent 12-6-84

Form W-9

DRILLER'S FINAL REPORT

OFFICE OF STATE ENGINEER
Pierre, South Dakota

Well No. ______ (do not fill in)

FALL RIVER COUNTY

Location: SW NE¼ Section 3 Twp. 7S Range 2E

Owner Robert G. Robinson Address Hot Springs, S. Dak.

Depth 247 Drawdown ______ Type Rig Used cable tool

Flow (gpm) pumped Pressure ______ Date Measured ______

Grd. Elev. ______ Water Level Below Ground Surface ______

Temperature ______ Character Water (soft, medium, hard)

Date Commenced ______ Date Completed 11/14/49

Section ______

CASING DETAIL

Type	Size	Length	Depth
	6 5/8	187	187
(60' of open hole)			

PERFORATIONS

Type	Size	Length	Depth

SCREEN

Type	Size	Length	Depth

Is there a seal between different size pipes? ______ What kind? ______

WATER BEARING SANDS

From ______ To ______

SOURCE OF INFORMATION

PMA office, Fall River Co.

DRILLER'S LOG

From	To	

~~Bonded~~ Driller Richard Lawrence
(Signature)

Address Hot Springs, S. Dak.

RECEIVED
Form No. 4 JUN 16 1951

OFFICE OF STATE ENGINEER
PIERRE, S. DAK.

ARTESIAN WELL REPAIR

OFFICE OF STATE ENGINEER
Pierre, South Dakota

Well No. 24-6R (do not fill in)

Fall River COUNTY

Location SE of SW 1/4 Section 23 Twp. 7S Range 1E

Owner J. E. Stewart Address Dickenson, N. Dak

Depth 240 Drawdown ______ Type Rig Used Repair

Flow (gpm) 2 1/2 Pressure Strong Date Measured June 10, 1951

Grd. Elev. ______ Water Level Below Ground Surface ______

Temperature ______ Character Water ~~soft~~, medium, ~~hard~~

Date Commenced June 6 Date Completed June 10

Bonded Driller H. P. Norbeck Address Redfield, S. D

Section 23

X

CASING DETAIL (old)

Type	Size	Length	Depth
Blk Std	2"	240'	240'

~~PERFORATIONS~~

~~Type~~	~~Size~~	~~Length~~	~~Depth~~

Perforations & WATER BEARING SANDS

From	To
160'	165'
222'	227'

SOURCE OF INFORMATION

Norbeck Co. Report

Repaired by: H. P. Norbeck

Address Redfield

RECORD OF WELL AFTER REPAIR

Depth 237 Date Completed June 10, 195

Flow (gpm) 2 Date Measured June 10, 1951

Water Level Below Ground Surface ______

CASING DETAIL (new)

Type	Size	Length	Depth
Std Galv	3"	31'	37'
driven over old 2" with 600# hammer			
"M" Copper tube	1 1/2"	231'	237'

PERFORATIONS

Type	Size	~~Length~~	~~Depth~~
Drilled	1/4"	158' to	168'
		220	230

Did you reach bottom on this well? No

If not, how far down did you get? 237'

What do you think caused this well to fail? 2" corroded out permitting water to come up out side

Do you believe the repair was successful? Very

Well flowed only 2 GPM when drilled - this is a Dakota Sandstone well about 2 mi from outc.

Form # 4 5

DRILLER'S FINAL REPORT

OFFICE OF STATE ENGINEER
Pierre, South Dakota

Well No. ____________ (do not fill in)

CUSTER COUNTY

Location: SW NW¼ Section 33 Twp. 6S Range 1E

Owner George Putnam Address Burdock, S. Dak.

Depth 494 Drawdown ____ Type Rig Used cable tool

Flow(gpm) ____ Pressure ____ Date Measured ____

Grd. Elev. ____ Water Level Below Ground Surface ____

Temperature ____ Character Water (soft, medium, hard)

Date Commenced ____ Date Completed 11/12/49

x	

Section ____

CASING DETAIL

Type	Size	Length	Depth
	4"	497	494

PERFORATIONS

Type	Size	Length	Depth

SCREEN

Type	Size	Length	Depth

Is there a seal between different size pipes? ____ What kind? ____

WATER BEARING SANDS

From ____ To ____

SOURCE OF INFORMATION

~~PMA office, Fall River~~ Co.

DRILLER'S LOG

From	To	

~~Bonded~~ Driller Roy Boner (Signature)

Address Hot Springs, S. Dak.

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SE ¼ NE ¼ Sec 12 Twp 7S Rg 2E

County Fall River

Please mark well location with an "X"

North / W / E — X marked in NE quarter — 1 Mile

Well Completion Date 9/30/99

LOCATION: N/A
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from ______ (identify source).

PROPOSED USE:
- [x] Domestic/Stock
- [ ] Municipal
- [ ] Business
- [ ] Test Holes
- [ ] Irrigation
- [ ] Industrial
- [ ] Institutional
- [ ] Monitoring well

METHOD OF DRILLING: Air Rotary

CASING DATA: [ ] Steel [x] Plastic [ ] Other

If other describe flush jt

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	4.5 IN	0 FT	160 FT	7.0 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
I/II	~~22~~ 17	lb./gal	0 ft	90 ft
		lb./gal	ft	ft

Describe grouting procedure pressure grout & 9 gravel pack returns

SCREEN: [ ] Perforated pipe [x] Manufactured

Diameter 4.5 IN Length 60 FEET

Material plastic

Slot Size .025 Set From 90 Feet to 150 Feet

Other information 10' blk & cap in bottom

WAS A PACKER OR SEAL USED? [ ] YES [ ] NO

If so, what material?

Describe packer(s) and location?

DISINFECTION: Was well disinfected upon completion?
✓ YES, How: chlor tabs
___ NO, Why Not? KB

Laboratory sent to for water quality analysis — owner will set own pump

Well Owner: Ken Bronemann

Business Name:

Address: Deuey Rt, Edgemont SD 57735

WELL LOG:

FORMATION	DEPTH FROM	TO
gry/grn shales	0	110
water bearing tan/buff SS	110	146
red SS	146	160 TD

STATIC WATER LEVEL 38 Feet

If flowing: closed in pressure ______ PSI

GPM flow ______ through ______ inch pipe

Controlled by [ ] Valve [ ] Reducers [ ] Other

Reduced Flowrate ______ GPM

Can well be completely shut in?

WELL TEST DATA:
- [ ] Pumped
- [x] Bailed
- [ ] Other

Describe: air lift 8 gal/min

Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM

If pump installed, pump rate ______ GPM

REMARKS

JAN 2000 WATER RIGHTS PROGRAM Pierre, SD

This well was drilled under license # 489

And this report is true and accurate.

Drilling firm D&T Drilling

Signature of License Representative: Thomas E. Leigh

Signature of Well Owner or Equitable Property Holder: Kenneth Bronemann

Date: 1-21-00

7-19-78 Smith + Assoc. Cornilus #1
10-31-78 NENE (Sec 27) T6S 1 R.
S. Dak. 0-2 surface (6S 1R)
Custer 2-76 Red silty shale streaks of Gyp.
~~72~~ surface pipe set at 72 Ft. Down 5 Ft. cemented with 18 sack Reg. Cement. Put from surface 9-26 15 Ft. cement in pipe
76-95 Red silty shale streaks of Gyp
95-107 White + pink Gyp.
107-151 Red silty shale
151-194 White + Gray Gyp.
194-255 Red silty shale streaks of Gyp.
255-285 hard Gray limey Gyp streaks of
~~285-386~~ Red silty shale
285-386 Red silty shale
386-422 Pink + light lavender limestone.
422-429 Red + lavender limey shale
429-458 Red silty shale
458-482 White Gyp. streaks of Red silty sh.
482-508 Red silty shale
508-517 white Gyp. streaks of Pink limestone
517-520 Red silty shale lost circ 520
520-539 Red sandy shale
539-541 Pink limestone
541-570 White + Pink sand
570-592 Anhydrite white
592-621 Pink + lavender limestone
621-639 Pink sandstone
639-667 Buff limestone + Pink sand
667-723 Gray limestone
723-727 Gray shale + anhydrite
727-747 Gray Dolomite + Black shale
747-794 Gray + Pink Dolomite
cassed with 640 Ft. 4½ 10.5 black pipe
cemented 240 sacks cement. 5 shows

CEJA CORPORATION

JUL 1990
DIVISION OF
WATER RIGHTS
Pierre, SD

June 20, 1990

JUN 1990
RECEIVED
WESTERN
FIELD
OFFICE

South Dakota Dept. of Water and
Resources
Western Field Office
36 East Chicago
Rapid City, SD 57701

Attention: Anthony K. Petres, Geologist

RE: Tubbs #1-35
SE/4 SE/4 Sec 35-7S-1E
Fall River Co., SD

Gentlemen:

Pursuant to your recent request of June 15, 1990 to Weldon Spitzer, enclosed please find a written acceptance and release from Robert D. and Virginia Tubbs to convert the captioned to a freshwater well.

If you have any questions or we can be of further assistance, please feel free to contact us.

Very truly yours,

Nevin K. Cooper /ks

Nevin K. Cooper

NKC/ho

JUL 06 1990

Jim:
This oil test was
plugged back
and given to the
landowner for use
as a water well.
If you need
further info contact

TO:
Jim
Goodman

4400 One Williar ... leph

CEJA CORPORATION

July 27, 1989

Robert D. & Virginia Tubbs
P. O. Box 563
Edgemont, SD 57735

RE: Tubbs 1-35 Well
SE/4 SE/4 Sec 35-7S-1E
Fall River Co., SD
CWO 9506

Dear Mr. & Mrs. Tubbs:

You have requested the use of the referenced abandoned well as a potential freshwater well for which an acceptance and release is required under ARSD Article 74:10:04:02:(4)(c)(i), a copy of which is attached hereto.

Ceja hereby grants and conveys the well to you in its present condition as reflected in the attached plugging report, provided you sign and return this letter releasing Ceja of any further responsibility or liability for the well prior to its conversion for actual use as a freshwater well. You further understand that you shall assume responsibility for the well and all attendant liabilities and accept the well in its present condition without any warranty or representation of its fitness for your intended use.

Thank you for your cooperation and assistance. If we may be of further assistance, please call me at 1-800-331-3359.

Yours very truly,

Paul G. Rose

Paul G. Rose
Vice President

ACCEPTANCE AND RELEASE given this 3 day of August, 1989.

BY: Robert D. Tubbs
Robert D. Tubbs

BY: Virginia Tubbs
Virginia Tubbs

S. Dak. Oil & Gas Board
FORM 7

PLUGGING RECORD

Operator: CEJA Corporation		Address: 4400 One Williams Ctr., Tulsa, OK., 74172	
Name of Lease: Tubbs	Well No.: 1-35	Field & Reservoir: Wildcat	
Location of Well: 990'FSL & 595'FEL SE SE 35-7S-1E		Sec-Twp-Rge or Block & Survey	County: Fall River

Application to drill this well was filed in name of	Has this well ever produced oil or gas	Character of well at completion (initial production): Oil (bbls/day)	Gas (MCF/day)	Dry?
CEJA Corporation	No			Yes

Date plugged:	Total depth	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day)	Water (bbls./day)
July 2, 1989	2558'	0	0	0

Name of each formation containing oil or gas. Indicate which formation open to well-bore at time of plugging	Fluid content of each formation	Depth interval of each formation	Size, kind & depth of plugs used. Indicate zones squeeze cemented, giving amount cement.
None	Water		

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, ripped etc)	Packers and shoes
8.625	418	None	All		

Was well filled with mud-laden fluid, according to regulations? Yes

Indicate deepest formation containing fresh water. Fall River-Lakota

In addition to other information required on this form, if this well was plugged back for use as a fresh water well, give all pertinent details of plugging operations to base of fresh water sand, perforated interval to fresh water sand, name and address of surface owner, and attach letter from surface owner authorizing completion of this well as a water well and agreeing to assume full liability for any subsequent plugging which might be required.

Wellbore was plugged back to 610' for use as fresh water well from the Lakota formation as follows:

100' plug	2108'-2208'	Red Shale Marker-2158'
100' plug	1662'-1762'	Minnelusa-1712'
100' plug	1050'-1150'	Canyon Springs-1100'
100' plug	610'-710'	Morrison-578'

with heavy mud in between plugs.

Surface Owner: Robert D. Tubbs, Box 563, Edgemont, S.D., 57735

USE REVERSE SIDE FOR ADDITIONAL DETAIL

Executed this the 27 day of July, 1989

State of Oklahoma

County of Tulsa

Weldon G. Spitzer
Signature of Affiant

Before me, the undersigned authority, on this day personally appeared Weldon G Spitzer known to me to be the person whose name is subscribed to the above instrument, who being by me duly sworn on oath states, that he is duly authorized to make the above report and that he has knowledge of the facts stated therein, and that said report is true and correct.

Subscribed and sworn to before me this 27 day of July, 1989

SEAL

My commission expires June 28, 1990

Mary E Kisley
Notary Public in and for Tulsa
County, Oklahoma

DO NOT WRITE BELOW THIS LINE

Approved ______
Date

OIL AND GAS BOARD OF THE STATE OF SOUTH DAKOTA

______, Secretary

INSTRUCTIONS

General: This form is designed for submitting a complete and correct well completion report and log on all types of lands and leases to either a Federal agency or a State agency, or both, pursuant to applicable Federal and/or State laws and regulations. Supplemental instructions by local Federal and/or State offices will govern the use of this form.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, all types electric, etc.), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal and/or State laws and regulations. All attachments should be listed on this form, see last blank.

If this well was directionally drilled, show both the location at the surface and at total depth from nearest lines, where possible; also show the locations at the top and at the bottom of any zone for which production data are reported in space 33, and any zone open for injection or disposal. Use this reverse side if more space is needed. (MD-Measured Depth, TVD-True Vertical Depth)

*Indicate which elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

If this well is completed for separate production from more than one zone (multiple-zone completion), so state in the correct space and show the producing interval, or intervals, top(s), bottom(s) and name(s) (if any) for only the zone reported in the blanks under PRODUCTION. Submit a separate completion report on this form for each interval (zone) to be separately produced.

"Sacks Cement": Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

SUMMARY OF POROUS ZONES:
SHOW ALL IMPORTANT ZONES OF POROSITY AND CONTENTS THEREOF; CORED INTERVALS; AND ALL DRILL-STEM TESTS, INCLUDING DEPTH INTERVAL TESTED, CUSHION USED, TIME TOOL OPEN, FLOWING AND SHUT-IN PRESSURES, AND RECOVERIES

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
Canyon Springs	1100	1130	Canyon Springs-wet
Converse Sands	1715	1886	Converse Sands-wet
2nd Leo	2280	2325	DST #1-2nd Leo, 2287'-2307' IF: 5 min., IFP: 436-436 ISI: 30 min., ISIP: 973 FF: 60 min., FFP: 432-877 FSI: 120 min., FSIP; 973 Opened with 2" blow, died 8 min. after ISI. Second open 2" blow, continued; died 1 min. after FSI. Rec. 180' muddy wtr., 1860' water. BHT-103F: Sample R_W=1.9 @ 80F 2700 ppm chlorides.

GEOLOGIC MARKERS

NAME	TOP MEAS. DEPTH	TOP TRUE VERT. DEPTH
Morrison	578	
Sundance	751	
Spearfish	1130	
Goose Egg	1364	
Minnekahta	1604	
Minnelusa	1712	
Red Shale Marker	2158	
Second Leo	2287	
Atoka	2524	

(iv) Cement must be circulated to fill at least a 100-foot interval, of which at least 50 feet must be above the shoe of the surface casing; and

(v) A cement plug must be set at the surface as prescribed by the secretary;

(b) Wells without production casing:

(i) All aquifers, salt zones, and fluid-bearing formations must be sealed or separated with individual cement plugs, circulated to fill at least 100 feet of hole. Each individual cement plug must be at least 50 feet above the top of the following formations, as specified by the secretary;

(A) Fort Union Group
(B) Hell Creek Formation
(C) Fox Hill Formation
(D) Niobrara Formation
(E) Greenhorn Formation
(F) Newcastle Sandstone
(G) Inyan Kara Group
(H) Sundance Formation
(I) Minnelusa Formation
(J) Madison Formation
(K) Interlake Formation
(L) Red River Formation
(M) Deadwood Formation

(ii) Cement must be circulated to fill at least a 100-foot interval, of which at least 50 feet must be above the shoe of the surface casing; and

(iii) A cement plug must be set at the surface as prescribed by the secretary;

(c) Conversion of a well to a water well:

(i) When a test hole may safely be used by the landowner as a potential freshwater well, the operator must follow the plugging procedures set forth in this section to the base of the objective freshwater strata, if applicable. The surface owner must give a signed release to the operator before the conversion is made;

(ii) The well must then be constructed to meet specifications established in article 74:02.

Source: SL 1975, ch 16, § 1; transferred from § 52:02:04:02, effective July 1, 1979; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 50, effective October 4, 1987.
General Authority: SDCL 45-9-13.
Law Implemented: SDCL 45-9-11, 45-9-15.

74:10:04:03. Temporary abandonment of a well. Written approval must be obtained from the secretary for the temporary abandonment of a well. A well that is not completed with production casing may not be temporarily abandoned and must be plugged immediately. A well with production casing may not be temporarily abandoned for more than six months, unless the operator is granted an extension by the secretary.

SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-86

Location NW¼ NW¼ Sec 2 Twp 7 Rg 2

County
FALL RIVER

North

Please mark well location with an "X"

W E

1 mile

Well Completion Date JUNE 16, 1991

PROPOSED USE:
- [x] Domestic
- [ ] Irrigation
- [ ] Municipal
- [ ] Industrial
- [ ] Test Holes
- [x] Stock

Method of Drilling:
ROTARY AIR

CASING DATA:
- [ ] Steel
- [x] Plastic
- [ ] Other

If other describe

PIPEWEIGHT		DIAMETER		FROM		TO		HOLE DIAMETER	
SCH 200	LB/FT	5	IN	0	FT	145	FT	7⅞	IN
	LB/FT		IN		FT		FT		IN
	LB/FT		IN		FT		FT		IN
	LB/FT		IN		FT		FT		IN

GROUT:
Was the well grouted? [x] YES [ ] NO
To what depth? 28 FT FEET
What is grouting material? CEMENT
If cement, number of sacks? 4
Describe grouting procedure TREMI LINE TO TOP PACKER

What was grout weight? 94 # 7 LB/GAL

SCREEN: [ ] Perforated pipe [x] Manufactured
Diameter 5 IN Length 100 FEET
Material PVC
Slot Size .064 Set From 30 Feet To 130 Feet
Slot Size Set From Feet To Feet
Slot Size Set From Feet To Feet
Other information

Was a packer or seal used? [x] YES [ ] NO
If so, what material? NEO PRENE
Describe packer(s) and location? CEMENT PACKER AT 28 FT FORMATION PACKER AT 100 FT

Was well disinfected upon completion? [x] YES [ ] NO
Explain 1 OT CLOROX
Bacteriological analysis [x] YES [ ] NO
Laboratory sent to WILL BE SENT to TWIN CITY LAB.

Well Owner:
Name Kenneth Broneman
Address Edgemont S.Dak HC 57 Box 73

Well Log:

Formation		Depth From	To
SURFACE	LOWER	0	5
SHALE	SUNDANCE	5	20
SAND STONE		20	130
RED SHALE (SPEARFISH)		130	145

JUN 1991 DIVISION OF WATER RIGHTS Pierre, SD

STATIC WATER LEVEL 11 Feet
If flowing: closed in pressure PSI
GPM flow through inch pipe
Controlled by [ ] Valve [ ] Reducers [ ] Other
If other; specify
Can well be completely shut in?

WELL TEST DATA:
- [ ] Pumped
- [x] Bailed
- [ ] Other

Describe: AIR BAILED 13 GPM from TD.

Pumping Level Below Land Surface

ft.	After	Hrs.	pumped	GPM

REMARKS:

This well was drilled under license # 415
And this report is true and accurate.
Drilling firm RABY DRILLING
Signature of License Representative: Russell S Raby
Signature of Well Owner: Kenneth Broneman
Date 6-19-91

SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-85

Location ____¼____¼ Sec 31 Twp 7S Rg 1E

County: Fall River

Please mark well location with an "X"

North / W / E / 1 mile

Well Completion Date: April 23, 1991

PROPOSED USE:
- [ ] Domestic
- [ ] Municipal
- [ ] Test Holes
- [ ] Irrigation
- [ ] Industrial
- [x] Stock

Method of Drilling:

Auger bucket drilling system

CASING DATA:
- [ ] Steel
- [x] Plastic
- [x] Other

If other describe: Concrete

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
____ LB/FT	8 IN	0 FT	12 FT	38 IN
____ LB/FT	36 IN	12 FT	52 FT	38 IN
____ LB/FT	____ IN	____ FT	____ FT	____ IN
____ LB/FT	____ IN	____ FT	____ FT	____ IN

GROUT:
Was the well grouted? [x] YES [ ] NO

To what depth? 23 FEET

What is grouting material? Granular bentonite

If cement, number of sacks? ____

Describe grouting procedure: Well was drilled, cased and gravel packed. The bentonite was placed in the annular space above gravel pack

What was grout weight? ____ LB/GAL

SCREEN: [ ] Perforated pipe [ ] Manufactured

Diameter ____ IN Length ____ FEET

Material ____

Slot Size ____ Set From ____ Feet To ____ Feet

Slot Size ____ Set From ____ Feet To ____ Feet

Slot Size ____ Set From ____ Feet To ____ Feet

Other information ____

Was a packer or seal used? [ ] YES [x] NO

If so, what material? ____

Describe packer(s) and location? ____

Was well disinfected upon completion? [x] YES [ ] NO

Explain: 2 cups chlorine added

Bacteriological analysis [x] YES [ ] NO

Laboratory sent to: SOUTH DAKOTA STATE DEPT OF HEALTH – PIERRE, SO. DAK

Well Owner:

Name: Robert Simons

Address: 4052 S. Wabash Denver,CO 80237

Well Log:

Formation	Depth From	Depth To
Topsoil	0	1
Clay	1	6
Brown shale	6	15
Shale	15	52

MAY 1991 DIVISION WATER RIGHTS Pierre, SD

STATIC WATER LEVEL 24 Feet

If flowing: closed in pressure ____ PSI

GPM flow ____ through ____ inch pipe

Controlled by [ ] Valve [ ] Reducers [ ] Other

If other; specify ____

Can well be completely shut in? ____

WELL TEST DATA:
- [ ] Pumped
- [ ] Bailed — Describe: ____
- [ ] Other

Pumping Level Below Land Surface

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

REMARKS:

Driller: T. Schamber

This well was drilled under license # 195

And this report is true and accurate.

Drilling firm: S. Bice Drilling Co.

Signature of License Representative: Samuel J. Bice

Signature of Well Owner: Robert E. Simons

Date: May 12, 1991

6/14/91

SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-85

Location SE ¼ SE ¼ Sec 12 Twp 7 Rg 1

County
FALL RIVER

Please mark well location with an "X"

North / W / E / 1 mile

Well Completion Date JUNE 12 1988

PROPOSED USE:
☐ Domestic ☐ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☒ Stock

Method of Drilling:
ROTARY AIR + MUD

CASING DATA:
☐ Steel ☒ Plastic ☐ Other
If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
SCH 200 LB/FT	5 IN	0 FT	520 FT	7 7/8 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUT:
Was the well grouted? ☒ YES ☐ NO
To what depth? 280 FT FEET
What is grouting material? CEMENT
If cement, number of sacks? 34 SACKS
Describe grouting procedure TREMI LINE

What was grout weight? 1 BAG 7 GAL LB/GAL

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 5 IN Length 80 FEET
Material PVC
Slot Size .064 Set From 300 Feet To 340 Feet
Slot Size .064 Set From 480 Feet To 520 Feet
Slot Size Set From Feet To Feet
Other information

Was a packer or seal used? ☒ YES ☐ NO
If so, what material? NEOPRENE
Describe packer(s) and location? 5 X 8 PACKERS SET AT 280 + 300 FT TOP SCREEN 380 - 420 + 480 FT ABOVE BOTTOM SCREEN

Was well disinfected upon completion? ☐ YES ☐ NO
Explain
Bacteriological analysis ☐ YES ☐ NO
Laboratory sent to

Well Owner:
Name LESLIE COATS
Address Dewey Rt. Edgemont, S.D. 57735

Well Log:

Formation	Depth From	Depth To
FALL RIVER	0	180
LAKOTA	180	530
MORRISON	530	540

JUN 1988 DIVISION OF WATER RIGHTS Pierre, SD

STATIC WATER LEVEL 0 Feet
If flowing: closed in pressure 2 PSI
GPM flow SEEP through 1 GAL 10 MIN inch pipe
Controlled by ☒ Valve ☐ Reducers ☐ Other
If other; specify
Can well be completely shut in? YES

WELL TEST DATA:
☐ Pumped AIR BAILED
☒ Bailed Describe: 10 GPM
☐ Other
Pumping Level Below Land Surface
ft. After Hrs. pumped GPM
ft. After Hrs. pumped GPM
ft. After Hrs. pumped GPM

REMARKS:
3 GPM MEASURED AT 320
10 GPM MEASURED FROM 500 FT SAND.

This well was drilled under license # 415
And this report is true and accurate.
Drilling firm RABY DRILLING + EXP
Signature of License Representative:
Russell Raby
Signature of Well Owner:

Date

7-6-88

7-2-22c

SCHEDULED

RECORD OF SAMPLE DETERMINATIONS

Fall River Co

1

SW 22 — 7 S — 2 E

R. G. Robinson — 1

Fall River Co — South Dakota

0 - 170

From	To	Formation and remarks
		Sundance formation
0	130	Clay, pale greenish gray, sandy
130	154	Sandstone, fine, rounded, white; with few large frosted quartz grains
154	170	Sandstone, fine, rounded, white to orange; few large orange and white frosted quartz grains

JWH 4/79
accdg to geol. quad map
(Edgemont NE), land surface
is Fall River Formation

So log interp. or well loc is wrong

7-2-16 ca

U. S. Forest Service Water Well
NE¼ SW¼ sec. 16, T. 7 S., R. 2 E.
Fall River County, South Dakota
Drilled by Otto Boskar, Hot Springs, S. D.
Samples described by J. P. Gries, 1959
State School of Mines and Technology
Sample set 118.

need better location

SCHEDULED

15 - 20 sandstone, fine to medium, colorless, subangular, some grains with secondary crystal faces
30 sandstone, same
35 sandstone, same, with few coarse frosted grains, some gray waxy shale gives sample dirty appearance
40 sandstone, fine to coarse, gray, 1/2; shale, medium to dark gray, waxy, 1/2
50 sandstone, fine to coarse, calcareous, poorly sorted, 2/3; shale, gray, sandy, 1/3
65 sandstone, fine, white, 1/2; shale, dark gray, 1/2
75 sandstone, white to gray, very calcareous, 1/3; limestone, very sandy, gray, white and light brown, 1/3; shale, dark gray, 1/3
85 sandstone, as above, 40%; limestone, as above, 20%; shale, as above, 40%
90 shale, gray, some sandy, 1/2; limestone, very finely crystalline, light gray-brown to coarsely crystalline calcite, 1/2
100 clay, gray, slightly sandy, slightly waxy
110 sandstone, very fine to medium, white, calcareous total depth

All in Inyan Kara

7-1-20

Robert Tubbs   Feb. 4, 1977
Edgemont, S.D.
Fall River County Sec. 20 Twp. 7S Range 1E

Total Depth 40'   Static 26'
Dia. 30"

0-3 topsoil
3-26 sand
26-28 gravel
28-40 blue shale

Bca

NOTICE OF WELL CONSTRUCTION

7-1-16

Fall River

(1) WELL CONSTRUCTION

Location of well: SE 1/4 SE 1/4 Section 16 Township 7S Range 1E

Well owner Peterson & Son, Inc. (Name) Edgemont, SD (Address)

Date well drilling completed 11-17-81 Purpose of well Domestic (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-380	Blk Sh
380-470	lB gy clst & ss
470-495	Gy ss & clst
495-565	Gy, rd-brn & gn clst
565-580	Gy ss
580-650	Gy clst

Attach sheet if more space is needed

Depth to top of water producing aquifer 555 ft.

Depth to static water level flowing ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 650 ft.

Depth to bottom of casing 650 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

4" blk iron 10#/ft

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

slotted 566-608
629-650

If a flowing well, flow of completed well 30 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

______
Name of Pump Installation Contractor

SCHEDULED

D7-1-12 bc

State South Dakota Farm W. E. Hack Index

County Fall River Company

Sec. 12 T. 7 S R. 1 E Drilled by Richard Lawrence Date 1954

Authority driller Type of log sample

Type of drill cable tool Samples yes

Elevation method T.D. 156'

Remarks from SDGS files

x			

Left Hwy

Skull Creek - based on Darton's geol map

1. shale, light gray, very silty	0 - 37
2. clay, light gray, bentonitic, waxy, with muscovite mica flakes; piece of sandstone, fine, tight, white	37 - 80
3. shale, light gray, silty	80 - 100
4. sandstone, fine white, with white clay in interstices (looks like Unkpapa)	100 - 140
5. sandstone, fine to medium, incoherent, subrounded; some white clay and one siderite pellet. Water sand.	140 - 146
6. clay, gray-brown to light gray, waxy, translucent	146-147
7. sandstone, like sample 5	147 - 150
8. sand, as above, and much waxy clay	150 - 156

Fall River

Inyan Kara

This is an odd set of samples. Samples 1 to 3 do not look like Skull Creek. 4 could be Muddy, but looks like much of the Unkpapa where it is white. Nos. 5 and 7 look like Dakota but not like Newcastle (Muddy). Nos. 6 and 8 look like Morrison, but could be Fuson.

I still think it is a Dakota section, but the next time I get down that way, I shall stop for a look at the surface.

Salt River

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NW 1/4 NW 1/4 ______ Section 3 Township 7S Range 1E

Well owner Kathryn Spencer (Name) Dewey Route, Edgemont, SD 57735 (Address)

Date well drilling completed 10-22-80 Purpose of well Domestic (domestic, irrigation, municipal, industrial, other)

WELL LOG

(Litho Log Footages)

	Layers, top to top in feet	Description of layer
Ksc →	0-320	Dark gray shale
Kfu →	320-395	Gray mudstone with 10% gray siltstone
	395-445	Gray mudstone with 5%-20% gray vfgss
Klf →	445-490	Green mudstone
	490-520	AA w/10-30% G & GR Wt slst
	520-545	Gray fgss
	545-560	well cemented vf - fgss
	560-575	Gray mudstone with 10% dark brown mudstone
	575-590	AA with 10-20% gray vfgss
	590-615	Gray fine grain sandstone
	615-620	Green mudstone with <5% gray vfgss
	620-625	Green mudstone with 50% Brown-red mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 580 ft.

Depth to static water level flows ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 625 ft.

Depth to bottom of casing 580 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

5 1/2" 14 lbs/ft.

Random twenties

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

45 ft. open hole

If a flowing well, flow of completed well 1.00 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

TVA well pump test 76-77 2 miles
14 Days 2.00

NOTICE OF WELL CONSTRUCTION

7S 1E 3BB

Fall River

(1) WELL CONSTRUCTION

Location of well NW 1/4, NW 1/4 ______ Section ______ Township 7S Range 1E

Well owner Kathryn Spencer (Name) Dewey Route, Edgemont, SD 57735 (Address)

Date well drilling completed 10-22-80 Purpose of well Domestic (domestic, irrigation, municipal, industrial, other)

WELL LOG

(Litho Log Footages)

	Layers, top to top in feet	Description of layer
Ksc	0-320	Dark gray shale
Kfu	320-395	Gray mudstone with 10% gray siltstone
	395-445	Gray mudstone with 5%-20% gray vfgss
Klf	445-490	Green mudstone
	490-520	AA w/10-30% G & GR Wt slst
	520-545	Gray fgss
	545-560	well cemented vf - fgss
	560-575	Gray mudstone with 10% dark brown mudstone
	575-590	AA with 10-20% gray vfgss
	590-615	Gray fine grain sandstone
	615-620	Green mudstone with <5% gray vfgss
	620-625	Green mudstone with 50% Brown-red mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 580 ft.

Depth to static water level flows ft.

Name of producing aquifer (if known) Lakota

Total depth of drill hole 625 ft.

Depth to bottom of casing 580 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

5 1/2" 14 lbs/ft.

Random twenties

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

45 ft. open hole

If a flowing well, flow of completed well 1.00 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

Ed

(2) PUMP INSTALLATION

Company name and size of pump ______ HP. ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______, tube material ______.

______
Name of Pump Installation Contractor

S. D. Farm Linch Index 0902 scheduled

County Fall River Company

Sec. 2 T. 7S R. 1E Drilled by Date

Authority Mrs. Linch (owner) Type of log

Type of drill Samples

Elevation by method

Remarks Information obtained verbally April 1944.

	o?		

1st water — — — — —	177
Stinking water — — — — —	369

Well flows size of thumb.

Tallis [illegible] site of well from a distance. Possibly [illegible] in Mowry. In any event, the [illegible] water can't be Dakota

Jan 4/4
Land surface is Skull Creek,
[illegible] over Skull Creek or is Fall
River. So most of depth of this
well is in Fall River & Lakota

NOTICE OF WELL CONSTRUCTION

6-1-18

~~Fall R~~

Custer

) WELL CONSTRUCTION

Location of well: SE 1/4 NE 1/4 Section 18 Township 6S Range 1E

Well owner: Earl Darrow (Name) Edgemont, SD (Address)

Date well drilling completed: 7-30-81 Purpose of well: Domestic (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-20	Wth brn & gy clst and sltst
20-25	Gy clst & ywtn bent
25-35	Gy clst & ss
35-55	Gy clst
55-60	Gy ss
60-65	Brn & gy clst
65-70	Gy ss
70-95	Gy, blk, rd & orng-brn clst
95-115	Rd, orgn-brn & ppl ss
115-120	Gy clst w/ss

Attach sheet if more space is needed

Depth to top of water producing aquifer: 90 ft.

Depth to static water level: 0 ft.

Name of producing aquifer (if known): Fall River

Total depth of drill hole: 120 ft.

Depth to bottom of casing: 120 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

160# 4" PVC

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

slotted casing 90-115

If a flowing well, flow of completed well: 0.2 G.P.M.

Silver King Mines, Inc.

Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ______ HP. ______

Type of pump ______ Capacity of installed pump ______ G.P.M.

Depth of pump placement ______ ft., Date of pump installation ______

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46,408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ______ ft., tube diameter ______ tube material ______.

DEC 1981

______

Name of Pump Installation Contractor

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ SW ¼ Sec 23 Twp 6S Rg 1E

County Custer

Please mark well location with an "X"

North / W / E — X — 1 Mile

Well Completion Date Feb 98

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ____ ft. from ~~Don Septic~~ NONE (identify source).

PROPOSED USE:
- [x] Domestic/Stock
- [ ] Municipal
- [ ] Business
- [ ] Test Holes
- [ ] Irrigation
- [ ] Industrial
- [ ] Institutional
- [ ] Monitoring well

METHOD OF DRILLING:
Air Rotary

CASING DATA: [x] Steel [x] Plastic [ ] Other

If other describe ____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
15.5 LB/FT	5 IN	0 FT	70 FT	7⅞ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cement	5	6 gal lb./gal	0 ft.	30 ft
		lb./gal	ft.	ft

Describe grouting procedure Pumped

SCREEN: [x] Perforated pipe [ ] Manufactured

Diameter 5 IN Length 40 FEET

Material Steel

Slot Size ¼ x 6 Set From 30 Feet to 70 Feet

Other information ____

WAS A PACKER OR SEAL USED? [x] YES [ ] NO

If so, what material? Rubberpacker @ 30ft

Describe packer(s) and location? ____

DISINFECTION: Was well disinfected upon completion? X YES, How: Chlorine tabs

____ NO, Why Not?

Laboratory sent to for water quality analysis

Well Owner: Lloyd & John Putnam

Business Name: Putnam & Putnam

Address: HC 59 BOX 22
Edgmont SD 57735

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Sand & Gravel	0	75
Shale	75	80

STATIC WATER LEVEL 20 Feet

If flowing: closed in pressure ____ PSI

GPM flow ____ through ____ inch pipe

Controlled by [ ] Valve [ ] Reducers [ ] Other ____

Reduced Flowrate ____ GPM

Can well be completely shut in? ____

WELL TEST DATA:
- [ ] Pumped
- [ ] Bailed
- [x] Other

Describe: Air lift ~~150~~ 15-20 gpm

Pumping Level Below Land Surface

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

If pump installed, pump rate ____ GPM

FEB 1999 WATER RIGHTS PROGRAM Pierre, SD

REMARKS

This well was drilled under license # 603

And this report is true and accurate.

Drilling firm Uptilden Drilling

Signature of License Representative: Craig Uptilden

Signature of Well Owner or Equitable Property Holder: Putnam & Putnam Partnership by John A Putnam

Date: 01.22.99

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location SW ¼ SW ¼ Sec 15 Twp 6S Rg 1E

County Custer

Please mark well location with an "X"

North / W / E — X (SW corner) — 1 Mile

Well Completion Date Jan 98

LOCATION:
Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? ______ ft. from None (identify source).

PROPOSED USE:
☒ Domestic/Stock ☐ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING: Air Rotary

CASING DATA: ☐ Steel ☒ Plastic ☐ Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
200 LB/FT	5 IN	0 FT	140 FT	7⅞ IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
Cement	11	6gal lb./gal	0 ft	80 ft
		lb./gal	ft	ft

Describe grouting procedure Pumped

SCREEN: ☐ Perforated pipe ☒ Manufactured
Diameter 5 IN Length ~~80~~ 60 FEET
Material PVC
Slot Size .025 Set From 80 Feet to 140 Feet
Other information

WAS A PACKER OR SEAL USED? ☒ YES ☐ NO
If so, what material? Rubber packer @ 80ft
Describe packer(s) and location?

DISINFECTION: Was well disinfected upon completion?
X YES, How: Chlorine Tablets
___ NO, Why Not?

Laboratory sent to for water quality analysis

Well Owner: Don Spencer
Business Name:
Address: HCR 59 Box 74
Edgemont SD 57735

WELL LOG:

FORMATION	DEPTH FROM	DEPTH TO
Mowry Shale	0	80
Newcastle Sand	80	140

STATIC WATER LEVEL 90 Feet

If flowing: closed in pressure ______ PSI
GPM flow ______ through ______ inch pipe
Controlled by ☐ Valve ☐ Reducers ☐ Other
Reduced Flowrate ______ GPM
Can well be completely shut in?

WELL TEST DATA:
☐ Pumped
☐ Bailed
☒ Other

Describe: Air lift 15-20 gpm

Pumping Level Below Land Surface
______ ft. After ______ Hrs. pumped ______ GPM
______ ft. After ______ Hrs. pumped ______ GPM
If pump installed, pump rate ______ GPM

REMARKS

FEB 1999 WATER RIGHTS PROGRAM Pierre, SD

This well was drilled under license # 603
And this report is true and accurate.
Drilling firm Wyrick Drilling
Signature of License Representative: [signature]

Signature of Well Owner or Equitable Property Holder: Don Spencer

Date: January 20, 1999

(see other location) Fall River
Sed 265 ± 50

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: SE 1/4 SW 1/4 ____ Section 11 Township 7S Range 1E

Well owner: Tennessee Valley Authority (Name), P. O. Box 49, Edgemont, South Dakota (Address)

Date well drilling completed: 7-26-78 Purpose of well: Test (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-30	Brown & Gray Soil
30-95	Brown-Gray Mudstone, Siltstone
95-135	IB Lt. Gray Sandstone, and Gray Mudstone
135-205	Variegated Mudstone & Siltstone
205-280	Tan & Gray Sandstone
280-305	Gray & Green Mudstone
305-335	Gray Sandstone
335-400	IB Brown-Gray Mudstone, Gray Sandstone
400-665	Gray, Brown & Green Mudstones
665-780	IB Red-Brown Sandstone and Gray & Green Claystone
780-840	Black Shale & Gray-Green Claystone
840-880	Red Siltstone-Mudstone

Attach sheet if more space is needed

Depth to top of water producing aquifer 665 ft.

Depth to static water level + 240 ft.

Name of producing aquifer (if known) Sundance

Total depth of drill hole 880 ft.

Depth to bottom of casing 780 ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

$5\frac{1}{2}$" 14# Steel Casing

Morrison — Redwater Shale

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

Torch Slotted 666-780

If a flowing well, flow of completed well 4 G.P.M.

Silver King Mines, Inc.
Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump ____ HP ____

Type of pump ____ Capacity of installed pump ____ G.P.M.

Depth of pump placement ____ ft., Date of pump installation ____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed ____ ft., tube diameter ____, tube material ____.

____
Name of Pump Installation Contractor

WELL DATA FROM TENNESSEE VALLEY AUTHORITY

Table 2.5.2-1

Summary of Wells Within a Four-Mile (6.5 km.) Radius of the TVA Burdock, No. 1 Shaft Site

Well No.: Based on the Federal system of township and range. Each township within the project area is assigned a letter in consecutive order beginning with "A" in the northeast corner and ending with "F" in the southern part. Similarly, wells are numbered in consecutive order within a township--for example: B-1, B-2, etc. Location: Number based on township, range, section, 1/4 section, and 1/4 section. Aquifer: Qa, Quaternary alluvial deposits; Kf, Cretaceous, Fall River Formation; Kl, Cretaceous, Lakota Formation; Jm, Jurassic, Morrison Formation; Js, Jurassic, Sundance Formation; Trs, Triassic, Spearfish Formation; PmK, Permian, Minnekahta Limestone. Depth: Given in feet (ft.) and meters (m.) below land surface. Use Rate and Flow Rate: In gallons per minute (gpm) and liters per second (l/s). Elevation of Land Surface and Elevation of Water Surface: In feet (ft.) and meters (m.) above sea level. Superscript a indicates flow rate less than 1 gpm. Superscript b indicates estimated water surface elevations.

Well No.	Latitude	Longitude	Location	Aquifer	Depth (ft)	Depth (m)	Use Rate (gal/min)	Use Rate (l/s)	Flow Rate (gal/min)	Flow Rate (l/s)	Elevation Land Surf. (ft)	Elevation Land Surf. (m)	Elevation Water Surf. (ft)	Elevation Water Surf. (m)	Remarks
B-1	43°30'00"	103°58'57"	6-1-27Db	Qa	50	15	30	1.9	-	-	3715	1132	3700	1128	
B-2	43°29'58"	103°58'57"	6-1-27Db	Qa	46	14	30	1.9	-	-	3715	1132	3700	1128	
B-3	43°29'10"	104°02'43"	6-1-31Bd	-	-	-	-	-	12	.8	3605	1099	3610^b	1100	
B-4	43°29'09"	104°00'40"	6-1-33Bc	Kl	550	168	-	-	2	.1	3630	1106	3630^b	1106	
B-5	43°28'51"	103°59'06"	6-1-34Dc	Kl	350	107	-	-	-	-	3663	1116	-	-	
D-1	43°28'20"	103°56'47"	7-1-18d	Kl	330	101	-	-	-	-	3905	1190	3747	1146	Flowed until Triangle mine de-watered. 1/3 h.p. pump.
D-2	43°28'32"	103°57'34"	7-1-2Aa	Kf	180	55	10	.6	-	-	3749	1143	-	-	Water contains iron.
D-3	43°28'35"	103°58'15"	7-1-2Bb	Kl	495	151	-	-	a	-	3705	1129	3705^b	1129	Unused.
D-4	43°28'26"	103°58'20"	7-1-2Bc	Kl	280	85	5	.3	-	-	3698	1127	3674	1120	Water contains iron.
D-5	43°28'01"	103°58'22"	7-1-2Cc	Kl	470	143	-	-	a	-	3679	1121	3680^b	1122	Unused.
D-6	43°28'38"	103°59'42"	7-1-3Bb	Kl	500	152	-	-	2	.1	3660	1116	3661^b	1116	A.E.C. water analysis.
D-7	43°28'02"	104°00'00"	7-1-4Dd	Kl	805	245	-	-	1	.06	3645	1111	3646^b	1111	
D-8	43°28'17"	104°01'19"	7-1-5Ac	Kl	600	183	-	-	25	1.6	3600	1097	3610^b	1100	Flow rate in 1969, 30 gpm (1.9 l/s).
D-9	43°27'30"	103°59'52"	7-1-9Ad	Kl	550	168	-	-	16	1.0	3615	1102	3620^b	1103	Water contains iron & sulphur.
D-10	43°27'03"	104°00'54"	7-1-9Cc	Kf	527	161	-	-	8	.5	3700	1128	3701^b	1128	

TABLE 2.5.2-1 (continued)

Well No.	Latitude	Longitude	Location	Aquifer	Depth (ft.)	Depth (m)	Use Rate (gal/min)	Use Rate (l/s)	Flow Rate (gal/min)	Flow Rate (l/s)	Elevation Land Surf. (ft)	Elevation Land Surf. (m)	Elevation Water Surf. (ft)	Elevation Water Surf. (m)	Remarks
D-11	43°27'05"	103°59'46"	7-1-9Dd	Kl	600	183	-	-	1	.06	3624	1105	3631	1107	Water contains iron.
D-12	43°27'05"	103°57'47"	7-1-11Dc	Kl	525	160	-	-	-	-	3700	1128	-	-	A.E.C. water analysis.
D-13	43°28'29"	103°56'53"	7-1-12Bd	Kf	156	48	-	-	-	-	3750	1143	-	-	
D-14	43°27'04"	103°56'21"	7-1-12Dd	-	-	-	-	-	-	-	3830	1167	-	-	
D-15	43°26'55"	103°56'12"	7-1-13Aa	Kl	200	61	-	-	-	-	3740	1140	3662	1116	
D-16	43°26'54"	103°58'24"	7-1-14Bb	-	-	-	-	-	8	-	3675	1120	3675[b]	1120	
D-17	43°44'45"	103°58'25"	7-1-14Ba	Kl	850	259	-	-	7	.4	3630	1105	3634[b]	1108	Water contains iron.
D-18	43°25'23"	103°57'48"	7-1-14Db	Kl	280	85	1	.06	-	-	3610	1100	3598	1097	
D-19	43°25'09"	103°58'43"	7-1-15Dd	-	2264	690	-	-	-	-	3576	1090	3580[b]	1091	
D-20	43°25'15"	103°59'58"	7-1-16Dd	Kl	640	195	-	-	15	.9	3555	1084	3560[b]	1085	A.E.C. water analysis.
D-21	43°25'16"	104°02'01"	7-1-17Cb	Kf	530	162	-	-	4	.3	3555	1084	3558[b]	1084	A.E.C. water analysis.
D-22	43°26'33"	104°03'06"	7-1-18Bc	Kf	740	226	-	-	-	-	3700	1128	-	-	
D-23	43°25'48"	104°03'12"	7-1-19Bc	Kf	910	277	-	-	15	.9	3590	1091	3585[b]	1093	
D-24	43°25'48"	103°59'31"	7-1-22Bc	-	2400	732	-	-	3	.2	3548	1081	3550[b]	1082	
D-25	43°25'59"	103°57'24"	7-1-23Aa	Kf	90	27	-	-	3	.2	3625	1105	3625[b]	1105	Flow rate 1969, 10 gpm (.6 l/s).
D-26	43°25'02"	103°58'26"	7-1-23Bb	Kl	500	152	-	-	5	.3	3574	1089	3574[b]	1089	
D-27	43°26'03"	103°58'29"	7-1-23Bb	Kf	200	61	3	.2	-	-	3574	1089	3561	1085	
D-28	43°25'26"	103°57'48"	7-1-23Dc	Kl	500	152	-	-	5	.3	3542	1080	3542[b]	1080	Casing perforated in 10 ft (3 m.) intervals below elevations 3222 (982 m.) and 3384 (1031 m.).
D-29	43°25'27"	103°57'44"	7-1-23Dc	Kf	240	73	-	-	1	.06	3542	1080	3542[b]	1080	
D-30	42°25'24"	103°57'30"	7-1-23Dd	Js-PmK	1470	448	-	-	5	.3	3550	1082	3550[b]	1082	
D-31	43°25'30"	103°57'07"	7-1-24Cb	Js-PmK	2430	756	-	-	6	.4	3577	1090	3578[b]	1091	
D-32	43°24'38"	103°55'58"	7-1-25Ca	Kl	375	114	-	-	2	.1	3508	1069	3508[b]	1069	
D-33	43°24'40"	103°56'37"	7-1-25Db	Kf	96	29	-	-	1	.05	3510	1070	3510[b]	1070	
D-34	43°24'45"	103°56'29"	7-1-25Db	Kf	90	28	-	-	1	.06	3528	1075	3528[b]	1075	

TABLE 2.5.2-1 (continued)

Well No.	Latitude	Longitude	Location	Aquifer	Depth (ft)	Depth (m)	Use Rate (gal/min)	Use Rate (l/s)	Flow Rate (gal/min)	Flow Rate (l/s)	Elevation Land Surf. (ft)	Elevation Land Surf. (m)	Elevation Water Surf. (ft)	Elevation Water Surf. (m)	Remarks
D-35	43°24'28"	103°55'[illegible]	7-1-25Dc	Kf	130	40	-	-	1	.06	3510	1070	3510[b]	1070	
D-36	43°24'30"	103°56'2[illegible]	7-1-25Dd	Kf	450	137	-	-	3	.2	3508	1069	3508[b]	1069	
D-37	43°24'42"	103°57'[illegible]	7-1-26Ca	Kl	260	79	-	-	2	.1	3530	1076	3530[b]	1076	
D-38	43°24'47"	103°59'07"	7-1-27Ac	Kf	350	107	-	-	-	-	3560	1085	3560[b]	1085	
D-39	43°25'01"	104°00'[illegible]	7-1-28Ba	Kf	600	183	-	-	-	-	3576	1090	3553[b]	1083	
D-40	43°25'01"	104°02'[illegible]	7-1-29Bb	Kf	600	183	-	-	1	.06	3590	1094	3590[b]	1094	
D-41	43°23'30"	104°00'[illegible]	7-1-33Dc	Kl	600	183	-	-	-	-	3670	1119	-	-	
D-42	43°24'05"	103°57'[illegible]	7-1-35Ac	Kf	350	107	-	-	1	.06	3545	1081	3545[b]	1081	
D-43	43°23'44"	103°57'[illegible]	7-1-35Da	Kf	320	98	-	-	-	-	3555	1084	3545	1031	Slight flow in 1969; no flow in 1976.
D-44	43°23'37"	103°57'22"	7-1-35Dd	Kf	320	98	-	-	-	-	3555	1084	-	-	1969 Flow, 15 gpm (.9 l/s); no flow in 1976.
D-45	43°23'10"	103°55'[illegible]	7-1-36Aa	Kf	92	28	-	-	9	.6	3500	1067	3504[b]	1068	
D-46	43°23'55"	103°55'[illegible]	7-1-36Ca	Kf	100	30	-	-	1.5	.2	3535	1077	3536[b]	1078	
E-1	43°28'08"	103°55'[illegible]	7-2-6Ca	-	40	12	-	-	-	-	3860	1177	-	-	
E-2	43°27'11"	103°55'[illegible]	7-2-7Cd	-	365	111	-	-	-	-	3755	1145	3475	1059	Unused.
E-3	43°27'32"	103°54'[illegible]	7-2-8Bc	Js	470	143	-	-	-	-	3970	1210	-	-	
E-4	43°25'57"	103°55'[illegible]	7-2-19Ba	Kl	145	44	-	-	-	-	3640	1109	-	-	Flow rate in 1969, 2 gpm (.1 l/s); no flow in 1976;unused.
E-5	43°25'38"	103°55'[illegible]	7-2-19Ca	Kl	148	45	-	-	-	-	3620	1103	-	-	
E-6	43°25'15"	103°55'[illegible]	7-2-19Dc	Kl	255	78	-	-	10	.6	3600	1097	3605[b]	1099	
E-7	43°25'11"	103°55'[illegible]	7-2-30Aa	-	-	-	-	-	-	-	3600	1097	-	-	
E-8	43°25'13"	103°56'[illegible]	7-2-30Bb	Kl	330	101	-	-	2	.1	3530	1076	3530[b]	1076	
E-9	43°24'27"	103°55'[illegible]	7-2-30Cc	Kf	90	27	-	-	a	-	3522	1074	3522[b]	1074	
E-10	43°24'07"	103°55'52"	7-2-31Bc	Kf	104	32	-	-	1.3	.08	3495	1065	3500[b]	1067	

INTEROFFICE CORRESPONDENCE

Company Silver King Mines, Inc. Date August 3, 1979

To: R. M. Caywood

From: Keith E. Andersen Subject: Quarterly Burdock Area Water Levels

Attached are quarterly measurements of Burdock Area water well flow rates and water levels. Wells numbered 135 - 143 are new wells or wells added to our monitoring program by request. Wells numbered 200 - 216 are probable Sundance wells located east of the Burdock Area.

In an effort to obtain all possible information, several measurements of questionable accuracy were made as noted below.

Well No.	Problem
2	Leaking around casing
4	Leaking around casing
7S	Measuring point changes
13	Pipeline use affects flow
33	Measuring point changes
35	Measured inside cylinder drop pipe
36	Leaking around pipeline fittings
37	Measured inside cylinder drop pipe
40	Two wells at different elevations piped together
41	Pump had been operating
42	Leaking around pipeline fittings
52	Measuring point changed
53	Measured through cylinder drop pipe
56	Casing broken out
98	Casing leaking
113	Measured inside cylinder drop pipe
114	Measured inside cylinder drop pipe

Water quality data on these wells is not yet complete.

Keith E. Andersen

Keith E. Andersen, Chief Engineer

F 300 B 4M 7-78

Additional Water Wells In Edgemont Project Area

No.	Owner	Use	Depth	Probable Aquifer	Remarks
135	Mike Ringer	D,S	360	Lakota	Drilled 1977 - Submersible Pump
136	Ed Dodson	D,S		Spring	Source Uncertain
137	USFS	S			Windmill
138	John Carlson	D	100	Fall River	Drilled 1977, flows, Jet Pump
139	Gerald Darrow	S	620	Lakota	Drilled 1978, flows 20 gpm
140	Ken Barker	D,S			
141	Howard Henderson	S		Spring	Source Uncertain
142	Jack Standen	D,S	280	Fall River	Submersible Pump
143	Jeff Schultz	D,S	1,640	Fall River	Drilled 1962, Submersible Pump @ 440
200	George Hey	D,S	108	Sundance	Water Level 52.7', Submersible Pump
201	George Hey	S	110	Sundance	Pump Jack
202	George Hey	S	200	Sundance	Water Level 16.7'
203	Donald Spencer	D,S	200	Sundance	Submersible Pump at 160
204	Donald Spencer	U	170	Sundance	
205	Mason Miller	U	108	Sundance	Water Level 24.5
206	Mason Miller	D,S	200	Sundance	Water Level 18.4, Jet Pump
207	Mason Miller	D,S			Submersible Pump, Pipeline
208	Mason Miller	S	179	Sundance	Pump Jack
209	Donald Spencer	U	247	Sundance	Water Level 145.2
210	George Hey	S	125	Sundance	Pump Jack
211	Donald Spencer	S	161	Sundance	Pump Jack - Water Level 8.14
212	Carl Reutter	S	2,204		Flows 1.5 gpm, old oil test
213	George Hey	S	100	Sundance	Submersible Pump, Water Level 34.1
214	George Hey	S	270	Sundance	Water Level 39.1
215	Claude Smith	S	900		Water Level 60.7, Submersible Pump, Pipeline
216	Claude Smith	U			Water Level 217.9
144		S,O			Water Level 368.4'

Additional Water Wells In Edgemont Project Area

Well No.	Location
135	T 8 S, R 2 E, Sec. 1 bd
136	T 8 S, R 2 E, Sec. 5 bb
137	T 7 S, R 2 E, Sec. 17 bd
138	T 6 S, R 1 E, Sec. 18 a
139	T 41 N, R 60 W, Sec. 18 dd
140	T 9 S, R 3 E, Sec. 19 bc
141	T 10 S, R 3 E, Sec. 20 aa
142	T 7 S, R 2 E, Sec. 35 bd
143	T 8 S, R 1 E, Sec. 30 dc
200	T 7 S, R 2 E, Sec. 13 ca
201	T 7 S, R 2 E, Sec. 13 ca
202	T 7 S, R 2 E, Sec. 13 ca
203	T 7 S, R 2 E, Sec. 12 cd
204	T 7 S, R 2 E, Sec. 12 cb
205	T 7 S, R 2 E, Sec. 12 ac
206	T 7 S, R 2 E, Sec. 12 ac
207	T 7 S, R 2 E, Sec. 12 aa
208	T 7 S, R 2 E, Sec. 2 bc
209	T 7 S, R 2 E, Sec. 3 da
210	T 7 S, R 2 E, Sec. 2 bd
211	T 7 S, R 2 E, Sec. 12 ba
212	T 8 S, R 3 E, Sec. 8 db
213	T 7 S, R 3 E, Sec. 20 dc
214	T 7 S, R 3 E, Sec. 18 cd
215	T 6 S, R 2 E, Sec. 27 dd
216	T 6 S, R 2 E, Sec. 22 aa
144	T9S, R3E, Sec. 21
145	T8S, R2E, Sec 3 dc
146	T9S, R2E, Sec 21 bc

Additional Water Wells In Edgemont Project Area

No.	Owner	Use	Depth	Probable Aquifer	Remarks
135	Mike Ringer	D,S	360	Lakota	Drilled 1977 - Submersible Pump
136	Ed Dodson	D,S		Spring	Source Uncertain
137	USFS	S			Windmill
138	John Carlson	D	100	Fall River	Drilled 1977, flows, Jet Pump
139	Gerald Darrow	S	620	Lakota	Drilled 1978, flows 20 gpm
140	Ken Barker	D,S			
141	Howard Henderson	S		Spring	Source Uncertain
142	Jack Standen	D,S	280	Fall River	Submersible Pump
143	Jeff Schultz	D,S	1,640	Fall River	Drilled 1962, Submersible Pump @ 440
200	George Hey	D,S	108	Sundance	Water Level 52.7', Submersible Pump
201	George Hey	S	110	Sundance	Pump Jack
202	George Hey	S	200	Sundance	Water Level 16.7'
203	Donald Spencer	D,S	200	Sundance	Submersible Pump at 160
204	Donald Spencer	U	170	Sundance	
205	Mason Miller	U	108	Sundance	Water Level 24.5
206	Mason Miller	D,S	200	Sundance	Water Level 18.4, Jet Pump
207	Mason Miller	D,S			Submersible Pump, Pipeline
208	Mason Miller	S	179	Sundance	Pump Jack
209	Donald Spencer	U	247	Sundance	Water Level 145.2
210	George Hey	S	125	Sundance	Pump Jack
211	Donald Spencer	S	161	Sundance	Pump Jack - Water Level 8.14
212	Carl Reutter	S	2,204		Flows 1.5 gpm, old oil test
213	George Hey	S	100	Sundance	Submersible Pump, Water Level 34.1
214	George Hey	S	270	Sundance	Water Level 39.1
215	Claude Smith	S	900		Water Level 60.7, Submersible Pump, Pipeline
216	Claude Smith	U			Water Level 217.9
144		S,O			Water Level 368.4'

Additional Water Wells In Edgemont Project Area

Well No.	Location
135	T 8 S, R 2 E, Sec. 1 bd
136	T 8 S, R 2 E, Sec. 5 bb
137	T 7 S, R 2 E, Sec. 17 bd
138	T 6 S, R 1 E, Sec. 18 a
139	T 41 N, R 60 W, Sec. 18 dd
140	T 9 S, R 3 E, Sec. 19 bc
141	T 10 S, R 3 E, Sec. 20 aa
142	T 7 S, R 2 E, Sec. 35 bd
143	T 8 S, R 1 E, Sec. 30 dc
200	T 7 S, R 2 E, Sec. 13 ca
201	T 7 S, R 2 E, Sec. 13 ca
202	T 7 S, R 2 E, Sec. 13 ca
203	T 7 S, R 2 E, Sec. 12 cd
204	T 7 S, R 2 E, Sec. 12 cb
205	T 7 S, R 2 E, Sec. 12 ac
206	T 7 S, R 2 E, Sec. 12 ac
207	T 7 S, R 2 E, Sec. 12 aa
208	T 7 S, R 2 E, Sec. 2 bc
209	T 7 S, R 2 E, Sec. 3 da
210	T 7 S, R 2 E, Sec. 2 bd
211	T 7 S, R 2 E, Sec. 12 ba
212	T 8 S, R 3 E, Sec. 8 db
213	T 7 S, R 3 E, Sec. 20 dc
214	T 7 S, R 3 E, Sec. 18 cd
215	T 6 S, R 2 E, Sec. 27 dd
216	T 6 S, R 2 E, Sec. 22 aa
144	T9S, R3E, Sec. 21
145	T8S, R2E, Sec 3 dc
146	T9S, R2E, Sec 21 bc

#	S.	to Electricity	Dia.	Condition	Setting, Capacity, Age, etc.	Use	Requirement	
1	S	300 ft.	4"	25 yrs. - fair	none			
2	D.S.I.	300 ft.	5"	45 yrs. - poor	none			casing rusted out - flowing around casing
3	S	1/2 mile	4"	10 yrs.	none			oil test open hole from top of F. R.
4	S.I.	700 ft.	3"	10 yrs. - poor	none			oil test flowing around casing
5	S	2 miles	5"	10 yrs. - fair	none			oil test - open hole from top of FR
6	S	1 mile	12"	20 yrs.	none			
7 FR	D	on site	6"	20 yrs.	jet pump at 25 ft.			
7 LAK	S.I.	" "	$5\frac{1}{2}$"	40 yrs. - poor	none			
8 FR	D.I.	on site		45 yrs. - poor	jet pump in basement			
8 LAK	S.I.	on site	6"	45 poor	none			
9	S	1 mile	6"	10 yrs.	none			
10	S	2 miles		2 yrs. - good	pump jack			
11	S	1/2 mile	8"	10 yrs.	none			oil test
12	S	2000 ft.	$4\frac{1}{2}$"	10 yrs. - poor	none			open hole from top FR
13	D.S.I.	on site	5"	20 yrs. - fair	none			
14	S	1/2 mile	4"	poor	none			first pump test stopped flow - well not used since flow stopped
15	S	on site	4"	fair	cylinder type			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
16	S	on site	$4\frac{1}{2}$	1 yr. - good	no pump installed yet			
17	S	2 miles	UNK.		windmill			
18	D.S.I.	on site	4"	48 yrs.	pressure pump			
19	S	1 mile	6"	16 yrs. - fair	pump jack			
20	D.S.I.	on site	6"	51 yrs. - poor	shallow well jet pump			casing rusted out - was repaired
21	S	$1\frac{1}{2}$ mile	7"	65 yrs.	none			oil test
22	S	on site	3"	10 yrs. - good	cylinder type			
23	S	1 mile	6"		none			
24	D.S.	on site	3"		none			
25	S	2 miles	$4\frac{1}{2}$"		windmill			
26	S	1 mile	5"		windmill			
27	S	on site	12"		submersible pump			serues pipeline
28	S	1/2 mile	6"	poor	none			
29	S	1/2 mile	5"	poor	none			casing rusted out
30	D.I.	on site	6"	24 yrs.	deep well jet pump set @ 80 ft.			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
30	S	on site	6"	cleaned 1977 22 years	none			
31	D.S.I.	on site	5½"	28 yrs.	none			
32	D.S.I.	on site	6"		pump type unknown			
33	D.S.	on site	5"	32 yrs.	none			
34	S	1 mile	2½"		none			2 wells - one does not flow and is not used
35		2 miles	8	poor	windmill			
36	S	1½ mile	4"	poor	none			
37		2½ miles	5½	poor	cylinder type			
38	S	½ mile	4'	26 yrs.	none			
39	S	½ mile	5"	poor	windmill			
40	D.S.I.	on site	6"	8 yrs.	none			)piped together
40	D.S.I.	on site	6"	31 yrs. poor	none			)
41	D.S.I.	on site	6"		submersible			serues pipeline
42	D.S.I.	on site	5"	33 yrs. poor	none			casing rusted out and repaired
43	D	on site	4"	poor	submersible			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
44	S	1/2 mile	6"	20 yrs.	none			
45	S	on site	4"	8 yrs. poor	none			
46	D.S.	1/2 mile	6"	18 yrs. poor	none			oil test - leaking around casing
47	D.S.I.	on site	6"	18 yrs. fair	none			
48	S	on site	2½"	10 yr.	none			
49	S	1 mile	4"	3 yrs.	none			
50 N	S	2 miles	4"	40 yrs. poor	none			
50 S	S	2 miles	6"	5 yrs. poor	none			surface casing only ?
51	S	1 mile	10"	80 yrs. poor	none			repaired 1930's ?
52	S	1/2 mile	2½"		none			
53	S	1 mile	6"		windmill			
54	S	1500 ft.	6"		none			
55	S	2000 ft.	6"		none			
56	D.S.I.	on site	3"	10 yrs. poor	submersible			leaking around casing
57	S.I.	1/2 mile	4"		none			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
58	S	100 ft.	6"		none			
59	S	1500 ft.	4"	poor	none			
60	S	1 mile	UNK.		windmill			
61	U	3 miles	5"		pump jack			
62	S	$1\frac{1}{2}$ mile	6"	1 yr. good	none			well replaced 1977
63	S	2000 ft.	5"		none			
64	S	1/2 mile	$2\frac{1}{2}$"	poor	none			
65	U	1/2 mile	6"	poor	none			
66	S	Approx. $\frac{1}{2}$ mile	5"		none			
67	S	Approx. $\frac{1}{2}$ mile	5"	poor	none			
68	D	on site	4"		none			
68	S.I.	on site	4"		none			
69	S	400 ft.	6"	18 yrs.	none			
70	S	2000 ft.	4"	7 yrs. poor	none			open hole from top Fall River
71	D	on site	5"		pump type unknown			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
72	S.I.	on site	6"	32 yrs. poor	none			
73	D.S.I.	on site	5"	2 yrs. good	submersible			
74	S	1/2 mile	5"	30 yrs. poor	none			casing rusted out
75	S	Approx. 1 mile	5"		windmill			pumps dry
76	S	Approx. $1\frac{1}{2}$ mile	7"	18 yrs. poor	none			casing rusted out
77	S	Approx. $1\frac{1}{2}$ Mile	5"	poor	none			casing rusted out
78	D.S.	on site	5"		cylinder			
79	D.S.I.	on site	6"		submersible set at 250'			
80	S	Approx. 3000 ft.	6"		cylinder			
81	S	Approx. $1\frac{1}{2}$ mile	4"		none			
82	S	Approx. $1\frac{1}{2}$ mile	$4\frac{1}{2}$"		none			
83	S	Approx. 1 mile	6"		cylinder			
84	S	Approx. 1 mile	2"		none			
85	D	on site						
86	S	1/2 mile	4"	poor	cylinder			stopped flowing when well #66 flowing uncontrolled about 1970

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
87	U	3/4 mile	4"	poor	none			same as 86
88	S.U.	1500 ft.	8"	poor	none			was used with pump jack in 1977 - not used in 1978
88	S	on site	6"		pump type unknown probably submersible			serues pipeline
89	D.S.	on site	6"	good	submersible			serues pipeline
90	S.U.	on site	6"		none			oil test
91	S	1 mile	5"		windmill			
92	D.S.I.	on site	$4\frac{1}{2}$"		submersible			
93	D.S.I.	on site	2"		submersible			
93	S.U.	on site	6"		none			
94	S	on site	5"		none			
95	D.S.I.	on site	10"		submersible			serues pipeline
96	D.S.I.	on site	5"		none			
97	S	1 mile	4"	poor	none			cased to 200"
98	S	2 miles	10'	poor	none			oil test
99	D.S.I.	on site	4"		none			

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
100	S		8"		none			
101	D S	on site	7"		submersible			serues extensive pipeline
102	DSI	on site	5"	fair	none			
103	S	1 mile	4"		none			
104	S	1 mile	$4\frac{1}{2}$"		Jensen jack			
105	S	3 miles	4"		pump jack			
106	S	1/2 mile	4"		none			
107	DSI	on site	5"	poor	none			
108	DSI	on site	6"	poor	none			
109	DSI	on site	6"		submersible - set @ 90'			
110	SI	on site	$6\frac{1}{2}$"		submersible			
111	SU	200 ft.	4"		none			
112	S	1 mile	$4\frac{1}{2}$		windmill			
113	S	2 miles	UNK		windmill			
114	S U	3 miles	UNK		windmill			

D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
DSI	on site	$3\frac{1}{2}$"		jet pump			
U	on site	1"		none			
S.I.	on site	6"		submersible pump			
S	1500 ft.	$9\frac{1}{2}$	poor	none			oil test
S	on site	5"		submersible pump			
S	on site	2"		pump jack			
S	$1\frac{1}{2}$ mile	5"		none			
S	5 miles	7"		windmill			
S	$4\frac{1}{2}$ mile	6"		cylinder			
S	5 miles	4"		windmill			
S	$1\frac{1}{2}$ miles	6"	poor	none			casing rusted off
DST	on site	$6\frac{1}{2}$"		none			
S	2 miles	6"	poor	none			oil test - casing rusted off
S	$2\frac{1}{2}$ miles	2"	poor	none			oil test

Well #	D. S.	Distance to Electricity	Well Dia.	Age and Condition	Pump Information-Type Setting, Capacity, Age, etc.	Season of Use	Water Requirement	Remarks
130	U	on site	UNK		none			covered up by owner H_2S is not used
131	S	200 ft.	3"		none			
132	S.I.	on site	approx.5"		pump type unknown			
133	U	1500 ft.	6"		none			
134	S.U.	on site	1"		UNK			

WELL #	DEWEY TEST WELL	D-1 FR	D-1 Fu	D-1 LK	D-2 LK	D-3 FR	D-3 LK	D-4 FR	D-4 LK	D-5 LK	D-6 LK	D-7 FR
Hole Number	DWT-99	DWM-51	54	46	47	49	48	52	50	55	56	DXM-1
Date Drilled	10-17-81	7-21-81	9-04-81	7-07-81	7-09-81	7-16-81	7-14-81	7-23-81	7-20-81	9-09-81	9-11-81	7-30-81
Date Completed	10-17-81	8-14-81	9-14-81	8-13-81	8-14-81	8-18-81	8-18-81	8-17-81	8-17-81	9-15-81	9-15-81	7-30-81
Depth Cased	694	504	609	712	692	505	715	503	714	735	715	120
Depth Completed	801	580	620	800	800	590	800	580	780	835	810	120
X-Coord.	80798	80923	80982	80972	80710	80385	80416	81564	81618	81126	80004	76979
Y-Coord.	214898	215036	215035	214972	215068	215595	215658	215330	215281	214090	214495	219008
Collar Elev.	3736.2	3737.3	3741.1	3741.4	3728.5	3738.0	3744.3	3753.5	3751.4	3747.7	3723.3	3723.9
"r"		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SWL (12-3-81)	34.16	26.23	32.16	39.68	26.56	21.03	42.37	34.22	49.68	45.86	21.42	Surface

Coordinates (SKM Grid) and Elevations for Burdock Area Observation Wells

Well	Aquifer	Coordinates		Measuring Point Elevation	Height of Measuring Point Above Ground Level
Original Nine Wells					
B-1 FR	Kf	90,856 E	188,869 N	3622.07	- 1.0 ft.
B-2	K_l	90,808 E	188,859 N	3621.08	0
B-3 FR	K_f	93,532 E	190,992 N	3701.16	2.0 ft.
B-3	K_l	93,583 E	191.005 N	3701.63	1.6 ft.
B-4	K_l	95,531 E	190,551 N	3679.45	2.58 ft.
B-5	K_l	97,944 E	191,909 N	3731.04	1.9 ft.
B-6 FR	K_f	91,925 E	192,493 N	3642.64	0
B-6	K_l	91,874 E	192,472 N	3644.12	0
B-8	K_l	100,952 E	193,839 N	3788.58	2.0 ft.
Burdock Well	K_f,K_l	91,081 E	189,167 N	3624.16 = GL Elevation	
Four Additional Wells					
B-7 FR	K_f	93,303 E	190,402 N	3671.24	1.75 ft.
B-7	K_l	93,279 E	190,373 N	3671.1	2.08 ft.
B-9 FR	K_f	91,389 E	187,658 N	3605.42	3.0 ft.
B-9	K_l	91,389 E	187,658 N	3605.42	2.6 ft.
Seven Replacement Wells					
B-2 LAK	K_f	90,776 E	188,900 N	3621.11	1.3 ft.
B-2 FU	K_{lf}	90,767 E	188,841 N	3619.96	0
B-10 FR	K_f	91,221 E	189,275 N	3631.19	1.4 ft.
B-10 FU	K_{lf}	91,265 E	189,344 N	3630.31	1.6 ft.
B-10 LAK	K_l	91,206 E	189,317 N	3631.24	1.6 ft.
B-11 FR	K_f	90,805 E	189,721 N	3623.94	0
B-11 LAK	K_l	90,843 E	189,739 N	3624.82	1.0 ft.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
1	Peterson & Son Inc.	Stock	600	K 1	Flowing 1.1 gpm, stopped during test. Casing was cut off closer to ground & flow recovered to 1.3 gpm, 6 wks after test.
2	Peterson & Son Inc.	Domestic	640	K 1	Flowing est. 15 gpm.
3	Peterson & Son Inc.	Stock	Oil test		Flowing 3 gpm.
4.	Peterson & Son Inc.	Stock	Oil Test		Couldn't measure- broken out around casing. Also used by Glen Peterson for garden.
5.	Peterson & Son Inc.	Stock	Oil Test		Plugged at 850", possible Sundance flow. Flowing 6.6 gpm, slowed to 5 gpm during test
6.	Glen Peterson	Stock	280'	K f	SWL 11'2", Siphon Arrangement into tank.
7.	Glen Peterson " "	Domestic	500' 200"	K 1 K f	Flowing 4.25 gpm. Slowed to 3.6 during test SWL 12' 8"
8.	Leslie Coates " "	Domestic	500 240	K 1 K f	Flowing 4.2 gpm. Flow est. 1 gpm. Pumped to house.
9.	Leslie Coates	Stock	90 ?	K f	Flowing 2.5 gpm.
10	Leslie Coates	Stock	200	K 1	SWL 78' New well.
11	Leslie Coates	Stock	Oil test		Flowing 5 gpm.
12	Leslie Coates	Stock	730'	K 1	Flowing 0.6 gpm, slowed to < 0.1 gpm during test. Recovered to 0.3 gpm after 6 weeks.
13	Miles Spencer	Domestic	500	K 1	Flowing 2.5 gpm., slowed to 1.2 gpm during test, Recovered to 2.0 gpm after 6 weeks.
14.	Earl Darrow	Stock	470	K 1	Barely flowing. Stopped during test. SWL recovered to 1.0 ft.
15	Earl Darrow	Stock	280	K 1	Pump jack, couldn't measure accurately SWL approximately 24'
16	Earl Darrow	Stock	330	K 1	New well, SWL 157' 7"
17	H. P. Heck	Stock	156	K f	Windmill, couldn't measure
18	Dick Andersen	Domestic	527	K f	Flowing 7.5 gpm.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
19	Dick Andersen	Stock	740	K f	Pump jack, couldn't measure.
20	Edwin Andersen	Domestic	530	K f	Flowing 4.5 gpm.
21.	Tubbs Ranch	Stock	910	K f	Flowing 14 gpm.
22.	Coates, Andersen	Stock	800	K f	Pump jack, reported SWL 30'
23	Tubbs Ranch	Stock	600	K f	Flowing 0.8 gpm.
24	Tubbs Ranch	Domestic			Siphon arrangement, water level 23'
25	Tubbs Ranch	Stock			Windmill, couldn't measure, reported to barely flow.
26	Tubbs Ranch	Stock	350	K f	Windmill, couldn't measure, reported to barely flow.
27	Tubbs & Schultz	Stock	900	K l	Submersible pump to pipeline. SWL 15'
28	Tubbs Ranch	Stock	300	K f	Will flow 20 gpm. H2S
29	B. Childers	Stock			Wild well, flowing est. 35 gpm. H2S around casing.
30	Harold Dodson	Doméstic	120	K f	Barely flows, pumped to house.
	" "	Stock	120	K f	Flows 0.75 gpm
31	F. A. Heck	Domestic	104	K f	Flows 1.3 gpm.
32	Tony Bryan	Domestic	90	K f	Pumped to house, couldn't measure, flow est. ½ gpm.
33	H. P. Heck	Domestic	96	K f	Piped into house, flowing reported 1.25 gpm
34	Tony Bryan	Stock	330	K l	2 wells, one no flow & not used, one flows 1.5 gpm.
35	Tony Bryan	Stock	148	K l	Pumped well, not visited.
36	Tony Bryan	Stock	255	K l	Flowing 10 gpm .
37	Tony Bryan	Stock	145	K l	Pumped well, not visited
38	Lloyd Putnam	Stock	550	K l	Flowing 1.5 gpm.
39	Norris Darrow	Stock	700	K l	Windmill, reported SWL 15'
40	Norris Darrow	Domestic Domestic	660 700	K l K l	Two wells piped together, both flow, but couldn't measure

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
1	Robert Bakewell	Domestic			Flows 12 gpm.
2	Lloyd Putnam	Domestic	600	K l	Flows est. 25 gpm.
3	Preston Richardson	Domestic	350	K l	Submersible pump, couldn't measure, stopped flowing when old Triangle mine dewatered.
4	Harold Dodson	Stock	130	K f	Will flow est. 40 gpm.
5	Harold Dodson	Stock	190	K f	Flows 3.1 gpm. H_2S
6	Harold Dodson	Stock	Oil test	K f	Plugged at 140', but couldn't measure. Flowing around casing.
7	Harold Dodson	Stock	90	K f	SWL 10'
8	Norris Darrow	Stock	725	K l	Will flow est. 60 gpm.
9	Norris Darrow	Stock	600	K l	Flows 5 gpm.
50	Lloyd Putnam	Stock	609	K l	Flows 1.5 gpm., may be 2 wells piped together.
51	Burlington R.R.	Stock	550	K l	Flows 15.5 gpm., used by Leslie Coates.
52	Tony Bryan	Stock			Flows 2.8 gpm.
53	Tony Bryan	Stock			Windmill, couldn't measure.
54	Tony Bryan	Stock	90	K f	Flows 0.5 gpm.
55	Tony Bryan	Stock	92	K f	Flows 9 gpm.
56	Effie Gow	Domestic	300	K l	Broken out around casing, flowing
57	Effie Gow	Garden	270	K l	Couldn't measure, reported 100+ gpm. H_2S Used by Rev. Brown to irrigate garden.
58	F. A. Heck	Stock	100+	K f	Flows 4 gpm.
59	F. A. Heck	Stock	118	K f	Flows 2.8 gpm H_2S
60	F. A. Heck	Stock			Windmill, couldn't measure.
61	Earl Darrow	Stock	525	K l	Pumpjack, couldn't measure.
62	F. A. Heck	Stock			Couldn't measure, flowing est. 2 gpm into covered tank.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
63	Tony Bryan	Stock	100+	K f	Flows 1.5 gpm.
64	Leonard McElhaney	Stock			Flows 5 gpm H2S, may flow more through big valve.
65	" "	?			2 wells, one windmill, SWL 15', neither apparently used.
66	" "	Stock			Valve at well head shut off except for small line to H. Dodson's stock tank. Reported by Keene as flowing 270 gpm. in 1970
67	Leonard McElhaney	Stock			Flows 25 gpm. H2S.
68	" "	Domestic	230	K l	Piped to house, couldn't measure.
		Stock	230	K l	Flows 6 gpm.
69	H. P. Heck	Stock	130	K f	Flows 1.2 gpm.
70	H. P. Heck	Stock	375	K f, K l	Flows 1.0 gpm.
71	Ed Benton	Domestic		K f	Pumped to house, reported to barely flow
72	Ed Benton	Stock	212	K f	Yard water, Flows 13 gpm H2S
73	Ed Benton	Stock	560	K l	Flows 1.6 gpm.
74	Ed Benton	Stock	305	K f	Casing rusted out, flows, couldn't measure
75	Ed Benton	Stock	430	K f	Windmill, reported to pump dry
76	Ed Benton	Stock	420	K f	Broken out around casing, est. 7 or 8 gpm.
77	Darrell Heldman	Stock	400	K f	Broken out around casing, est. 5 gpm.
78	" "	"	410	K f	Pump jack, Keene reports SWL 30'
79	B. Childers	Domestic	337	K f	Couldn't measure, pump set at 250'
80	" "	Stock	650	K l	Pump jack, Keene reports SWL 100'
81	" "	"	440	Kl	Flows 4 gpm, sl. H2S
82	" "	"	200	K f	Flows 9 gpm., H2S
83	" "	"	270	K f	Pump jack, couldn't measure.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
84	Dick Miller	Stock	155	K f	Flows 0.25 gpm.
85	Tubbs Ranch	Domestic	415	K f	Pumped to house, Reported SWL 30'
86	Tubbs Ranch	Stock	360	K f	Pump jack, SWL reported 20'
87	Tubbs Ranch	Appears abandoned	380	K f	Plugged with wooden plug. Reported SWL 20'
88	Tubbs Ranch	Appears abandoned	320	K f	Two wells, one may be caved in, one SWL 10'
89	Porter & Benton	Pipeline	860	K 1	Submersible pump, runs extensive pipeline. SWL reported 5'
90	B. Childers	Stock	Oil test		SWL 1.0 '
91	Carl Reutter	Stock	150	K f	Windmill SWL 34'
92	Carl Reutter	Domestic	298	K f	Pumped to house, Keene reports SWL 132'
93	Bob Runge	Domestic	200	K 1	Two wells, couldn't measure, Keene reports SWL 80'
94	Bob Runge	Stock	200+	K 1	Flows 0.75 gpm.
95	Wayne Jackson	Pipeline	~~800~~ 860	K f	Barely flows, submersible pump to pipeline.
96	Billy Stearns	Domestic	560	K 1	Flows 4.8 gpm.
97	Billy Stearns	Stock		K 1	Uranium test cased to 200', hole reported to be caving below that & sealing off flow. Flows.
98	Billy Stearns	Stock	Oil test		Leaking around top of casing, flows est 2 g
99	Gerald Darrow	Domestic	420	K 1	Flows 2.2 gpm.
100	" "	Stock	530	K 1	Flows 150 gpm (by Hodson) apparently used to fill water trucks.
101	" "	Morresy Pipeline	665	K 1	Pipeline serves ranches west, submersible pump. Hodson reports flow 3 gpm.
102	Lloyd Darrow	Domestic	267	K 1	Will flow est. 100 gpm. Sells water
103	Lloyd Darrow	Stock	350	K 1	Flows 1.3 gpm.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
104	Lloyd Darrow	Stock		K l	Jensen jack, reported SWL 6'
105	Lloyd Darrow	Stock		K l	Not visited, reported SWL 8 to 10'
106	Lloyd Darrow	Stock			Flows 3.5 gpm.
107	Earl Darrow	Domestic	90	K f	Pumped into house, flow est. 1 gpm.
108	Chet Taylor	Domestic	90	K f	Taylor lives here part of time. Info reported by Earl Darrow. Flow rep. 1 gpm
109	Vivian Cook	Domestic	220	Kl	Reported SWL 22'
110	Vivian Cook	Stock	240	K l	Reported SWL 30'
111	Vivian Cook	Not used	100	K f	Owner plans to develop, reported SWL 5'
112	Miles Spencer	Stock	120	K f	Windmill, couldn't measure.
113	Miles Spencer	Stock			Back up well for Spencer pipeline.
114	No info				Forest Service.
115	Bud Hollenbeck	Domestic		K f	Flows 3 gpm.
116	Bud Hollenbeck			K f	Flows 2.75 gpm. At Dewey Post Office.
117	Bud Hollenbeck	Stock Garden			Submersible Pump. SWL 27'
118	Bud Hollenbeck	Stock	Oil test		Flowing out of casing at ground level
119	Bud Hollenbeck	Stock			Submersible pump, reported SWL 6'
120	Forest Service	Stock			Pumpjack, couldn't measure.
121	Bud Hollenbeck	Stock	430	K l	Will flow?? est. 100 gpm.
122	Bud Hollenbeck	Stock			Windmill, couldn't measure.
123	Bud Hollenbeck	Stock			Pump jack, couldn't measure.
124	Bud Hollenbeck	Stock			Not visited, reported windmill.
125	Bud Hollenbeck	Stock			Casing rusted off. Flows at ground level.
126	Francis Carr	Domestic		K l	Flows, couldn't measure.
127	Francis Carr	Stock	Oil test	K l	Casing rusted off, flows at ground level.

Water Wells in Edgemont Project Area

Map #	Owner	Use	Depth	Probable Aquifer	Remarks
128	Francis Carr	Stock	Oil test	K l	Couldn't measure, est. 5 gpm.
129	There are several old oil tests in this area. The ones reported as being used are reported above. There appears to be some flow from some of these but the casings seem to be bad and all there is now are some marshy areas. Some use of water for stock from these is possible.				
130	Dick Miller	Domestic	155	K f	?
131	Dick Miller	Stock	110	K f	Flows 0.8 gpm
132	Dick Miller	Stock	300	K l	Flows est. 2gpm
133	Dick Miller	Stock	300	K l	Not contacted. Information from Keene
134	Roberts & Daniels	Stock	860		

WATER WELLS IN EDGEMONT PROJECT AREA

Well No.	Location			
1	SE/4 SE/4	Sec.	9	T7S,R1E
2	SE/4 SE/4	Sec.	16	T7S,R1E
3	SW/4 NW/4	Sec.	22	T7S,R1E
4	SE/4 SE/4	Sec.	15	T7S,R1E
5	NE/4 NW/4	Sec.	14	T7S,R1E
6	NE/4 SE/4	Sec.	14	T7S,R1E
7	NW/4 NW/4	Sec.	23	T7S,R1E
8	NW/4 SE/4	Sec.	23	T7S,R1E
9	NE/4 NE/4	Sec.	23	T7S,R1E
10	NE/4 NE/4	Sec.	13	T7S,R1E
11	NW/4 SW/4	Sec.	24	T7S,R1E
12	SE/4 SE/4	Sec.	4	T7S,R1E
13	NW/4 NW/4	Sec.	3	T7S,R1E
14	NW/4 SW/4	Sec.	2	T7S,R1E
15	NW/4 NW/4	Sec.	2	T7S,R1E
16	NW/4 SE/4	Sec.	1	T7S,R1E
17	SE/4 NW/4	Sec.	12	T7S,R1E
18	NW/4 SW/4	Sec.	9	T7S,R1E
19	NW/4 NW/4	Sec.	18	T7S,R1E
20	NW/4 SW/4	Sec.	17	T7S,R1E
21	SW/4 NW/4	Sec.	19	T7S,R1E
22	NE/4 SW/4	Sec.	27	T40N, R60W
23	NW/4 NW/4	Sec.	29	T7S, R1E
24	NE/4 NW/4	Sec.	28	T7S,R1E
25	SE/4 NW/4	Sec.	27	T7S,R1E
26	SW/4 NE/4	Sec.	35	T7S,R1E
27	SE/4 SE/4	Sec.	33	T7S,R1E
28	NE/4 SW/4	Sec.	22	T8S,R2E
29	NE/4 NW/4	Sec.	16	T8S,R2E
30	SE/4 SE/4	Sec.	31	T7S,R2E
31	SW/4 NW/4	Sec.	31	T7S,R2E

Well No.	Location			
32	SW/4 SW/4	Sec. 30	T7S,R2E
33	NW/4 SE/4	Sec. 25	T7S,R1E
34	NW/4 NW/4	Sec. 30	T7S,R2E
35	SW/4 NE/4	Sec. 19	T7S,R2E
36	NW/4 NE/4	Sec. 30	T7S,R2E
37	NW/4 SW/4	Sec. 18	T7S,R2E
38	SW/4 NW/4	Sec. 33	T6S,R1E
39	NE/4 NE/4	Sec. 29	T6S,R1E
40	NW/4 SW/4	Sec. 30	T6S,R1E
41	SW/4 NW/4	Sec. 31	T6S,R1E
42	SW/4 NE/4	Sec. 5	T7S,R1E
43	SE/4 SW/4	Sec. 34	T6S,R1E
44	NW/4 SE/4	Sec. 31	T7S,R2E
45	NW/4 NW/4	Sec. 5	T8S,R2E
46	SW/4 NE/4	Sec. 31	T7S,R2E
47	SW/4 SW/4	Sec. 32	T7S,R2E
48	SE/4 NW/4	Sec. 19	T6S,R1E
49	SW/4 SW/4	Sec. 29	T6S,R1E
50	SW/4 SW/4	Sec. 28	T41N,R60W
51	SW/4 NE/4	Sec. 9	T7S,R1E
52	NE/ SE/4	Sec. 30	T7S,R2E
53	SW/4 NE/4	Sec. 30	T7S,R2E
54	NE/4 SE/4	Sec. 25	T7S,R1E
55	NW/4 NE/4	Sec. 36	T7S,R1E
56	SE/4 SE/4	Sec. 32	T7S,R2E
57	NE/4 SE/4	Sec. 5	T8S,R2E
58	NW/4 NE/4	Sec. 31	T7S,R1E
59	NE/4 NW/4	Sec. 5	T8S,R2E
60	NE/4 SW/4	Sec. 33	T7S,R2E
61	NW/4 SE/4	Sec. 11	T7S,R1E
62	SW/4 SW/4	Sec. 25	T7S,R1E
63	SW/4 NW/4	Sec. 36	T7S,R1E

Continued - Page 3

Well No.	Location
64	SW/4 NE/4 Sec. 9 T8S,R2E
65	NW/4 NE/4 Sec. 9 T8S,R2E
66	NE/4 NW/4 Sec. 8 T8S,R2E
67	SE/4 NW/4 Sec. 8 T8S,R2E
68	NE/4 NE/4 Sec. 8 T8S,R2E
69	SW/4 SE/4 Sec. 25 T7S,R1E
70	SE/4 SW/4 Sec. 25 T7S,R1E
71	NW/4 SE/4 Sec. 6 T8S,R2E
72	NW/4 SE/4 Sec. 6 T8S,R2E
73	NE/4 SW/4 Sec. 6 T8S,R2E
74	NE/4 SW/4 Sec. 6 T8S,R2E
75	SW/4 SW/4 Sec. 17 T8S,R2E
76	SE/4 NW/4 Sec. 17 T8S,R2E
77	NW/4 NE/4 Sec. 17 T8S,R2E
78	NE/4 SE/4 Sec. 20 T8S,R2E
79	NE/4 SE/4 Sec. 27 T8S,R2E
80	SW/4 NW/4 Sec. 35 T8S,R2E
81	SW/4 NW/4 Sec. 14 T8S,R2E
82	SW/4 SW/4 Sec. 10 T8S,R2E
83	NE/4 SW/4 Sec. 14 T8S,R2E
84	SW/4 NW/4 Sec. 10 T8S,R2E
85	NE/4 SE/4 Sec. 28 T8S,R2E
86	NW/4 SW/4 Sec. 6 T8S,R2E
87	NW/4 NE/4 Sec. 1 T8S,R1E
88	NE/4 SE/4 Sec. 35 T7S,R1E
88	SE/4 SE/4 Sec. 35 T7S,R1E
89	NW/4 NE/4 Sec. 11 T8S,R1E
90	SE/4 NW/4 Sec. 23 T8S,R2E
91	SE/4 NW/4 Sec. 12 T8S,R2E
92	SE/4 SW/4 Sec. 23 T8S,R2E
93	SE/4 NE/4 Sec. 2 T8S,R2E
94	SW/4 SW/4 Sec. 34 T7S,R2E

Well No.	Location			
95	SE/4	Sec. 25	T40N,R61W
96	SW/4 SW/4	Sec. 22	T41N,R60W
97	Not Located		
98	SW/4 NW/4	Sec. 17	T41N,R60W
99	NE/4 NE/4	Sec. 17	T41N,R60W
100	NW/4 SE/4	Sec. 7	T41N,R60W
101	SW/4 NE/4	Sec. 1	T41N,R61W
102	SW/4 NE/4	Sec. 18	T6S,R1E
103	NW/4 NW/4	Sec. 10	T41N,R60W
104	NW/4 SW/4	Sec. 10	T41N,R60W
105	SE/4 NW/4	Sec. 9	T41N,R60W
106	NE/4 NE/4	Sec. 18	T6S,R1E
107	SE/4 NE/4	Sec. 18	T6S,R1E
108	SE/4 NE/4	Sec. 18	T6S,R1E
109	NE/4 NW/4	Sec. 17	T6S,R1E
110	NE/4 NE/4	Sec. 17	T6S,R1E
111	NW/4 NE/4	Sec. 17	T6S,R1E
112	SE/4	Sec. 16	T6S,R1E
113	NE/4 SW/4	Sec. 6	T7S,R2E
114	NE/4 SW/4	Sec. 7	T7S,R2E
115	SE/4 NE/4	Sec. 18	T6S,R1E
116	SE/4 NE/4	Sec. 18	T6S,R1E
117	SW/4 SE/4	Sec. 8	T6S,R1E
118	NE/4 SE/4	Sec. 7	T6S,R1E
119	NW/4 NW/4	Sec. 8	T6S,R1E
120	NW/4 SW/4	Sec. 5	T6S,R1E
121	SW/4 SW/4	Sec. 31	T5S,R1E
122	NE/4 NW/4	Sec. 30	T5S,R1E
123	NE/4 NW/4	Sec. 21	T42N,R60W
124	NW/4 SW/4	Sec. 18	T5S,R1E
125	SW/4 SW/4	Sec. 6	T6S,R1E

Well No.	Location
126	SE/4 SW/4 Sec. 16 T41N,R60W
127	SW/4 NE/4 Sec. 7 T41N,R60W
128	NW/4 SE/4 Sec. 1 T41N,R61W
129	Sec. 7 Sec. 5 T41N,R60W
130	
131	NW/4 SE/4 Sec. 4 T8S,R2E
132	NW/4 SE/4 Sec. 4 T8S,R2E
133	
134	SE/4 NW/4 Sec. 29 T40N,R60W

GROUND WATER RESOURCES IN FALL RIVER COUNTY

These wells, located in Fall River County, S. D., were not visited. Information is from "Ground Water Resources of the western half of Fall River County, S.D." by Keene, and from Silver King Mines, Inc. files.

LOCATION	OWNER	DEPTH	REMARKS
T7S, R2E, 35dd	Jack Standen	300 KL	SWL 200
T8S, R1E, 30dc	Schultz & Manke	1640 K L	SWL 240
T8S, R2E, 24ca	M. F. Childers	300 K f	
24cb	M. F. Childers		
36ad	V. Childers	320 K L	SWL 60
36ad	Brian Childers	172 K f	SWL 10
36cc	M. Fritz	138 K f	
36da	P. Koller	263 K f	SWL 15
36da	E. Chord	270 K f	
T8S, R3E, 4cb	Ed Stevens	175 K f	SWL 60
6db	Bob Runge	200 K f	
11bd	J. McKnight	150 K L	SWL 140
14ac	J. McKnight	140 K f	SWL 130
14bb	J. McKnight	K f Spring	
21dd	C. V. Gull	550 K L	
24ba	B. Miller	85 K L	SWL 30
25bd	C. V. Gull	50 K L	SWL 21
25cd	C. V. Gull	200 K L	SWL 50

GROUND WATER RESOURCES IN FALL RIVER COUNTY

Location	OWNER	DEPTH	REMARKS
T8S, R3E, scc29bb	John Curl	85 K f	SWL 30'
34cc	J. Koller	350 K L	SWL 45'
35bb	C. V. Gull	118 K f	SWL 91'
T8S, R4E, 6ac	J. Murdock	60 K f	Flows 1 gpm.
24ab	Ball Bros.	K f spring	
35ba	C. McClure	K f spring	
35bd	C. McClure	56 K L	SWL 54'
35bd	C. McClure	87 K L	SWL 80'
35cd	C. McClure	120 K L	SWL115'
T9S, R1E, 20dd	Pfister & Danks	2010 Kf, K L	
T9S, R2E, 1bc	D. DuToit	550 K L	SWL 25'
4cd	O. Eberle	860 K f	SWL 360'
21bb	R. Porter	1228 K L	SWL 250'
T9S, R3E, 3bd	J. Koller	250 K L	SWL 40'
9ac	P. Erschen	400 K f	
15ac	M. Helsel	180 K f	SWL 130' ??
24bb	M. Helsel	130 K L	SWL 110'
25dc	M. Helsel	220 K f, K L	SWL 165' ?
26	M. Helsel	840 K f	
33dd	R. Heppner	1020 K f	

GROUND WATER RESOURCES IN FALL RIVER COUNTY

LOCATION	OWNER	DEPTH	REMARKS
T9S, R4E, 9cd	B. Cox	161 K L	SWL 20'
16cd	Gene Miller	150 K f	SWL 20'
13db	A. Landers	85 K f	SWL 40'
13db	A. Landers	400 K L	SWL 55'
13da	A. Landers	60 K f	
14bc	Ball Bros.	120 K f	SWL 35'
15ac	Ball Bros.	120 K f	SWL 40'
17da	Ball Bros.	160 K L	SWL 60'
19cc	A. Landers	255 K L	
19cd	J. Manke	320 K L	SWL 250'
20ca	J. Manke	216 K L	SWL 176'
21cd	J. Manke	90 K f	SWL 67'
28bc	J. Manke	105 K f	Flows
30db	J. Manke	233 K L	SWL 75'
T10S, R3E,15ba	H. Henderson	1250 K f	SWL 300'

Additional Water Wells In Edgemont Project Area

No.	Owner	Use	Depth	Probable Aquifer	Remarks
135	Mike Ringer	D,S	360	Lakota	Drilled 1977 - Submersible Pump
136	Ed Dodson	D,S		Spring	Source Uncertain
137	USFS	S			Windmill
138	John Carlson	D	100	Fall River	Drilled 1977, flows, Jet Pump
139	Gerald Darrow	S	620	Lakota	Drilled 1978, flows 20 gpm
140	Ken Barker	D,S			
141	Howard Henderson	S		Spring	Source Uncertain
142	Jack Standen	D,S	280	Fall River	Submersible Pump
143	Jeff Schultz	D,S	1,640	Fall River	Drilled 1962, Submersible Pump @ 440
200	George Hey	D,S	108	Sundance	Water Level 52.7', Submersible Pump
201	George Hey	S	110	Sundance	Pump Jack
202	George Hey	S	200	Sundance	Water Level 16.7'
203	Donald Spencer	D,S	200	Sundance	Submersible Pump at 160
204	Donald Spencer	U	170	Sundance	
205	Mason Miller	U	108	Sundance	Water Level 24.5
206	Mason Miller	D,S	200	Sundance	Water Level 18.4, Jet Pump
207	Mason Miller	D,S			Submersible Pump, Pipeline
208	Mason Miller	S	179	Sundance	Pump Jack
209	Donald Spencer	U	247	Sundance	Water Level 145.2
210	George Hey	S	125	Sundance	Pump Jack
211	Donald Spencer	S	161	Sundance	Pump Jack - Water Level 8.14
212	Carl Reutter	S	2,204		Flows 1.5 gpm, old oil test
213	George Hey	S	100	Sundance	Submersible Pump, Water Level 34.1
214	George Hey	S	270	Sundance	Water Level 39.1
215	Claude Smith	S	900		Water Level 60.7, Submersible Pump, Pipeline
216	Claude Smith	U			Water Level 217.9
144		S,O			Water Level 368.4'

Additional Water Wells In Edgemont Project Area

Well No.	Location
135	T 8 S, R 2 E, Sec. 1 bd
136	T 8 S, R 2 E, Sec. 5 bb
137	T 7 S, R 2 E, Sec. 17 bd
138	T 6 S, R 1 E, Sec. 18 a
139	T 41 N, R 60 W, Sec. 18 dd
140	T 9 S, R 3 E, Sec. 19 bc
141	T 10 S, R 3 E, Sec. 20 aa
142	T 7 S, R 2 E, Sec. 35 bd
143	T 8 S, R 1 E, Sec. 30 dc
200	T 7 S, R 2 E, Sec. 13 ca
201	T 7 S, R 2 E, Sec. 13 ca
202	T 7 S, R 2 E, Sec. 13 ca
203	T 7 S, R 2 E, Sec. 12 cd
204	T 7 S, R 2 E, Sec. 12 cb
205	T 7 S, R 2 E, Sec. 12 ac
206	T 7 S, R 2 E, Sec. 12 ac
207	T 7 S, R 2 E, Sec. 12 aa
208	T 7 S, R 2 E, Sec. 2 bc
209	T 7 S, R 2 E, Sec. 3 da
210	T 7 S, R 2 E, Sec. 2 bd
211	T 7 S, R 2 E, Sec. 12 ba
212	T 8 S, R 3 E, Sec. 8 db
213	T 7 S, R 3 E, Sec. 20 dc
214	T 7 S, R 3 E, Sec. 18 cd
215	T 6 S, R 2 E, Sec. 27 dd
216	T 6 S, R 2 E, Sec. 22 aa
144	T9S, R3E, Sec. 21
145	T8S, R2E, Sec 3 dc
146	T9S, R2E, Sec 21 bc

Powertech (USA) Inc.

APPENDIX 5.2-C

GROUNDWATER

QUALITY DATA

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #2				
Analyte	9/26/2007 12:46	11/12/2007 9:25	2/12/2008 10:21	5/30/2008 15:21
A/C Balance (± 5) (%)	-2.46	0.663	-3.82	3.25
Alkalinity-Total as CaCO3 (mg/L)	214	208	208	212
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.4	0.4	0.3
Anions (meq/L)	16.7	16.5	17.8	16.6
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	261	254	254	258
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1
Boron-Total (mg/L)			<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	48.5	51.7	54	57.8
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	15.9	16.7	16.5	17.7
Chloride (mg/L)	10	11	11	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1570	1500	1580	1670
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.2	0.2	0.3	0.3
Gross Alpha-Dissolved (pCi/L)	1.4	8.7	6.7	8.2
Gross Beta-Dissolved (pCi/L)	9.3	12.4	22.1	10.3
Gross Gamma-Dissolved (pCi/L)	<20	260	<20	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			1.48	1.54
Lead 210-Dissolved (pCi/L)	<1	<1	<1	3.1
Lead 210-Suspended (pCi/L)	<1	<1	<1	1.4
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	15.8	16.6	17.6	19
Manganese-Dissolved (mg/L)	0.08	0.08	0.09	0.08
Manganese-Total (mg/L)			0.09	0.09
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #2				
Analyte	9/26/2007 12:46	11/12/2007 9:25	2/12/2008 10:21	5/30/2008 15:21
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		140	190	190
pH	7.91	7.85	7.93	7.92
Polonium 210-Dissolved (pCi/L)	<1	2	2.1	0.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	11.5	11.4	11.5	11
Radium 226-Dissolved (pCi/L)	<0.2	1.3	1.1	2.1
Radium 226-Suspended (pCi/L)	2.2	<0.2	<0.2	0.2
Radium 226-Total (pCi/L)	2.2			
Radon 222-Total (pCi/L)		674	792	727
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8	8.1	8.7	4.3
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		8.8	8.3	8.7
Sodium-Dissolved (mg/L)	273	286	276	297
Solids-Total Dissolved Calculated (mg/L)	1070	1090	1160	1110
Solids-Total Dissolved TDS @ 180 C (mg/L)	1100	1100	1100	1100
Strontium-Total (mg.L)			1.7	1.8
Sulfate (mg/L)	583	577	639	579
TDS Balance (0.80 - 1.20) (dec.%)	1	0.97	0.94	0.96
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0004		<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #2								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.59	3.18	-2.8	-0.90	1.31	-3.82	3.25	4
Alkalinity-Total as CaCO3 (mg/L)	210.5	3	208	210	212.5	208	214	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.29	0.17	0.24	0.35	0.4	0.05	0.4	4
Anions (meq/L)	16.9	0.6	16.6	16.65	17.0	16.5	17.8	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.0025	0.002	0.00175	0.0025	0.00325	0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	2
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	256.8	3.4	254	256	258.8	254	261	4
Boron-Dissolved (mg/L)	0.063	0.025	0.05	0.05	0.063	0.05	0.1	4
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.003	0.00125	0.0025	0.0025	0.003	0.0025	0.005	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	2
Calcium-Dissolved (mg/L)	53	3.9	50.9	52.9	55.0	48.5	57.8	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cations (meq/L)	16.7	0.75	16.35	16.6	16.95	15.9	17.7	4
Chloride (mg/L)	10.25	0.96	9.75	10.5	11	9	11	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1580	69.8	1552.5	1575	1602.5	1500	1670	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	2
Fluoride (mg/L)	0.25	0.06	0.2	0.25	0.3	0.2	0.3	4
Gross Alpha-Dissolved (pCi/L)	6.3	3.3	5.4	7.5	8.3	1.4	8.7	4
Gross Beta-Dissolved (pCi/L)	13.5	5.9	10.1	11.4	14.8	9.3	22.1	4
Gross Gamma-Dissolved (pCi/L)	93	144	10	10	135	10	260	3
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	1.51	0.04	1.50	1.51	1.53	1.48	1.54	2
Lead 210-Dissolved (pCi/L)	1.15	1.3	0.5	0.5	1.15	0.5	3.1	4
Lead 210-Suspended (pCi/L)	0.725	0.45	0.5	0.5	0.725	0.5	1.4	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Lead-Dissolved (mg/L)	0.0066	0.0123	0.0005	0.0005	0.0066	0.0005	0.025	4
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	2
Magnesium-Dissolved (mg/L)	17.25	1.4	16.4	17.1	18.0	15.8	19	4
Manganese-Dissolved (mg/L)	0.0825	0.005	0.08	0.08	0.0825	0.08	0.09	4
Manganese-Total (mg/L)	0.09		0.09	0.09	0.09	0.09	0.09	2
Mercury-Dissolved (mg/L)	0.0004	0.0002	0.0004	0.0005	0.0005	0.0001	0.0005	4
Mercury-Total (mg/L)	0.00039	0.00023	0.00039	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	173.3	28.9	165	190	190	140	190	3
pH	7.90	0.04	7.90	7.92	7.92	7.85	7.93	4
Polonium 210-Dissolved (pCi/L)	1.18	1.02	0.4	1.25	2.03	0.1	2.1	4
Polonium 210-Suspended (pCi/L)	0.5		0.5	0.5	0.5	0.5	0.5	3
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.35	0.24	11.3	11.45	11.5	11	11.5	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #2								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Radium 226-Dissolved (pCi/L)	1.15	0.82	0.85	1.2	1.5	0.1	2.1	4
Radium 226-Suspended (pCi/L)	0.65	1.03	0.1	0.15	0.7	0.1	2.2	4
Radium 226-Total (pCi/L)	2.2			2.2		2.2	2.2	1
Radon 222-Total (pCi/L)	731	59.1	700.5	727	759.5	674	792	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	7.28	2.01	7.08	8.05	8.25	4.30	8.70	4
Silver-Dissolved (mg/L)	0.0031	0.0013	0.0025	0.0025	0.003125	0.0025	0.005	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	2
Sodium Adsorption Ratio (SAR) (meq/L)	8.6	0.26	8.5	8.7	8.75	8.3	8.8	3
Sodium-Dissolved (mg/L)	283	10.9	275.3	281	288.8	273	297	4
Solids-Total Dissolved Calculated (mg/L)	1107.5	38.6	1085	1100	1122.5	1070	1160	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1100		1100	1100	1100	1100	1100	4
Strontium-Total (mg.L)	1.75	0.07	1.73	1.75	1.78	1.7	1.8	2
Sulfate (mg/L)	594.5	29.8	578.5	581	597	577	639	4
TDS Balance (0.80 - 1.20) (dec.%)	0.97	0.025	0.96	0.97	0.98	0.94	1	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1	1.7E-17	0.1	0.1	0.1	0.1	0.1	3
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.002	0.001	0.002	0.0025	0.0025	0.0005	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00019	0.00008	0.00015	0.00015	0.0001875	0.00015	0.0003	4
Uranium-Total (mg/L)	0.0002	0.0001	0.00015	0.00015	0.000275	0.00015	0.0004	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	2

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Groundwater Quality Data

Well #7				
Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45
A/C Balance (± 5) (%)		-3.73	1.13	-2.5
Actinium 228-Dissolved (pCi/L)	<20			
Alkalinity-Total as CaCO3 (mg/L)	170	176	170	170
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20			
Ammonia (mg/L)	0.4	0.3	0.4	0.3
Anions (meq/L)		14.1	15.6	15.9
Antimony-Total (mg/L)				<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001
Barium 133-Dissolved (pCi/L)	<20			
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1
Beryllium-Total (mg/L)				<0.001
Bicarbonate as HCO3 (mg/L)	210	215	207	207
Bismuth 212-Dissolved (pCi/L)	<20			
Bismuth 214-Dissolved (pCi/L)	300			
Bismuth precision (±) (pCi/L)	18			
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005
Calcium-Dissolved (mg/L)	37	30	36	32.9
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)		13	15.9	15.1
Cesium 134-Dissolved (pCi/L)	<20			
Cesium 137-Dissolved (pCi/L)	<20			
Chloride (mg/L)	13	12	12	11
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05
Cobalt 60-Dissolved (pCi/L)	<20			
Conductivity @ 25 C (umhos/cm)	1530	1490	1440	1600
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01
Fluoride (mg/L)	0.37	0.3	0.4	0.3
Gross Alpha precision (±) (pCi/L)	0.8			
Gross Alpha-Dissolved (pCi/L)	17	4.4	7.2	15.5
Gross Beta precision (±) (pCi/L)	1.6			
Gross Beta-Dissolved (pCi/L)	16	5	14.9	10.1
Gross Gamma-Dissolved (pCi/L)	<20	1200	130	77
Iodine 125-Dissolved (pCi/L)	<20			
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.41
Lead 210-Dissolved (pCi/L)		<1	<1	24
Lead 210-Suspended (pCi/L)		<1	<1	<1

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Groundwater Quality Data

Well #7				
Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45
Lead 210-Total (pCi/L)		<1		
Lead 212-Dissolved (pCi/L)	<20			
Lead 214 precision (±) (pCi/L)	30			
Lead 214-Dissolved (pCi/L)	350			
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001
Magnesium-Dissolved (mg/L)	16	11.5	15.3	14
Manganese 54-Dissolved (pCi/L)	<20			
Manganese-Dissolved (mg/L)	0.03	0.03	0.03	0.03
Manganese-Total (mg/L)				0.03
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5			
Oxidation-Reduction Potential (mV)			210	180
pH	8.08	8.13	8.05	8.14
Polonium 210-Dissolved (pCi/L)		<1	2.1	<1
Polonium 210-Suspended (pCi/L)		<1	<1	<1
Polonium 210-Total (pCi/L)		<1		
Potassium 40-Dissolved (pCi/L)	<20			
Potassium-Dissolved (mg/L)	10	11	11.1	10.8
Radium 223-Dissolved (pCi/L)	<20			
Radium 224-Dissolved (pCi/L)	<20			
Radium 226 precision (±) (pCi/L)	0.6			
Radium 226-Dissolved (pCi/L)	2.6	0.6	1.1	0.7
Radium 226-Suspended (pCi/L)		<0.2	<0.2	<0.9
Radium 226-Total (pCi/L)		<0.2		
Radium 228-Dissolved (pCi/L)	<1			
Radon 222-Total (pCi/L)			206	242
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001
Selenium-Total (mg/L)				<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.5	7.8	7.5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			10	10
Sodium-Dissolved (mg/L)	270	237	289	276
Solids-Total Dissolved Calculated (mg/L)		896	1040	1050
Solids-Total Dissolved TDS @ 180 C (mg/L)	1000	1000	1000	990

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Groundwater Quality Data

Well #7				
Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45
Strontium-Total (mg.L)				1
Sulfate (mg/L)	546	586	567	583
TDS Balance (0.80 - 1.20) (dec.%)		1.16	0.98	0.94
Thallium 208-Dissolved (pCi/L)	<20			
Thallium-Total (mg/L)				<0.001
Thorium 228-Dissolved (pCi/L)	<20			
Thorium 230-Dissolved (pCi/L)		<0.2	<0.2	<0.2
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.2
Thorium 230-Total (pCi/L)		<0.2		
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20			
Uranium 238-Dissolved (pCi/L)	<20			
Uranium-Dissolved (mg/L)	<0.001	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	48			
Zinc 65-Dissolved (pCi/L)	<20			
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)				<0.01

POWERTECH (USA) INC.

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Groundwater Quality Data

Well #7								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.7525	5.321243	-3.4225	-0.685	6.365	-3.73	8.11	4
Alkalinity-Total as CaCO3 (mg/L)	171.5	3	170	170	174.5	170	176	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.325	0.05	0.3	0.3	0.375	0.3	0.4	4
Anions (meq/L)	15	0.883176	14.175	15	15.825	14.1	15.9	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	209	4	207	207	213	207	215	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	35.25	5.182342	30.725	34.45	40.575	30	42.1	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	15.25	1.690168	13.525	15.5	16.725	13	17	4
Chloride (mg/L)	11.5	0.57735	11	11.5	12	11	12	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1545	96.78154	1452.5	1545	1637.5	1440	1650	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	7.6	5.516641	3.575	5.8	13.425	3.3	15.5	4
Gross Beta-Dissolved (pCi/L)	9.9	4.047221	6.15	9.85	13.7	5	14.9	4
Gross Gamma-Dissolved (pCi/L)	351.75	568.0131	19.25	103.5	932.5		1200	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.41			0.41		0.41	0.41	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	6.375	11.75	0.5	0.5	18.125	0.5	24	4
Lead 210-Suspended (pCi/L)	-1.475	3.95	-5.425	0.5	0.5	-7.4	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	14.75	2.788668	12.125	14.65	17.475	11.5	18.2	4
Manganese-Dissolved (mg/L)	0.03		0.03	0.03	0.03	0.03	0.03	4
Manganese-Total (mg/L)	0.03			0.03		0.03	0.03	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	200	17.32051	180	210	210	180	210	3
pH	8.1225	0.051235	8.07	8.135	8.1625	8.05	8.17	4

Powertech (USA) Inc.

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Groundwater Quality Data

Well #7								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	0.775	0.914239	0.125	0.5	1.7		2.1	4
Polonium 210-Suspended (pCi/L)	0.35	0.3	0.05	0.5	0.5	-0.1	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	10.975	0.125831	10.85	11	11.075	10.8	11.1	4
Radium 226-Dissolved (pCi/L)	0.825	0.221736	0.625	0.8	1.05	0.6	1.1	4
Radium 226-Suspended (pCi/L)	0.0875	0.306526	-0.2	0.1	0.3625	-0.3	0.45	4
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	299.6667	132.2888	206	242	451	206	451	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.725	1.755705	4.95	7.5	7.725	4.1	7.8	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	275.5	27.47726	246.75	282.5	297.25	237	300	4
Sodium Adsorption Ratio (SAR) (meq/L)	9.9	0.173205	9.7	10	10	9.7	10	3
Solids-Total Dissolved Calculated (mg/L)	999	70.73896	924.5	1025	1047.5	896	1050	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	987.5	18.92969	967.5	995	1000	960	1000	4
Strontium-Total (mg.L)	1.05	0.070711		1.05		1	1.1	2
Sulfate (mg/L)	562.5	33.39162	527.25	575	585.25	514	586	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0075	0.103078	0.9425	0.965	1.115	0.94	1.16	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.15	0.057735	0.1	0.15	0.2	0.1	0.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015			0.00015		0.00015	0.00015	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

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Groundwater Quality Data

Well #8					
Analyte	9/26/2007 14:33	11/27/2007 16:30	11/27/2007 16:40	2/5/2008 10:20	5/29/2008 11:41
A/C Balance (± 5) (%)	-2.44	-3.23	-4.83	5.03	5.33
Alkalinity-Total as CaCO3 (mg/L)	168	178	156	166	164
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.2	0.3	0.3	0.2
Anions (meq/L)	15	14.8	15.4	13.1	14.3
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)				<0.001	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	205	217	190	202	200
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	48.5	56.4	55.1	52.6	58.9
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	14.3	13.9	13.9	14.5	15.9
Chloride (mg/L)	13	12	12	12	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1420	1420	1420	1430	1560
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4	0.5	0.4
Gross Alpha-Dissolved (pCi/L)	5	8.7	9	5.4	3.2
Gross Beta-Dissolved (pCi/L)	15.9	25	29.1	21	16.2
Gross Gamma-Dissolved (pCi/L)	650	970	1200	<20	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.21	0.23
Lead 210-Dissolved (pCi/L)	<1	4	<1	3	0.8
Lead 210-Suspended (pCi/L)	<1	<1	<1	1.9	4.9
Lead 210-Total (pCi/L)	<1				
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	21.2	24.6	24.5	22.6	26.3
Manganese-Dissolved (mg/L)	0.08	0.11	0.11	0.08	0.09
Manganese-Total (mg/L)				0.08	0.09
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		150	150	220	210

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Groundwater Quality Data

Well #8					
Analyte	9/26/2007 14:33	11/27/2007 16:30	11/27/2007 16:40	2/5/2008 10:20	5/29/2008 11:41
pH	7.93	7.95	7.94	7.94	7.97
Polonium 210-Dissolved (pCi/L)	<1	<1	<1	1.6	-0.2
Polonium 210-Suspended (pCi/L)	<1	<1	<1	<1	-0.1
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	14.2	15.7	15.2	14.7	13.7
Radium 226-Dissolved (pCi/L)	<0.2	2.7	1.9	1.5	1.2
Radium 226-Suspended (pCi/L)	3.5	<0.2	<0.2	2.8	-0.4
Radium 226-Total (pCi/L)	3.5				
Radon 222-Total (pCi/L)		123	197	329	514
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	0.002	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	0.001	<0.001
Silica-Dissolved (mg/L)	6.9	6.7	6.6	7.3	3.5
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		5.6	5.7	6.4	6.5
Sodium-Dissolved (mg/L)	224	199	201	222	240
Solids-Total Dissolved Calculated (mg/L)	962	939	973	879	973
Solids-Total Dissolved TDS @ 180 C (mg/L)	960	1000	1100	1000	940
Strontium-Total (mg.L)				1.6	1.6
Sulfate (mg/L)	540	594	570	455	514
TDS Balance (0.80 - 1.20) (dec.%)	1	1.12	1.09	1.15	0.97
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	<0.2	
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003			<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	0.01	0.02	<0.01
Zinc-Total (mg/L)				<0.01	<0.01

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Groundwater Quality Data

Well #8								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.028	4.832734	-4.03	-2.44	5.18	-4.83	5.33	5
Alkalinity-Total as CaCO3 (mg/L)	166.4	7.924645	160	166	173	156	178	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.21	0.10247	0.125	0.2	0.3	0.05	0.3	5
Anions (meq/L)	14.52	0.88713	13.7	14.8	15.2	13.1	15.4	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0007	0.000274	0.0005	0.0005	0.001	0.0005	0.001	5
Arsenic-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	202.8	9.731393	195	202	211	190	217	5
Boron-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	54.3	3.960429	50.55	55.1	57.65	48.5	58.9	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	14.5	0.824621	13.9	14.3	15.2	13.9	15.9	5
Chloride (mg/L)	12	0.707107	11.5	12	12.5	11	13	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1450	61.64414	1420	1420	1495	1420	1560	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.42	0.044721	0.4	0.4	0.45	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	6.26	2.507588	4.1	5.4	8.85	3.2	9	5
Gross Beta-Dissolved (pCi/L)	21.44	5.69412	16.05	21	27.05	15.9	29.1	5
Gross Gamma-Dissolved (pCi/L)	566	548.115	5	650	1085		1200	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	0.22	0.014142		0.22		0.21	0.23	2
Lead-Dissolved (mg/L)	0.0054	0.010957	0.0005	0.0005	0.01275	0.0005	0.025	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.76	1.63187	0.5	0.8	3.5	0.5	4	5
Lead 210-Suspended (pCi/L)	1.66	1.909974	0.5	0.5	3.4	0.5	4.9	5
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	23.84	1.973069	21.9	24.5	25.45	21.2	26.3	5
Manganese-Dissolved (mg/L)	0.094	0.015166	0.08	0.09	0.11	0.08	0.11	5
Manganese-Total (mg/L)	0.085	0.007071		0.085		0.08	0.09	2
Mercury-Dissolved (mg/L)	0.00042	0.000179	0.0003	0.0005	0.0005	0.0001	0.0005	5
Mercury-Total (mg/L)	0.00035	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	182.5	37.74917	150	180	217.5	150	220	4
pH	7.946	0.015166	7.935	7.94	7.96	7.93	7.97	5

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Groundwater Quality Data

Well #8								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	0.58	0.645755	0.15	0.5	1.05	-0.2	1.6	5
Polonium 210-Suspended (pCi/L)	0.38	0.268328	0.2	0.5	0.5	-0.1	0.5	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	14.7	0.790569	13.95	14.7	15.45	13.7	15.7	5
Radium 226-Dissolved (pCi/L)	1.48	0.954987	0.65	1.5	2.3	0.1	2.7	5
Radium 226-Suspended (pCi/L)	1.22	1.79081	-0.15	0.1	3.15	-0.4	3.5	5
Radium 226-Total (pCi/L)	3.5			3.5		3.5	3.5	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	290.75	171.4961	141.5	263	467.75	123	514	4
Selenium-Dissolved (mg/L)	0.0008	0.000671	0.0005	0.0005	0.00125	0.0005	0.002	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Silica-Dissolved (mg/L)	6.2	1.532971	5.05	6.7	7.1	3.5	7.3	5
Silver-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	217.2	17.19593	200	222	232	199	240	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.05	0.465475	5.625	6.05	6.475	5.6	6.5	4
Solids-Total Dissolved Calculated (mg/L)	945.2	39.52468	909	962	973	879	973	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	1000	61.64414	950	1000	1050	940	1100	5
Strontium-Total (mg.L)	1.6			1.6		1.6	1.6	2
Sulfate (mg/L)	534.6	53.78476	484.5	540	582	455	594	5
TDS Balance (0.80 - 1.20) (dec.%)	1.066	0.077653	0.985	1.09	1.135	0.97	1.15	5
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Suspended (pCi/L)	0.08	0.044721	0.05	0.1	0.1		0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Uranium-Dissolved (mg/L)	0.00018	0.0000671	0.00015	0.00015	0.000225	0.00015	0.0003	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	3
Vanadium-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Zinc-Dissolved (mg/L)	0.012	0.007583	0.005	0.01	0.02	0.005	0.02	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

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Groundwater Quality Data

Well #13					
Analyte	**10/3/2006 11:36**	**9/27/2007 15:45**	**11/12/2007 12:15**	**2/20/2008 14:41**	**5/19/2008 12:20**
A/C Balance (± 5) (%)		-1.26	-3.53	-4.96	6.97
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	170	168	142	160	156
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	0.2	0.6	0.1	<0.1	<0.1
Anions (meq/L)		12.3	14	13.9	12.6
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001	0.001
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	205	173	195	190
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	<20				
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.001
Calcium-Dissolved (mg/L)	61	57.4	61.3	58	72.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		12	13.1	12.6	14.5
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	11	11	11	10	10
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1290	1280	1140	1330	1420
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.43	0.4	0.4	0.5	0.5
Gross Alpha precision (±) (pCi/L)	0.7				
Gross Alpha-Dissolved (pCi/L)	12	8.9	7.5	19.5	4.2
Gross Beta precision (±) (pCi/L)	1.7				
Gross Beta-Dissolved (pCi/L)	17	9.6	11.7	11.4	10.3
Gross Gamma-Dissolved (pCi/L)	<20	<20	4300	<20	
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				3.11	4.56
Lead 210-Dissolved (pCi/L)		<1	<1	4.7	4.1
Lead 210-Suspended (pCi/L)		<1	<1	<1	-0.2
Lead 210-Total (pCi/L)		<1			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214-Dissolved (pCi/L)	<20				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	22	21	25.1	22.4	29.5
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.11	0.1	0.2	0.16	0.2
Manganese-Total (mg/L)				0.16	0.2
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.01
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05

Powertech (USA) Inc.

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Groundwater Quality Data

Well #13					
Analyte	**10/3/2006 11:36**	**9/27/2007 15:45**	**11/12/2007 12:15**	**2/20/2008 14:41**	**5/19/2008 12:20**
Nitrogen, Nitrate as N (mg/L)		<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			230	200	260
pH	7.93	7.83	7.75	8.05	7.96
Polonium 210-Dissolved (pCi/L)		<1	2.6	1.1	-0.6
Polonium 210-Suspended (pCi/L)		5.2	<1	<1	
Polonium 210-Total (pCi/L)		5.2			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	9	11.3	11.7	11.8	11.5
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	0.5				
Radium 226-Dissolved (pCi/L)	2.1	1.8	1.6	1.1	1.6
Radium 226-Suspended (pCi/L)		<0.2	<0.2	1.6	0.01
Radium 226-Total (pCi/L)		1.1			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	63.2				
Radon 222-Total (pCi/L)	335		305	258	412
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.005
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.7	6.2	6.5	3.6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			4.7	4.9	4.7
Sodium-Dissolved (mg/L)	180	163	175	173	188
Solids-Total Dissolved Calculated (mg/L)		781	898	888	857
Solids-Total Dissolved TDS @ 180 C (mg/L)	880	890	890	850	880
Strontium-Total (mg.L)				1.5	1.7
Sulfate (mg/L)	460	488	520	499	442
TDS Balance (0.80 - 1.20) (dec.%)		1.14	0.99	0.96	1.02
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		0.4	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.4	0.2
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	<0.001	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	51				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	<0.01	<0.01	0.04	<0.01	0.01
Zinc-Total (mg/L)				0.07	0.04

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Groundwater Quality Data

Well #13								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.695	5.332257	-4.6025	-2.395	4.9125	-4.96	6.97	4
Alkalinity-Total as CaCO3 (mg/L)	156.5	10.87811	145.5	158	166	142	168	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.2	0.267706	0.05	0.075	0.475	0.05	0.6	4
Anions (meq/L)	13.2	0.875595	12.375	13.25	13.975	12.3	14	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	190.75	13.37597	177.25	192.5	202.5	173	205	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	62.275	6.964374	57.55	59.65	69.625	57.4	72.4	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	13.05	1.066146	12.15	12.85	14.15	12	14.5	4
Chloride (mg/L)	10.5	0.57735	10	10.5	11	10	11	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1292.5	117.0114	1175	1305	1397.5	1140	1420	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	10.025	6.616835	5.025	8.2	16.85	4.2	19.5	4
Gross Beta-Dissolved (pCi/L)	10.75	0.974679	9.775	10.85	11.625	9.6	11.7	4
Gross Gamma-Dissolved (pCi/L)	1080	2146.672	2.5	10	3227.5		4300	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	3.835	1.025305		3.835		3.11	4.56	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	2.45	2.26495	0.5	2.3	4.55	0.5	4.7	4
Lead 210-Suspended (pCi/L)	0.325	0.35	-0.025	0.5	0.5	-0.2	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	24.5	3.742548	21.35	23.75	28.4	21	29.5	4
Manganese-Dissolved (mg/L)	0.165	0.047258	0.115	0.18	0.2	0.1	0.2	4
Manganese-Total (mg/L)	0.18	0.028284		0.18		0.16	0.2	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000288	0.000246	0.0000625	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	230	30	200	230	260	200	260	3
pH	7.8975	0.13351	7.77	7.895	8.0275	7.75	8.05	4

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Groundwater Quality Data

Well #13								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	0.9	1.334166	-0.325	0.8	2.225	-0.6	2.6	4
Polonium 210-Suspended (pCi/L)	1.55	2.444722	0.125	0.5	4.025		5.2	4
Polonium 210-Total (pCi/L)	5.2			5.2		5.2	5.2	1
Potassium-Dissolved (mg/L)	11.575	0.221736	11.35	11.6	11.775	11.3	11.8	4
Radium 226-Dissolved (pCi/L)	1.525	0.298608	1.225	1.6	1.75	1.1	1.8	4
Radium 226-Suspended (pCi/L)	0.4525	0.766176	0.0325	0.1	1.225	0.01	1.6	4
Radium 226-Total (pCi/L)	1.1			1.1		1.1	1.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	325	78.92401	258	305	412	258	412	3
Selenium-Dissolved (mg/L)	0.001	0.001	0.0005	0.0005	0.002	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6	1.726268	4.25	6.35	7.4	3.6	7.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	174.75	10.27538	165.5	174	184.75	163	188	4
Sodium Adsorption Ratio (SAR) (meq/L)	4.766667	0.11547	4.7	4.7	4.9	4.7	4.9	3
Solids-Total Dissolved Calculated (mg/L)	856	52.9591	800	872.5	895.5	781	898	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	877.5	18.92969	857.5	885	890	850	890	4
Strontium-Total (mg.L)	1.6	0.141421		1.6		1.5	1.7	2
Sulfate (mg/L)	487.25	32.95831	453.5	493.5	514.75	442	520	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0275	0.078899	0.9675	1.005	1.11	0.96	1.14	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.173205	0.025	0.1	0.325		0.4	4
Thorium 230-Suspended (pCi/L)	0.2	0.141421	0.1	0.15	0.35	0.1	0.4	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015			0.00015		0.00015	0.00015	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.015	0.016833	0.005	0.0075	0.0325	0.005	0.04	4
Zinc-Total (mg/L)	0.055	0.021213		0.055		0.04	0.07	2

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Groundwater Quality Data

Well #16					
Analyte	**10/3/2006 12:00**	**9/27/2007 19:18**	**11/12/2007 16:05**	**3/30/2008 15:19**	**6/30/2008 13:45**
A/C Balance (± 5) (%)		-2.85	-1.55	-2	4.63
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	160	158	148	148	150
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	<0.1	0.4	<0.1	<0.1	<0.1
Anions (meq/L)		11.8	11	12.5	11.5
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)				0.004	<0.002
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	193	180	180	183
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	770				
Bismuth precision (±) (pCi/L)	35				
Boron-Dissolved (mg/L)	0.12	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	140	108	103	113	125
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		11.1	10.7	12	12.6
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	6.2	5	5	5	4
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1260	1080	925	1050	1000
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.37	0.4	0.4	0.4	0.5
Gross Alpha precision (±) (pCi/L)	1.5				
Gross Alpha-Dissolved (pCi/L)	110	62.7	12.2	85.7	28.3
Gross Beta precision (±) (pCi/L)	2				
Gross Beta-Dissolved (pCi/L)	50	33.1	24	47.2	19.3
Gross Gamma precision(±) (pCi/L)	70				
Gross Gamma-Dissolved (pCi/L)	1600	<20	2300	600	760
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.25	0.26
Lead 210-Dissolved (pCi/L)		<1	2.2	-27	2
Lead 210-Suspended (pCi/L)		<1	1.2		-0.4
Lead 210-Total (pCi/L)		<1			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214 precision (±) (pCi/L)	35				
Lead 214-Dissolved (pCi/L)	810				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.003
Magnesium-Dissolved (mg/L)	55	40.7	39.4	46.8	47
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.19	0.16	<0.01	0.13	0.14
Manganese-Total (mg/L)				0.14	0.13
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1

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Groundwater Quality Data

Well #16					
Analyte	**10/3/2006 12:00**	**9/27/2007 19:18**	**11/12/2007 16:05**	**3/30/2008 15:19**	**6/30/2008 13:45**
Molybdenum-Total (mg/L)				<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.2	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			240	200	230
pH	7.44	7.43	7.48	7.57	7.38
Polonium 210-Dissolved (pCi/L)		<1	<1	0.2	
Polonium 210-Suspended (pCi/L)		<1	<1	0.8	
Polonium 210-Total (pCi/L)		<1			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	16	16.6	16	15.1	16.7
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	2.5				
Radium 226-Dissolved (pCi/L)	33.6	26.2	8.1	15.3	6.4
Radium 226-Suspended (pCi/L)		<0.2	<0.2	1.4	-0.3
Radium 226-Total (pCi/L)		17.4			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	252				
Radon 222-Total (pCi/L)	39000		1090	28200	3150
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	0.002
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.3	6.5	7	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			0.94	0.96	0.93
Sodium-Dissolved (mg/L)	53	44	44.1	48	48
Solids-Total Dissolved Calculated (mg/L)		715	686	786	743
Solids-Total Dissolved TDS @ 180 C (mg/L)	940	810	760	780	780
Strontium-Total (mg.L)				2.7	2.7
Sulfate (mg/L)	522	448	428	449	401
TDS Balance (0.80 - 1.20) (dec.%)		1.14	1.11	0.99	1.04
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		0.3	<0.2	0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.1	
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	0.002	0.0021	0.0007	0.0007	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				0.0007	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	52				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	0.04	0.04	0.06	0.01	0.02
Zinc-Total (mg/L)				0.02	<0.03

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Groundwater Quality Data

Well #16								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.4425	3.424358	-2.6375	-1.775	3.085	-2.85	4.63	4
Alkalinity-Total as CaCO3 (mg/L)	151	4.760952	148	149	156	148	158	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.1375	0.175	0.05	0.05	0.3125	0.05	0.4	4
Anions (meq/L)	11.7	0.627163	11.125	11.65	12.325	11	12.5	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	184	6.164414	180	181.5	190.5	180	193	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	112.25	9.429563	104.25	110.5	122	103	125	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	11.6	0.860233	10.8	11.55	12.45	10.7	12.6	4
Chloride (mg/L)	4.75	0.5	4.25	5	5	4	5	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1013.75	67.74646	943.75	1025	1072.5	925	1080	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.425	0.05	0.4	0.4	0.475	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	47.225	33.1899	16.225	45.5	79.95	12.2	85.7	4
Gross Beta-Dissolved (pCi/L)	30.9	12.28414	20.475	28.55	43.675	19.3	47.2	4
Gross Gamma-Dissolved (pCi/L)	917.5	976.469	157.5	680	1915	10	2300	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.255	0.007071		0.255		0.25	0.26	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.001	0.000707		0.001		0.0005	0.0015	2
Lead 210-Dissolved (pCi/L)	-5.575	14.30347	-20.125	1.25	2.15	-27	2.2	4
Lead 210-Suspended (pCi/L)	0.325	0.689807	-0.3	0.25	1.025	-0.4	1.2	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	43.475	3.991136	39.725	43.75	46.95	39.4	47	4
Manganese-Dissolved (mg/L)	0.10875	0.070282	0.03625	0.135	0.155	0.005	0.16	4
Manganese-Total (mg/L)	0.135	0.007071		0.135		0.13	0.14	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.0003	0.000231	0.0001	0.0003	0.0005	0.0001	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05			0.05		0.05	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4

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Dewey-Burdock Project

Groundwater Quality Data

Well #16								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	223.3333	20.81666	200	230	240	200	240	3
pH	7.465	0.081035	7.3925	7.455	7.5475	7.38	7.57	4
Polonium 210-Dissolved (pCi/L)	0.3	0.244949	0.05	0.35	0.5		0.5	4
Polonium 210-Suspended (pCi/L)	0.45	0.331662	0.125	0.5	0.725		0.8	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	16.1	0.734847	15.325	16.3	16.675	15.1	16.7	4
Radium 226-Dissolved (pCi/L)	14	9.001852	6.825	11.7	23.475	6.4	26.2	4
Radium 226-Suspended (pCi/L)	0.325	0.741058	-0.2	0.1	1.075	-0.3	1.4	4
Radium 226-Total (pCi/L)	17.4			17.4		17.4	17.4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	10813.33	15092.48	1090	3150	28200	1090	28200	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.175	1.552149	4.55	6.75	7.225	3.9	7.3	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	46.025	2.280899	44.025	46.05	48	44	48	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.943333	0.015275	0.93	0.94	0.96	0.93	0.96	3
Solids-Total Dissolved Calculated (mg/L)	732.5	42.58717	693.25	729	775.25	686	786	4
Solids-Total Dissolved TDS @ 180 C (mg/L	782.5	20.61553	765	780	802.5	760	810	4
Strontium-Total (mg.L)	2.7			2.7		2.7	2.7	2
Sulfate (mg/L)	431.5	22.51666	407.75	438	448.75	401	449	4
TDS Balance (0.80 - 1.20) (dec.%)	1.07	0.067823	1.0025	1.075	1.1325	0.99	1.14	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.129099	0.025	0.15	0.275		0.3	4
Thorium 230-Suspended (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.000913	0.000833	0.000288	0.0007	0.00175	0.00015	0.0021	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.000425	0.000389		0.000425		0.00015	0.0007	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.0325	0.022174	0.0125	0.03	0.055	0.01	0.06	4
Zinc-Total (mg/L)	0.0175	0.003536		0.0175		0.015	0.02	2

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Dewey-Burdock Project

Groundwater Quality Data

Well #18						
Analyte	**10/3/2006 10:07**	**9/26/2007 10:39**	**11/12/2007 10:15**	**11/12/2007 10:20**	**2/12/2008 11:08**	**5/30/2008 11:12**
A/C Balance (± 5) (%)		0.211	-0.239	-0.843	-1.77	5.45
Actinium 228-Dissolved (pCi/L)	<20					
Alkalinity-Total as CaCO3 (mg/L)	180	184	176	172	180	180
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20					
Ammonia (mg/L)	0.2	0.2	0.2	0.2	0.2	0.1
Anions (meq/L)		14.7	15	15	15.2	14.2
Antimony-Total (mg/L)					<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	0.002	0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)					0.002	0.003
Barium 133-Dissolved (pCi/L)	<20					
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)					<0.1	<0.1
Beryllium-Total (mg/L)					<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	220	224	215	210	219	219
Bismuth 212-Dissolved (pCi/L)	<20					
Bismuth 214-Dissolved (pCi/L)	<20					
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)					<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.01	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)					<0.005	<0.005
Calcium-Dissolved (mg/L)	34	31.8	33	32.5	34	38
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)		14.8	15	14.7	14.7	15.8
Cesium 134-Dissolved (pCi/L)	<20					
Cesium 137-Dissolved (pCi/L)	<20					
Chloride (mg/L)	14	13	13	13	14	12
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)					<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20					
Conductivity @ 25 C (umhos/cm)	1430	1430	1360	1330	1450	1470
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)					<0.01	<0.01
Fluoride (mg/L)	0.38	0.4	0.4	0.4	0.5	0.4
Gross Alpha precision (±) (pCi/L)	1					
Gross Alpha-Dissolved (pCi/L)	37	15.7	18.9	20	31.7	27.5
Gross Beta precision (±) (pCi/L)	1.6					
Gross Beta-Dissolved (pCi/L)	14	6.7	12.1	13	13	4.8
Gross Gamma-Dissolved (pCi/L)	<20	510	370	330	190	
Iodine 125-Dissolved (pCi/L)	<20					
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)					1.04	1.11
Lead 210-Dissolved (pCi/L)		<1	4.6	<1	<1	-1
Lead 210-Suspended (pCi/L)		<1	<1	<1	<1	29.6
Lead 210-Total (pCi/L)		<1				
Lead 212-Dissolved (pCi/L)	<20					
Lead 214-Dissolved (pCi/L)	<20					
Lead-Dissolved (mg/L)	<0.01	<0.05	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)					<0.001	<0.001
Magnesium-Dissolved (mg/L)	12	11.3	11.6	11.4	12.2	13.4
Manganese 54-Dissolved (pCi/L)	<20					
Manganese-Dissolved (mg/L)	0.06	0.06	0.06	0.06	0.07	0.06
Manganese-Total (mg/L)					0.06	0.06
Mercury-Dissolved (mg/L)		<0.0002	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001		<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)					<0.01	<0.1
Nickel-Dissolved (mg/L)	0.03	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)					<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5					
Oxidation-Reduction Potential (mV)			80	85	130	200
pH	8.11	8.09	8.02	8.06	8.11	8.1
Polonium 210-Dissolved (pCi/L)		<1	<1	<1	2.2	
Polonium 210-Suspended (pCi/L)		6	<1	<1	<1	1.7

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Analyte	**10/3/2006 10:07**	**9/26/2007 10:39**	**11/12/2007 10:15**	**11/12/2007 10:20**	**2/12/2008 11:08**	**5/30/2008 11:12**
Polonium 210-Total (pCi/L)		6				
Potassium 40-Dissolved (pCi/L)	<20					
Potassium-Dissolved (mg/L)	7	7.2	7	7	7.3	6.9
Radium 223-Dissolved (pCi/L)	<20					
Radium 224-Dissolved (pCi/L)	<20					
Radium 226 precision (±) (pCi/L)	1.2					
Radium 226-Dissolved (pCi/L)	5.8	<0.2	3.2	3.6	3.2	2.6
Radium 226-Suspended (pCi/L)		4	<0.2	<0.2	1.1	1.1
Radium 226-Total (pCi/L)		4				
Radium 228 precision (±) (pCi/L)	1.2					
Radium 228-Dissolved (pCi/L)	2.3					
Radon 222 precision (±) (pCi/L)	69.3					
Radon 222-Total (pCi/L)	762		945	944	1220	1210
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)					<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.5	7.3	7.3	7.8	4.2
Silver-Dissolved (mg/L)	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)					<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			11	11	10	10
Sodium-Dissolved (mg/L)	260	278	280	276	270	291
Solids-Total Dissolved Calculated (mg/L)		965	994	988	1000	973
Solids-Total Dissolved TDS @ 180 C (mg/L)	950	990	960	950	960	940
Strontium-Total (mg.L)					0.6	0.7
Sulfate (mg/L)	481	513	534	536	537	492
TDS Balance (0.80 - 1.20) (dec.%)		1.03	0.97	0.97	0.96	0.96
Thallium 208-Dissolved (pCi/L)	<20					
Thallium-Total (mg/L)					<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20					
Thorium 230-Dissolved (pCi/L)		<0.2	<0.2	<0.2	0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)		<0.2				
Thorium 232-Dissolved (pCi/L)		<0.001	<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20					
Uranium 238-Dissolved (pCi/L)	<20					
Uranium-Dissolved (mg/L)	0.007	0.0061	0.0066	0.0065	0.0066	0.0059
Uranium-Suspended (mg/L)		0.0017	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)					0.0062	0.0062
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	52					
Zinc 65-Dissolved (pCi/L)	<20					
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)					<0.01	<0.01

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Well #18								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.5618	2.831501	-1.3065	-0.239	2.8305	-1.77	5.45	5
Alkalinity-Total as CaCO3 (mg/L)	178.4	4.560702	174	180	182	172	184	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.18	0.044721	0.15	0.2	0.2	0.1	0.2	5
Anions (meq/L)	14.82	0.389872	14.45	15	15.1	14.2	15.2	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0012	0.000447	0.001	0.001	0.0015	0.001	0.002	5
Arsenic-Total (mg/L)	0.0025	0.000707		0.0025		0.002	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	217.4	5.22494	212.5	219	221.5	210	224	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	33.86	2.449081	32.15	33	36	31.8	38	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	15	0.463681	14.7	14.8	15.4	14.7	15.8	5
Chloride (mg/L)	13	0.707107	12.5	13	13.5	12	14	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1408	60.16644	1345	1430	1460	1330	1470	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.42	0.044721	0.4	0.4	0.45	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	22.76	6.60969	17.3	20	29.6	15.7	31.7	5
Gross Beta-Dissolved (pCi/L)	9.92	3.882911	5.75	12.1	13	4.8	13	5
Gross Gamma-Dissolved (pCi/L)	280	193.6492	95	330	440		510	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	1.075	0.049497		1.075		1.04	1.11	2
Lead-Dissolved (mg/L)	0.0054	0.010957	0.0005	0.0005	0.01275	0.0005	0.025	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.02	2.104044	-0.25	0.5	2.55	-1	4.6	5
Lead 210-Suspended (pCi/L)	6.32	13.01392	0.5	0.5	15.05	0.5	29.6	5
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	11.98	0.867179	11.35	11.6	12.8	11.3	13.4	5
Manganese-Dissolved (mg/L)	0.062	0.004472	0.06	0.06	0.065	0.06	0.07	5
Manganese-Total (mg/L)	0.06			0.06		0.06	0.06	2
Mercury-Dissolved (mg/L)	0.00042	0.000179	0.0003	0.0005	0.0005	0.0001	0.0005	5
Mercury-Total (mg/L)	0.000388	0.000225	0.000163	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	123.75	55.58402	81.25	107.5	182.5	80	200	4
pH	8.076	0.036469	8.04	8.09	8.105	8.02	8.11	5

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Groundwater Quality Data

Well #18								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	0.74	0.844393	0.25	0.5	1.35		2.2	5
Polonium 210-Suspended (pCi/L)	1.84	2.382855	0.5	0.5	3.85	0.5	6	5
Polonium 210-Total (pCi/L)	6			6		6	6	1
Potassium-Dissolved (mg/L)	7.08	0.164317	6.95	7	7.25	6.9	7.3	5
Radium 226-Dissolved (pCi/L)	2.54	1.409965	1.35	3.2	3.4	0.1	3.6	5
Radium 226-Suspended (pCi/L)	1.28	1.600625	0.1	1.1	2.55	0.1	4	5
Radium 226-Total (pCi/L)	4			4		4	4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1079.75	156.2271	944.25	1077.5	1217.5	944	1220	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	6.82	1.478851	5.75	7.3	7.65	4.2	7.8	5
Silver-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	279	7.681146	273	278	285.5	270	291	5
Sodium Adsorption Ratio (SAR) (meq/L)	10.5	0.57735	10	10.5	11	10	11	4
Solids-Total Dissolved Calculated (mg/L)	984	14.61164	969	988	997	965	1000	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	960	18.70829	945	960	975	940	990	5
Strontium-Total (mg.L)	0.65	0.070711		0.65		0.6	0.7	2
Sulfate (mg/L)	522.4	19.65452	502.5	534	536.5	492	537	5
TDS Balance (0.80 - 1.20) (dec.%)	0.978	0.029496	0.96	0.97	1	0.96	1.03	5
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1	0.070711	0.05	0.1	0.15		0.2	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Uranium-Dissolved (mg/L)	0.00634	0.000321	0.006	0.0065	0.0066	0.0059	0.0066	5
Uranium-Suspended (mg/L)	0.00046	0.000693	0.00015	0.00015	0.000925	0.00015	0.0017	5
Uranium-Total (mg/L)	0.0062			0.0062		0.0062	0.0062	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #42					
Analyte	**10/3/2006 10:18**	**9/28/2007 11:34**	**11/12/2007 11:20**	**2/5/2008 14:10**	**5/30/2008 11:55**
A/C Balance (± 5) (%)		-1.32	-0.342	3.65	6.08
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	180	180	174	180	176
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	0.2	0.1	0.1	0.1	0.1
Anions (meq/L)		13.3	14.7	14.5	13.6
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	0.001	<0.001
Arsenic-Total (mg/L)				0.002	0.004
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	220	219	212	219	215
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	1600				
Bismuth precision (±) (pCi/L)	64				
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	35	30	34	35.3	39.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		13	14.6	15.6	15.3
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	14	12	13	12	11
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1410	1390	1310	1420	1510
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.39	0.4	0.4	0.4	0.4
Gross Alpha precision (±) (pCi/L)	3.2				
Gross Alpha-Dissolved (pCi/L)	560	371	375	526	558
Gross Beta precision (±) (pCi/L)	2.7				
Gross Beta-Dissolved (pCi/L)	110	122	173	93.5	159
Gross Gamma precision(±) (pCi/L)	130				
Gross Gamma-Dissolved (pCi/L)	3400	1300	70000	2800	150
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.15	0.16
Lead 210-Dissolved (pCi/L)		<1	21	15	17.8
Lead 210-Suspended (pCi/L)		57	<1	17	14
Lead 210-Total (pCi/L)		57			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214 precision (±) (pCi/L)	70				
Lead 214-Dissolved (pCi/L)	1800				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	12	9.4	11.8	12.3	13.5
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.08	0.06	0.08	0.09	0.08
Manganese-Total (mg/L)				0.08	0.08
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0001

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #42					
Analyte	**10/3/2006 10:18**	**9/28/2007 11:34**	**11/12/2007 11:20**	**2/5/2008 14:10**	**5/30/2008 11:55**
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.1
Nickel-Dissolved (mg/L)	0.02	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.2	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			240	170	200
pH	8.01	8.02	7.95	8.08	8.05
Polonium 210-Dissolved (pCi/L)		<1	<1	5.5	1.6
Polonium 210-Suspended (pCi/L)		13	1.1	2	0.3
Polonium 210-Total (pCi/L)		13			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	7	7.1	7.2	7.8	6.8
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	3.1				
Radium 226-Dissolved (pCi/L)	87.6	96.5	102	100	100
Radium 226-Suspended (pCi/L)		<0.2	<0.2	5.1	-0.3
Radium 226-Total (pCi/L)		79.7			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	581				
Radon 222-Total (pCi/L)	197000		132000	175000	219000
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	0.001	<0.001
Silica-Dissolved (mg/L)	7	7.1	7.2	7.4	4.1
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			10	11	9.7
Sodium-Dissolved (mg/L)	250	242	270	289	277
Solids-Total Dissolved Calculated (mg/L)		858	969	971	932
Solids-Total Dissolved TDS @ 180 C (mg/L)	940	960	940	980	930
Strontium-Total (mg.L)				0.7	0.7
Sulfate (mg/L)	473	505	519	505	466
TDS Balance (0.80 - 1.20) (dec.%)		1.12	0.97	1.01	1
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		<0.2	0.5	<0.2	0.1
Thorium 230-Suspended (pCi/L)		<0.2	0.2	<0.2	
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	0.04	0.015	0.0324	0.0194	0.0142
Uranium-Suspended (mg/L)		0.0029	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				0.0198	0.0149
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	53				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	<0.01	0.01	0.03	0.02	0.02
Zinc-Total (mg/L)				0.03	0.02

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #42								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	2.017	3.458088	-1.0755	1.654	5.4725	-1.32	6.08	4
Alkalinity-Total as CaCO3 (mg/L)	177.5	3	174.5	178	180	174	180	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Anions (meq/L)	14.025	0.680074	13.375	14.05	14.65	13.3	14.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.003	0.001414		0.003		0.002	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	216.25	3.40343	212.75	217	219	212	219	4
Boron-Dissolved (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	34.675	3.874167	31	34.65	38.375	30	39.4	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	14.625	1.161536	13.4	14.95	15.525	13	15.6	4
Chloride (mg/L)	12	0.816497	11.25	12	12.75	11	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1407.5	82.61356	1330	1405	1487.5	1310	1510	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Gross Alpha-Dissolved (pCi/L)	457.5	98.45642	372	450.5	550	371	558	4
Gross Beta-Dissolved (pCi/L)	136.875	36.04251	100.625	140.5	169.5	93.5	173	4
Gross Gamma-Dissolved (pCi/L)	18562.5	34308.83	437.5	2050	53200	150	70000	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.155	0.007071		0.155		0.15	0.16	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	13.575	9.054787	4.125	16.4	20.2	0.5	21	4
Lead 210-Suspended (pCi/L)	22.125	24.33233	3.875	15.5	47	0.5	57	4
Lead 210-Total (pCi/L)	57			57		57	57	1
Magnesium-Dissolved (mg/L)	11.75	1.721434	10	12.05	13.2	9.4	13.5	4
Manganese-Dissolved (mg/L)	0.0775	0.012583	0.065	0.08	0.0875	0.06	0.09	4
Manganese-Total (mg/L)	0.08			0.08		0.08	0.08	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000288	0.000246	0.0000625	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	203.3333	35.11885	170	200	240	170	240	3
pH	8.025	0.055678	7.9675	8.035	8.0725	7.95	8.08	4

Powertech (USA) Inc.

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Groundwater Quality Data

Well #42								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	2.025	2.373991	0.5	1.05	4.525	0.5	5.5	4
Polonium 210-Suspended (pCi/L)	4.1	5.973832	0.5	1.55	10.25	0.3	13	4
Polonium 210-Total (pCi/L)	13			13		13	13	1
Potassium-Dissolved (mg/L)	7.225	0.419325	6.875	7.15	7.65	6.8	7.8	4
Radium 226-Dissolved (pCi/L)	99.625	2.286737	97.375	100	101.5	96.5	102	4
Radium 226-Suspended (pCi/L)	1.25	2.573584	-0.2	0.1	3.85	-0.3	5.1	4
Radium 226-Total (pCi/L)	79.7			79.7		79.7	79.7	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	175333.3	43500.96	132000	175000	219000	132000	219000	3
Selenium-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Silica-Dissolved (mg/L)	6.45	1.571623	4.85	7.15	7.35	4.1	7.4	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	269.5	19.94158	249	273.5	286	242	289	4
Sodium Adsorption Ratio (SAR) (meq/L)	10.23333	0.680686	9.7	10	11	9.7	11	3
Solids-Total Dissolved Calculated (mg/L)	932.5	52.80467	876.5	950.5	970.5	858	971	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	952.5	22.17356	932.5	950	975	930	980	4
Strontium-Total (mg.L)	0.7			0.7		0.7	0.7	2
Sulfate (mg/L)	498.75	22.80899	475.75	505	515.5	466	519	4
TDS Balance (0.80 - 1.20) (dec.%)	1.025	0.065574	0.9775	1.005	1.0925	0.97	1.12	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.2	0.2	0.1	0.1	0.4	0.1	0.5	4
Thorium 230-Suspended (pCi/L)	0.1	0.08165	0.025	0.1	0.175		0.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.02025	0.008416	0.0144	0.0172	0.02915	0.0142	0.0324	4
Uranium-Suspended (mg/L)	0.000838	0.001375	0.00015	0.00015	0.002213	0.00015	0.0029	4
Uranium-Total (mg/L)	0.01735	0.003465		0.01735		0.0149	0.0198	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.02	0.008165	0.0125	0.02	0.0275	0.01	0.03	4
Zinc-Total (mg/L)	0.025	0.007071		0.025		0.02	0.03	2

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well# 615					
Analyte	**4/1/2008 14:34**	**4/1/2008 14:42**	**4/21/2008 16:16**	**5/28/2008 19:20**	**6/25/2008 13:55**
A/C Balance (± 5) (%)	1.45	2.22	4.26	3	2.39
Alkalinity-Total as CaCO3 (mg/L)	136	138	136	138	138
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	10.8	10.7	10.6	11.2	10.6
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.02	0.019	0.02	0.013	0.016
Arsenic-Total (mg/L)	0.024	0.025	0.024	0.024	0.024
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	166	168	166	168	168
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	70.9	71.1	73	79.2	71.8
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	11.1	11.2	11.5	11.9	11.1
Chloride (mg/L)	6	6	4	5	5
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1050	1050	1040	1050	1110
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.5	0.4	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	18.2	17.7	15.1	15.3	38.3
Gross Beta-Dissolved (pCi/L)	11.6	5.8	12.1	3.7	12.6
Gross Gamma-Dissolved (pCi/L)				170	
Iron-Dissolved (mg/L)	0.7	0.66	0.79	0.1	0.42
Iron-Total (mg/L)	1.35	1.4	1.35	1.4	1.5
Lead 210-Dissolved (pCi/L)	-2.5	-13.8		3.8	1.1
Lead 210-Suspended (pCi/L)	27.1	12.8	-3.2	1.5	3.5
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0.002	0.002	<0.001	<0.001	0.013
Magnesium-Dissolved (mg/L)	21.7	21.9	22.9	23.2	21.6
Manganese-Dissolved (mg/L)	0.08	0.08	0.07	0.07	0.07
Manganese-Total (mg/L)	0.08	0.08	0.07	0.07	0.07
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	0.06	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	210	210	300	200	140
pH	7.36	7.34	7.43	7.16	7.48
Polonium 210-Dissolved (pCi/L)	0.6	0.8	0.9	-0.1	0.5
Polonium 210-Suspended (pCi/L)	0.4	0.9	0.4		
Potassium-Dissolved (mg/L)	8.7	8.6	8.7	9	8.7
Radium 226-Dissolved (pCi/L)	1.8	2.3	2	2	7.2
Radium 226-Suspended (pCi/L)	0.3		-0.2	0.2	-0.4
Radon 222-Total (pCi/L)	1490	1250	1180	1070	1830
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001

POWERTECH (USA) INC.

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Groundwater Quality Data

Well# 615					
Analyte	**4/1/2008 14:34**	**4/1/2008 14:42**	**4/21/2008 16:16**	**5/28/2008 19:20**	**6/25/2008 13:55**
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.6	7.6	7.8	4.4	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.4	3.4	3.5	3.4	3.4
Sodium-Dissolved (mg/L)	127	128	132	134	127
Solids-Total Dissolved Calculated (mg/L)	715	710	715	745	696
Solids-Total Dissolved TDS @ 180 C (mg/L)	670	680	750	710	680
Strontium-Total (mg.L)	1.3	1.3	1.4	1.4	1.4
Sulfate (mg/L)	378	370	371	399	369
TDS Balance (0.80 - 1.20) (dec.%)	0.94	0.95	1.05	0.95	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2				
Thorium 230-Suspended (pCi/L)	0.9	0.2	0.1	0.1	0.1
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0026	0.0026	0.0025	0.0024	0.0024
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0026	0.0025	0.0025	0.0025	0.0023
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	0.02	0.02	<0.01	<0.01	<0.01

Powertech (USA) Inc.

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Groundwater Quality Data

Well #619				
Analyte	**9/27/2007 17:45**	**11/12/2007 14:25**	**3/24/2008 15:40**	**6/17/2008 18:10**
A/C Balance (± 5) (%)	-1.34	-2.56	3.41	9.08
Alkalinity-Total as CaCO3 (mg/L)	140	98	116	116
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.3	0.2	0.2
Anions (meq/L)	28.7	26.8	29.9	28.3
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)			0.002	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	171	119	141	141
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)			<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.005
Calcium-Dissolved (mg/L)	304	263	343	375
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	27.9	25.5	32	34
Chloride (mg/L)	9	10	12	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2270	1860	2180	2390
Copper-Dissolved (mg/L)	0.08	<0.01	<0.01	0.01
Copper-Total (mg/L)			<0.01	0.01
Fluoride (mg/L)	0.2	0.2	0.3	0.3
Gross Alpha-Dissolved (pCi/L)	367	341	438	398
Gross Beta-Dissolved (pCi/L)	117	170	175	144
Gross Gamma-Dissolved (pCi/L)	120	4200	25	270
Iron-Dissolved (mg/L)	1.95	4.39	3.22	3.03
Iron-Total (mg/L)			11.9	13
Lead 210-Dissolved (pCi/L)	<1	<1	19	-1.1
Lead 210-Suspended (pCi/L)	<1	<1	11	2
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	0.008	<0.001	<0.001	0.002
Lead-Total (mg/L)			0.005	0.002
Magnesium-Dissolved (mg/L)	106	96.4	125	129
Manganese-Dissolved (mg/L)	1.51	1.15	1.62	1.74
Manganese-Total (mg/L)			1.82	1.65
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		25	-80.2	150
pH	7.03	7.03	7.25	7.82
Polonium 210-Dissolved (pCi/L)	<1	<1	1.9	-0.1

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #619				
Analyte	**9/27/2007 17:45**	**11/12/2007 14:25**	**3/24/2008 15:40**	**6/17/2008 18:10**
Polonium 210-Suspended (pCi/L)	<1	<1	0.1	0.4
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	16.9	16.2	16.5	17.6
Radium 226-Dissolved (pCi/L)	120	100	99.7	110
Radium 226-Suspended (pCi/L)	<0.2	3.5	11.4	8.8
Radium 226-Total (pCi/L)	120			
Radon 222-Total (pCi/L)		2990	5580	5770
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.5	6	8	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.2	1.1	1
Sodium-Dissolved (mg/L)	80	86.1	90.3	90
Solids-Total Dissolved Calculated (mg/L)	1830	1720	1980	1940
Solids-Total Dissolved TDS @ 180 C (mg/L)	2100	1900	2100	2000
Strontium-Total (mg.L)			5.2	5.4
Sulfate (mg/L)	1440	1180	1310	1230
TDS Balance (0.80 - 1.20) (dec.%)	1.14	1.09	1.05	1.02
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.5	<0.2		
Thorium 230-Suspended (pCi/L)	<0.2	0.2	0.2	
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.002	0.0015	0.0015	0.0016
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0018	0.0018
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.11	0.07	0.03	0.03
Zinc-Total (mg/L)			0.18	0.08

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Groundwater Quality Data

Well #622				
Analyte	**4/1/2008 14:56**	**4/21/2008 15:28**	**5/28/2008 18:26**	**6/25/2008 12:05**
A/C Balance (± 5) (%)	-18.5	3.01	5.53	3.53
Alkalinity-Total as CaCO3 (mg/L)	164	180	178	178
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	13.4	14	14.1	13.9
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.001	0.006	0.006	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	0.2	0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	219	217	217
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	11.2	87.6	97.5	89.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	9.23	14.9	15.8	14.9
Chloride (mg/L)	12	10	10	10
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1260	1330	1220	1410
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	15	22.6	32.6	36.4
Gross Beta-Dissolved (pCi/L)	9.2	16.2	11.9	22.5
Gross Gamma-Dissolved (pCi/L)			150	
Iron-Dissolved (mg/L)	<0.03	0.03	<0.03	<0.03
Iron-Total (mg/L)	0.96	7.34	10.7	5.17
Lead 210-Dissolved (pCi/L)	-3.5	-4.1	1.2	-2
Lead 210-Suspended (pCi/L)			-0.9	3.5
Lead-Dissolved (mg/L)	<0.001	0.001	0.001	<0.001
Lead-Total (mg/L)	0.004	0.026	0.023	0.03
Magnesium-Dissolved (mg/L)	7.1	32	32.7	31.2
Manganese-Dissolved (mg/L)	0.02	0.18	0.2	0.19
Manganese-Total (mg/L)	0.02	0.23	0.25	0.22
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	0.08	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	200	340	200	240
pH	8.15	7.85	7.52	7.95

POWERTECH (USA) INC.

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Groundwater Quality Data

Well #622				
Analyte	**4/1/2008 14:56**	**4/21/2008 15:28**	**5/28/2008 18:26**	**6/25/2008 12:05**
Polonium 210-Dissolved (pCi/L)	0.8	1.1	-0.3	0.2
Polonium 210-Suspended (pCi/L)		2.8	2.5	1
Potassium-Dissolved (mg/L)	11.3	10.3	10.6	10.2
Radium 226-Dissolved (pCi/L)	2.3	2.7	3.2	4.1
Radium 226-Suspended (pCi/L)	0.7	0.9	1	-0.2
Radon 222-Total (pCi/L)	501	1090	804	1950
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	1.2	7.5	4	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	11	4.1	4.1	4
Sodium-Dissolved (mg/L)	179	175	182	174
Solids-Total Dissolved Calculated (mg/L)	793	931	944	914
Solids-Total Dissolved TDS @ 180 C (mg/L)	800	940	890	900
Strontium-Total (mg.L)	<0.1	1.6	1.6	1.6
Sulfate (mg/L)	470	487	493	481
TDS Balance (0.80 - 1.20) (dec.%)	1.01	1.01	0.95	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.1			
Thorium 230-Suspended (pCi/L)	0.2	0.1	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.0054	0.0056	0.0051
Uranium-Suspended (mg/L)	<0.0003	0.0008	0.0005	<0.0003
Uranium-Total (mg/L)	<0.0003	0.0065	0.0068	0.0059
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	0.01
Zinc-Total (mg/L)	0.03	0.22	0.25	0.13

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #622								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-1.6075	11.31394	-13.1225	3.27	5.03	-18.5	5.53	4
Alkalinity-Total as CaCO3 (mg/L)	175	7.393691	167.5	178	179.5	164	180	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	13.85	0.310913	13.525	13.95	14.075	13.4	14.1	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.00425	0.002363	0.00175	0.005	0.006	0.001	0.006	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	213.25	8.883505	204.25	217	218.5	200	219	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	71.475	40.41001	30.3	88.6	95.525	11.2	97.5	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	13.7075	3.015	10.6475	14.9	15.575	9.23	15.8	4
Chloride (mg/L)	10.5	1	10	10	11.5	10	12	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1305	83.46656	1230	1295	1390	1220	1410	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.375	0.05	0.325	0.4	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	26.65	9.705497	16.9	27.6	35.45	15	36.4	4
Gross Beta-Dissolved (pCi/L)	14.95	5.800287	9.875	14.05	20.925	9.2	22.5	4
Gross Gamma-Dissolved (pCi/L)	37.5	75			112.5		150	4
Iron-Dissolved (mg/L)	0.01875	0.0075	0.015	0.015	0.02625	0.015	0.03	4
Iron-Total (mg/L)	6.0425	4.081212	2.0125	6.255	9.86	0.96	10.7	4
Lead-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Lead-Total (mg/L)	0.02075	0.011529	0.00875	0.0245	0.029	0.004	0.03	4
Lead 210-Dissolved (pCi/L)	-2.1	2.370654	-3.95	-2.75	0.4	-4.1	1.2	4
Lead 210-Suspended (pCi/L)	0.65	1.946792	-0.675		2.625	-0.9	3.5	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	25.75	12.44843	13.125	31.6	32.525	7.1	32.7	4
Manganese-Dissolved (mg/L)	0.1475	0.085391	0.06	0.185	0.1975	0.02	0.2	4
Manganese-Total (mg/L)	0.18	0.107393	0.07	0.225	0.245	0.02	0.25	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nitrogen, Nitrate as N (mg/L)	0.0575	0.015	0.05	0.05	0.0725	0.05	0.08	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	245	66.08076	200	220	315	200	340	4
pH	7.8675	0.263106	7.6025	7.9	8.1	7.52	8.15	4
Polonium 210-Dissolved (pCi/L)	0.45	0.6245	-0.175	0.5	1.025	-0.3	1.1	4
Polonium 210-Suspended (pCi/L)	1.575	1.31244	0.25	1.75	2.725		2.8	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #622								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	10.6	0.496655	10.225	10.45	11.125	10.2	11.3	4
Radium 226-Dissolved (pCi/L)	3.075	0.776209	2.4	2.95	3.875	2.3	4.1	4
Radium 226-Suspended (pCi/L)	0.6	0.547723	0.025	0.8	0.975	-0.2	1	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1086.25	624.0355	576.75	947	1735	501	1950	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	4.15	2.582634	1.875	3.95	6.625	1.2	7.5	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	177.5	3.696846	174.25	177	181.25	174	182	4
Sodium Adsorption Ratio (SAR) (meq/L)	5.8	3.466987	4.025	4.1	9.275	4	11	4
Solids-Total Dissolved Calculated (mg/L)	895.5	69.42862	823.25	922.5	940.75	793	944	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	882.5	59.09033	822.5	895	930	800	940	4
Strontium-Total (mg.L)	1.2125	0.775	0.4375	1.6	1.6	0.05	1.6	4
Sulfate (mg/L)	482.75	9.810708	472.75	484	491.5	470	493	4
TDS Balance (0.80 - 1.20) (dec.%)	0.99	0.028284	0.96	1	1.01	0.95	1.01	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.025	0.05			0.075		0.1	4
Thorium 230-Suspended (pCi/L)	0.1	0.08165	0.025	0.1	0.175		0.2	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.004063	0.002616	0.001388	0.00525	0.00555	0.00015	0.0056	4
Uranium-Suspended (mg/L)	0.0004	0.000314	0.00015	0.000325	0.000725	0.00015	0.0008	4
Uranium-Total (mg/L)	0.004838	0.003147	0.001588	0.0062	0.006725	0.00015	0.0068	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.1575	0.099121	0.055	0.175	0.2425	0.03	0.25	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #628				
Analyte	**9/28/2007 9:23**	**11/14/2007 10:59**	**2/20/2008 18:30**	**5/29/2008 15:02**
A/C Balance (± 5) (%)	-4.9	-1.74	0.362	5.86
Alkalinity-Total as CaCO3 (mg/L)	134	160	162	160
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.6	0.2	0.2	0.2
Anions (meq/L)	23.5	14.4	17.6	15.2
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.001
Arsenic-Total (mg/L)			0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	154	195	193	195
Boron-Dissolved (mg/L)	0.4	<0.1	0.2	0.2
Boron-Total (mg/L)			<0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	24	43.2	50	40.1
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	21.3	13.9	17.8	17
Chloride (mg/L)	82	35	29	42
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2490	1800	1510	1640
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.5	0.4	0.4	0.5
Gross Alpha-Dissolved (pCi/L)	29.9	83.9	64.5	39
Gross Beta-Dissolved (pCi/L)	14	47.1	19	11.4
Gross Gamma-Dissolved (pCi/L)	<20	1100	440	260
Iron-Dissolved (mg/L)	0.11	<0.03	<0.03	<0.03
Iron-Total (mg/L)			0.7	0.66
Lead 210-Dissolved (pCi/L)	<1	<1	14	0.1
Lead 210-Suspended (pCi/L)	<1	<1	1.2	0.5
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	11.4	16.9	20.6	17.5
Manganese-Dissolved (mg/L)	0.06	0.15	0.09	0.08
Manganese-Total (mg/L)			0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		96	110	180

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #628				
Analyte	**9/28/2007 9:23**	**11/14/2007 10:59**	**2/20/2008 18:30**	**5/29/2008 15:02**
pH	8.66	7.77	8.32	8.21
Polonium 210-Dissolved (pCi/L)	<1	2.7	1.3	-0.5
Polonium 210-Suspended (pCi/L)	6.4	<1	<1	0.1
Polonium 210-Total (pCi/L)	6.4			
Potassium-Dissolved (mg/L)	8.8	8.5	9.3	8.2
Radium 226-Dissolved (pCi/L)	7.4	20.7	9	6.1
Radium 226-Suspended (pCi/L)	<0.2		1.7	-0.3
Radium 226-Total (pCi/L)	6.8			
Radon 222-Total (pCi/L)		2740	4360	5040
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	4.5	7.2	5	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		7.6	9.2	10
Sodium-Dissolved (mg/L)	435	233	306	307
Solids-Total Dissolved Calculated (mg/L)	1530	923	1180	1040
Solids-Total Dissolved TDS @ 180 C (mg/L)	1800	1300	920	980
Strontium-Total (mg.L)			0.9	0.9
Sulfate (mg/L)	1030	635	651	515
TDS Balance (0.80 - 1.20) (dec.%)	1.15	1.44	0.78	0.95
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	<0.2	0.3	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0017	0.0034	0.003	0.0027
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0031	0.0029
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #628								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.1045	4.526388	-4.11	-0.689	4.4855	-4.9	5.86	4
Alkalinity-Total as CaCO3 (mg/L)	154	13.36663	140.5	160	161.5	134	162	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.3	0.2	0.2	0.2	0.5	0.2	0.6	4
Anions (meq/L)	17.675	4.114507	14.6	16.4	22.025	14.4	23.5	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	184.25	20.18869	163.75	194	195	154	195	4
Boron-Dissolved (mg/L)	0.2125	0.143614	0.0875	0.2	0.35	0.05	0.4	4
Boron-Total (mg/L)	0.075	0.035355		0.075		0.05	0.1	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	39.325	11.02161	28.025	41.65	48.3	24	50	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	17.5	3.040833	14.675	17.4	20.425	13.9	21.3	4
Chloride (mg/L)	47	23.93045	30.5	38.5	72	29	82	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1860	436.4249	1542.5	1720	2317.5	1510	2490	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	54.325	24.56045	32.175	51.75	79.05	29.9	83.9	4
Gross Beta-Dissolved (pCi/L)	22.875	16.45507	12.05	16.5	40.075	11.4	47.1	4
Gross Gamma-Dissolved (pCi/L)	452.5	466.2885	72.5	350	935	10	1100	4
Iron-Dissolved (mg/L)	0.03875	0.0475	0.015	0.015	0.08625	0.015	0.11	4
Iron-Total (mg/L)	0.68	0.028284		0.68		0.66	0.7	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	3.775	6.819274	0.2	0.5	10.625	0.1	14	4
Lead 210-Suspended (pCi/L)	0.675	0.35	0.5	0.5	1.025	0.5	1.2	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	16.6	3.827096	12.775	17.2	19.825	11.4	20.6	4
Manganese-Dissolved (mg/L)	0.095	0.03873	0.065	0.085	0.135	0.06	0.15	4
Manganese-Total (mg/L)	0.085	0.007071		0.085		0.08	0.09	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	128.6667	45.0037	96	110	180	96	180	3
pH	8.24	0.367242	7.88	8.265	8.575	7.77	8.66	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #628								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	1	1.351542	-0.25	0.9	2.35	-0.5	2.7	4
Polonium 210-Suspended (pCi/L)	1.875	3.022554	0.2	0.5	4.925	0.1	6.4	4
Polonium 210-Total (pCi/L)	6.4			6.4		6.4	6.4	1
Potassium-Dissolved (mg/L)	8.7	0.469042	8.275	8.65	9.175	8.2	9.3	4
Radium 226-Dissolved (pCi/L)	10.8	6.705719	6.425	8.2	17.775	6.1	20.7	4
Radium 226-Suspended (pCi/L)	0.5	1.058301	-0.3	0.1	1.7	-0.3	1.7	3
Radium 226-Total (pCi/L)	6.8			6.8		6.8	6.8	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	4046.667	1181.581	2740	4360	5040	2740	5040	3
Selenium-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	5.175	1.410378	4.125	4.75	6.65	4	7.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	320.25	83.98164	251.25	306.5	403	233	435	4
Sodium Adsorption Ratio (SAR) (meq/L)	8.933333	1.22202	7.6	9.2	10	7.6	10	3
Solids-Total Dissolved Calculated (mg/L)	1168.25	263.0569	952.25	1110	1442.5	923	1530	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1250	402.8234	935	1140	1675	920	1800	4
Strontium-Total (mg.L)	0.9			0.9		0.9	0.9	2
Sulfate (mg/L)	707.75	223.2418	545	643	935.25	515	1030	4
TDS Balance (0.80 - 1.20) (dec.%)	1.08	0.283666	0.8225	1.05	1.3675	0.78	1.44	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.15	0.1	0.1	0.1	0.25	0.1	0.3	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0027	0.000726	0.00195	0.00285	0.0033	0.0017	0.0034	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.003	0.000141		0.003		0.0029	0.0031	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #631				
Analyte	**9/26/2007 16:40**	**11/14/2007 15:20**	**2/20/2008 13:55**	**5/19/2008 11:06**
A/C Balance (± 5) (%)	-4.28	-3.03	-4.87	5.08
Alkalinity-Total as CaCO3 (mg/L)	168	160	158	164
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	26.9	28.9	29.5	29.7
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			<0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	205	195	193	200
Boron-Dissolved (mg/L)	0.2	<0.1	0.1	0.2
Boron-Total (mg/L)			0.1	0.2
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.001
Calcium-Dissolved (mg/L)	268	307	324	375
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	24.7	27.2	26.8	32.8
Chloride (mg/L)	10	10	8	10
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2180	2170	2420	2530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.2	0.5
Gross Alpha-Dissolved (pCi/L)	51	46.5	162	60.7
Gross Beta-Dissolved (pCi/L)	20.9	29.4	52.1	26.2
Gross Gamma-Dissolved (pCi/L)	520	1900	510	130
Iron-Dissolved (mg/L)	<0.03	0.84	0.57	0.39
Iron-Total (mg/L)			1.06	0.98
Lead 210-Dissolved (pCi/L)	<1	<1	6.1	0.5
Lead 210-Suspended (pCi/L)	<1	<1	7.5	-1.4
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	82.9	89.3	82.6	110
Manganese-Dissolved (mg/L)	0.28	0.29	0.3	0.33
Manganese-Total (mg/L)			0.28	0.32
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.01
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		<0	180	230

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Dewey-Burdock Project

Groundwater Quality Data

Well #631				
Analyte	**9/26/2007 16:40**	**11/14/2007 15:20**	**2/20/2008 13:55**	**5/19/2008 11:06**
pH	7.76	7.23	7.6	7.54
Polonium 210-Dissolved (pCi/L)	<1	3.5	<1	0.2
Polonium 210-Suspended (pCi/L)	<1	<1	<1	0.1
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	15.9	15.7	15.7	16.3
Radium 226-Dissolved (pCi/L)	12.9	9.5	19.4	22.1
Radium 226-Suspended (pCi/L)	2.3		<0.9	-0.3
Radium 226-Total (pCi/L)	15.2			
Radon 222-Total (pCi/L)		4220	3920	4430
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.005
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.002	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.2	7.8	6.9	3.5
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.2	0.99	1.2
Sodium-Dissolved (mg/L)	92.4	92.9	77.1	107
Solids-Total Dissolved Calculated (mg/L)	1690	1830	1880	1980
Solids-Total Dissolved TDS @ 180 C (mg/L)	1900	2000	2000	2000
Strontium-Total (mg.L)			5.6	6.8
Sulfate (mg/L)	1240	1220	1250	1250
TDS Balance (0.80 - 1.20) (dec.%)	1.11	1.09	1.05	1.02
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	0.6	
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0027	0.0029	0.0027	0.0026
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.003		0.0026	0.0028
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	0.01

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Groundwater Quality Data

Well #631								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.775	4.633936	-4.7225	-3.655	3.0525	-4.87	5.08	4
Alkalinity-Total as CaCO3 (mg/L)	162.5	4.434712	158.5	162	167	158	168	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	28.75	1.279323	27.4	29.2	29.65	26.9	29.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	198.25	5.377422	193.5	197.5	203.75	193	205	4
Boron-Dissolved (mg/L)	0.1375	0.075	0.0625	0.15	0.2	0.05	0.2	4
Boron-Total (mg/L)	0.15	0.070711		0.15		0.1	0.2	2
Cadmium-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	318.5	44.3659	277.75	315.5	362.25	268	375	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	27.875	3.461575	25.225	27	31.4	24.7	32.8	4
Chloride (mg/L)	9.5	1	8.5	10	10	8	10	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2325	178.9786	2172.5	2300	2502.5	2170	2530	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.325	0.125831	0.225	0.3	0.45	0.2	0.5	4
Gross Alpha-Dissolved (pCi/L)	80.05	54.95371	47.625	55.85	136.675	46.5	162	4
Gross Beta-Dissolved (pCi/L)	32.15	13.75415	22.225	27.8	46.425	20.9	52.1	4
Gross Gamma-Dissolved (pCi/L)	765	778.1388	225	515	1555	130	1900	4
Iron-Dissolved (mg/L)	0.45375	0.346058	0.10875	0.48	0.7725	0.015	0.84	4
Iron-Total (mg/L)	1.02	0.056569		1.02		0.98	1.06	2
Lead-Dissolved (mg/L)	0.006625	0.01225	0.0005	0.0005	0.018875	0.0005	0.025	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.9	2.8	0.5	0.5	4.7	0.5	6.1	4
Lead 210-Suspended (pCi/L)	1.775	3.920353	-0.925	0.5	5.75	-1.4	7.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	91.2	12.90865	82.675	86.1	104.825	82.6	110	4
Manganese-Dissolved (mg/L)	0.3	0.021602	0.2825	0.295	0.3225	0.28	0.33	4
Manganese-Total (mg/L)	0.3	0.028284		0.3		0.28	0.32	2
Mercury-Dissolved (mg/L)	0.0004	0.0002	0.0002	0.0005	0.0005	0.0001	0.0005	4
Mercury-Total (mg/L)	0.000388	0.000225	0.000163	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4

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Dewey-Burdock Project

Groundwater Quality Data

Well #631								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	136.6667	120.9683		180	230		230	3
pH	7.5325	0.222017	7.3075	7.57	7.72	7.23	7.76	4
Polonium 210-Dissolved (pCi/L)	1.175	1.556438	0.275	0.5	2.75	0.2	3.5	4
Polonium 210-Suspended (pCi/L)	0.4	0.2	0.2	0.5	0.5	0.1	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	15.9	0.282843	15.7	15.8	16.2	15.7	16.3	4
Radium 226-Dissolved (pCi/L)	15.975	5.791589	10.35	16.15	21.425	9.5	22.1	4
Radium 226-Suspended (pCi/L)	0.816667	1.33822	-0.3	0.45	2.3	-0.3	2.3	3
Radium 226-Total (pCi/L)	15.2			15.2		15.2	15.2	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	4190	256.3201	3920	4220	4430	3920	4430	3
Selenium-Dissolved (mg/L)	0.001375	0.001031	0.0005	0.00125	0.002375	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.35	1.936492	4.35	7.05	7.65	3.5	7.8	4
Silver-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	92.35	12.21324	80.925	92.65	103.475	77.1	107	4
Sodium Adsorption Ratio (SAR) (meq/L)	1.13	0.121244	0.99	1.2	1.2	0.99	1.2	3
Solids-Total Dissolved Calculated (mg/L)	1845	120.6924	1725	1855	1955	1690	1980	4
Solids-Total Dissolved TDS @ 180 C (mg/L	1975	50	1925	2000	2000	1900	2000	4
Strontium-Total (mg.L)	6.2	0.848528		6.2		5.6	6.8	2
Sulfate (mg/L)	1240	14.14214	1225	1245	1250	1220	1250	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0675	0.040311	1.0275	1.07	1.105	1.02	1.11	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Suspended (pCi/L)	0.2	0.270801	0.025	0.1	0.475		0.6	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.002	0.001	0.001	0.0025	0.0025	0.0005	0.0025	4
Uranium-Dissolved (mg/L)	0.002725	0.000126	0.002625	0.0027	0.00285	0.0026	0.0029	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.0028	0.0002	0.0026	0.0028	0.003	0.0026	0.003	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.0075	0.003536		0.0075		0.005	0.01	2

Powertech (USA) Inc.

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Groundwater Quality Data

Well #635				
Analyte	**9/26/2007 18:08**	**11/27/2007 8:25**	**2/10/2008 14:55**	**4/29/2008 19:00**
A/C Balance (± 5) (%)	-1.14	-0.831	-0.25	3.52
Alkalinity-Total as CaCO3 (mg/L)	124	118	120	118
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.4	0.5	0.5
Anions (meq/L)	30.4	31.6	33.7	32.8
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			<0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	151	144	146	144
Boron-Dissolved (mg/L)	0.4	0.4	0.5	0.4
Boron-Total (mg/L)			0.5	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	110	120	132	136
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	29.8	31.1	33.5	35.2
Chloride (mg/L)	24	23	26	20
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2890	2830	2950	2810
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	2.5	4.4	14.8	13.2
Gross Beta-Dissolved (pCi/L)	4.3	6.3	10	-8
Gross Gamma-Dissolved (pCi/L)	960	1000	91	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			1.11	1.08
Lead 210-Dissolved (pCi/L)	<1	1.7	<1	
Lead 210-Suspended (pCi/L)	<1	5.1	<1	-9.6
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	0.003	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	44.3	49	52.3	54.1
Manganese-Dissolved (mg/L)	0.06	0.07	0.06	0.06
Manganese-Total (mg/L)			0.06	0.05
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)		270	129.4	180

Powertech (USA) Inc.

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Groundwater Quality Data

Well #635				
Analyte	**9/26/2007 18:08**	**11/27/2007 8:25**	**2/10/2008 14:55**	**4/29/2008 19:00**
pH	7.72	7.64	7.91	8.2
Polonium 210-Dissolved (pCi/L)	<1	1.9	<1	1.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	7.8	8.3	8.2	7.3
Radium 226-Dissolved (pCi/L)	1.6	0.8	1.3	
Radium 226-Suspended (pCi/L)	0.8	<0.2	0.6	0.3
Radium 226-Total (pCi/L)	2.4			
Radon 222-Total (pCi/L)		902	806	1070
Selenium-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.6	9	10	4.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		9.3	9.6	10
Sodium-Dissolved (mg/L)	470	480	515	545
Solids-Total Dissolved Calculated (mg/L)	2040	2120	2270	2280
Solids-Total Dissolved TDS @ 180 C (mg/L)	2200	2300	2300	2200
Strontium-Total (mg.L)			4.2	4.6
Sulfate (mg/L)	1500	1370	1470	1430
TDS Balance (0.80 - 1.20) (dec.%)	1.09	1.08	1.03	0.98
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0.2
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.002	0.002	0.0021	0.0017
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.002		0.0021	0.0017
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

Powertech (USA) Inc.

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Groundwater Quality Data

Well #635								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.32475	2.161883	-1.06275	-0.5405	2.5775	-1.14	3.52	4
Alkalinity-Total as CaCO3 (mg/L)	120	2.828427	118	119	123	118	124	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.375	0.189297	0.175	0.45	0.5	0.1	0.5	4
Anions (meq/L)	32.125	1.436141	30.7	32.2	33.475	30.4	33.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	146.25	3.304038	144	145	149.75	144	151	4
Boron-Dissolved (mg/L)	0.425	0.05	0.4	0.4	0.475	0.4	0.5	4
Boron-Total (mg/L)	0.45	0.070711		0.45		0.4	0.5	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	124.5	11.81807	112.5	126	135	110	136	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	32.4	2.415229	30.125	32.3	34.775	29.8	35.2	4
Chloride (mg/L)	23.25	2.5	20.75	23.5	25.5	20	26	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2870	63.24555	2815	2860	2935	2810	2950	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	8.725	6.174882	2.975	8.8	14.4	2.5	14.8	4
Gross Beta-Dissolved (pCi/L)	3.15	7.799359	-4.925	5.3	9.075	-8	10	4
Gross Gamma-Dissolved (pCi/L)	512.75	541.0578	22.75	525.5	990		1000	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	1.095	0.021213		1.095		1.08	1.11	2
Lead-Dissolved (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	0.675	0.722842	0.125	0.5	1.4		1.7	4
Lead 210-Suspended (pCi/L)	-0.875	6.207724	-7.075	0.5	3.95	-9.6	5.1	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	49.925	4.303777	45.475	50.65	53.65	44.3	54.1	4
Manganese-Dissolved (mg/L)	0.0625	0.005	0.06	0.06	0.0675	0.06	0.07	4
Manganese-Total (mg/L)	0.055	0.007071		0.055		0.05	0.06	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.03	0.028284		0.03		0.01	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #635								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	193.1333	71.21414	129.4	180	270	129.4	270	3
pH	7.8675	0.248914	7.66	7.815	8.1275	7.64	8.2	4
Polonium 210-Dissolved (pCi/L)	1	0.663325	0.5	0.8	1.7	0.5	1.9	4
Polonium 210-Suspended (pCi/L)	0.375	0.25	0.125	0.5	0.5		0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	7.9	0.454606	7.425	8	8.275	7.3	8.3	4
Radium 226-Dissolved (pCi/L)	1.233333	0.404145	0.8	1.3	1.6	0.8	1.6	3
Radium 226-Suspended (pCi/L)	0.45	0.310913	0.15	0.45	0.75	0.1	0.8	4
Radium 226-Total (pCi/L)	2.4			2.4		2.4	2.4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	926	133.6263	806	902	1070	806	1070	3
Selenium-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Selenium-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	8.125	2.229163	5.825	8.8	9.75	4.9	10	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	502.5	34.27827	472.5	497.5	537.5	470	545	4
Sodium Adsorption Ratio (SAR) (meq/L)	9.633333	0.351188	9.3	9.6	10	9.3	10	3
Solids-Total Dissolved Calculated (mg/L)	2177.5	117.2959	2060	2195	2277.5	2040	2280	4
olids-Total Dissolved TDS @ 180 C (mg/L	2250	57.73503	2200	2250	2300	2200	2300	4
Strontium-Total (mg.L)	4.4	0.282843		4.4		4.2	4.6	2
Sulfate (mg/L)	1442.5	56.19905	1385	1450	1492.5	1370	1500	4
TDS Balance (0.80 - 1.20) (dec.%)	1.045	0.050662	0.9925	1.055	1.0875	0.98	1.09	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.125	0.05	0.1	0.1	0.175	0.1	0.2	4
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00195	0.000173	0.001775	0.002	0.002075	0.0017	0.0021	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.001933	0.000208	0.0017	0.002	0.0021	0.0017	0.0021	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00875	0.0075	0.005	0.005	0.01625	0.005	0.02	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #650				
Analyte	**9/28/2007 19:00**	**11/12/2007 15:30**	**3/24/2008 9:00**	**5/30/2008 16:30**
A/C Balance (± 5) (%)	-3.87	4.96	-5.85	-1.4
Alkalinity-Total as CaCO3 (mg/L)	116	108	30	30
Aluminum-Dissolved (mg/L)	0.6	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.6	0.6	0.4	0.4
Anions (meq/L)	25.9	23.5	17.8	18.2
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	141	132	37	37
Boron-Dissolved (mg/L)	<0.1	<0.1	0.1	0.1
Boron-Total (mg/L)			0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.005
Calcium-Dissolved (mg/L)	219	221	101	125
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	23.9	26	15.9	17.7
Chloride (mg/L)	17	16	19	16
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2260	1770	1540	1700
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			0.08	<0.01
Fluoride (mg/L)	<0.1	<0.1	0.1	0.1
Gross Alpha-Dissolved (pCi/L)	13.1	5.6	2.9	2.1
Gross Beta-Dissolved (pCi/L)	20.9	20.1	12.5	10.8
Gross Gamma-Dissolved (pCi/L)	1100	2200	<20	
Iron-Dissolved (mg/L)	13.2	0.68	0.06	0.1
Iron-Total (mg/L)			7.59	8.99
Lead 210-Dissolved (pCi/L)	<1	1.4	24	1.5
Lead 210-Suspended (pCi/L)	<1	<1	12	6.2
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			0.05	0.002
Magnesium-Dissolved (mg/L)	85.2	100	62.3	70.6
Manganese-Dissolved (mg/L)	2.44	1.39	0.43	0.94
Manganese-Total (mg/L)			0.56	0.66
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		190	120	200

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #650				
Analyte	**9/28/2007 19:00**	**11/12/2007 15:30**	**3/24/2008 9:00**	**5/30/2008 16:30**
pH	7.04	7.22	7.4	7.3
Polonium 210-Dissolved (pCi/L)	<1	<1	0.4	-0.2
Polonium 210-Suspended (pCi/L)	<1	<1	1.2	0.2
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	17.6	18.1	14.5	15.6
Radium 226-Dissolved (pCi/L)	2.7	2.4	1.4	1.2
Radium 226-Suspended (pCi/L)	0.6	<0.2	0.7	-0.02
Radium 226-Total (pCi/L)	3.2			
Radon 222-Total (pCi/L)		134	202	254
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	2.7	1.1	0.9	<0.5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.9	2.3	2.1
Sodium-Dissolved (mg/L)	110	139	121	119
Solids-Total Dissolved Calculated (mg/L)	1630	1560	1140	1190
Solids-Total Dissolved TDS @ 180 C (mg/L)	2000	1600	1300	1400
Strontium-Total (mg.L)			2.1	2.6
Sulfate (mg/L)	1320	1000	801	825
TDS Balance (0.80 - 1.20) (dec.%)	1.21	1.01	1.11	1.13
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	0.4	
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	0.8	0.2
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0019	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	0.0014	<0.0003	0.0033	<0.0003
Uranium-Total (mg/L)			0.0004	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			0.07	0.02

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #650								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.54	4.700163	-5.355	-2.635	3.37	-5.85	4.96	4
Alkalinity-Total as CaCO3 (mg/L)	71	47.45524	30	69	114	30	116	4
Aluminum-Dissolved (mg/L)	0.1875	0.275	0.05	0.05	0.4625	0.05	0.6	4
Ammonia (mg/L)	0.5	0.11547	0.4	0.5	0.6	0.4	0.6	4
Anions (meq/L)	21.35	3.993745	17.9	20.85	25.3	17.8	25.9	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Arsenic-Total (mg/L)	0.0015	0.000707		0.0015		0.001	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	86.75	57.56373	37	84.5	138.75	37	141	4
Boron-Dissolved (mg/L)	0.075	0.028868	0.05	0.075	0.1	0.05	0.1	4
Boron-Total (mg/L)	0.1			0.1		0.1	0.1	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	166.5	62.55398	107	172	220.5	101	221	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	20.875	4.838991	16.35	20.8	25.475	15.9	26	4
Chloride (mg/L)	17	1.414214	16	16.5	18.5	16	19	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1817.5	310.309	1580	1735	2137.5	1540	2260	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.0425	0.053033		0.0425		0.005	0.08	2
Fluoride (mg/L)	0.075	0.028868	0.05	0.075	0.1	0.05	0.1	4
Gross Alpha-Dissolved (pCi/L)	5.925	5.012235	2.3	4.25	11.225	2.1	13.1	4
Gross Beta-Dissolved (pCi/L)	16.075	5.166801	11.225	16.3	20.7	10.8	20.9	4
Gross Gamma-Dissolved (pCi/L)	827.5	1050.567	2.5	555	1925		2200	4
Iron-Dissolved (mg/L)	3.51	6.46621	0.07	0.39	10.07	0.06	13.2	4
Iron-Total (mg/L)	8.29	0.989949		8.29		7.59	8.99	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.026	0.033941		0.026		0.002	0.05	2
Lead 210-Dissolved (pCi/L)	6.85	11.44217	0.725	1.45	18.375	0.5	24	4
Lead 210-Suspended (pCi/L)	4.8	5.500909	0.5	3.35	10.55	0.5	12	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	79.525	16.61112	64.375	77.9	96.3	62.3	100	4
Manganese-Dissolved (mg/L)	1.3	0.855219	0.5575	1.165	2.1775	0.43	2.44	4
Manganese-Total (mg/L)	0.61	0.070711		0.61		0.56	0.66	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000175	0.000218	0.00005	0.000075	0.0004	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #650								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	170	43.58899	120	190	200	120	200	3
pH	7.24	0.152315	7.085	7.26	7.375	7.04	7.4	4
Polonium 210-Dissolved (pCi/L)	0.3	0.33665	-0.05	0.45	0.5	-0.2	0.5	4
Polonium 210-Suspended (pCi/L)	0.6	0.424264	0.275	0.5	1.025	0.2	1.2	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	16.45	1.690168	14.775	16.6	17.975	14.5	18.1	4
Radium 226-Dissolved (pCi/L)	1.925	0.736546	1.25	1.9	2.625	1.2	2.7	4
Radium 226-Suspended (pCi/L)	0.345	0.357911	0.01	0.35	0.675	-0.02	0.7	4
Radium 226-Total (pCi/L)	3.2			3.2		3.2	3.2	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	196.6667	60.17752	134	202	254	134	254	3
Selenium-Dissolved (mg/L)	0.001375	0.001031	0.0005	0.00125	0.002375	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	1.2375	1.040332	0.4125	1	2.3	0.25	2.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	122.25	12.14839	112.25	120	134.5	110	139	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.1	0.2	1.9	2.1	2.3	1.9	2.3	3
Solids-Total Dissolved Calculated (mg/L)	1380	250.7323	1152.5	1375	1612.5	1140	1630	4
Solids-Total Dissolved TDS @ 180 C (mg/L	1575	309.5696	1325	1500	1900	1300	2000	4
Strontium-Total (mg.L)	2.35	0.353553		2.35		2.1	2.6	2
Sulfate (mg/L)	986.5	239.3721	807	912.5	1240	801	1320	4
TDS Balance (0.80 - 1.20) (dec.%)	1.115	0.08226	1.035	1.12	1.19	1.01	1.21	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.173205	0.025	0.1	0.325		0.4	4
Thorium 230-Suspended (pCi/L)	0.3	0.33665	0.1	0.15	0.65	0.1	0.8	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.000588	0.000875	0.00015	0.00015	0.001463	0.00015	0.0019	4
Uranium-Suspended (mg/L)	0.00125	0.001488	0.00015	0.000775	0.002825	0.00015	0.0033	4
Uranium-Total (mg/L)	0.000275	0.000177		0.000275		0.00015	0.0004	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00875	0.0075	0.005	0.005	0.01625	0.005	0.02	4
Zinc-Total (mg/L)	0.045	0.035355		0.045		0.02	0.07	2

POWERTECH (USA) INC.

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Dewey-Burdock Project

Groundwater Quality Data

Well #675					
Analyte	**9/28/2007 10:49**	**11/27/2007 17:34**	**2/5/2008 12:05**	**4/29/2008 17:47**	**4/29/2008 17:50**
A/C Balance (± 5) (%)	-4.99	1.35	5.71	1.42	0.84
Alkalinity-Total as CaCO3 (mg/L)	378	352	388	422	428
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	0.5	0.3	0.2	0.2
Anions (meq/L)	84.2	80	77.8	89.5	90.4
Antimony-Total (mg/L)			<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)			0.002	0.002	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	461	429	473	514	522
Boron-Dissolved (mg/L)	0.4	0.3	0.4	0.3	0.3
Boron-Total (mg/L)			<0.1	0.3	0.3
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	400	410	439	450	452
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	76.2	82.2	87.2	92.1	91.9
Chloride (mg/L)	64	60	75	64	64
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	6090	5830	6340	6560	6530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01	<0.01
Fluoride (mg/L)	0.1	0.4	0.6	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	18.8	18.3	29.3	55.2	51.1
Gross Beta-Dissolved (pCi/L)	18.5	<2	25.3	8	-0.4
Gross Gamma-Dissolved (pCi/L)	<20	1100	<20		
Iron-Dissolved (mg/L)	0.13	0.05	0.15	1.88	2.32
Iron-Total (mg/L)			3.48	5.03	5.12
Lead 210-Dissolved (pCi/L)	<1	6	<1		
Lead 210-Suspended (pCi/L)	14	<1	<1	-19.2	-5.2
Lead 210-Total (pCi/L)	14				
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	339	362	376	408	416
Manganese-Dissolved (mg/L)	2.89	3.14	3.39	3.02	2.66
Manganese-Total (mg/L)			3.4	3.02	2.75
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	0.07	0.07
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05	<0.05
Oxidation-Reduction Potential (mV)		220	180	240	240
pH	7.25	7.32	7.29	7.53	7.79
Polonium 210-Dissolved (pCi/L)	<1	<1	2.1	0.6	1.2
Polonium 210-Suspended (pCi/L)	<1	2	<1	0.3	-0.1
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	28	25.2	24.5	21.7	21.4

Powertech (USA) Inc.

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Groundwater Quality Data

Well #675					
Analyte	**9/28/2007 10:49**	**11/27/2007 17:34**	**2/5/2008 12:05**	**4/29/2008 17:47**	**4/29/2008 17:50**
Radium 226-Dissolved (pCi/L)	<0.2	0.5	<0.2		
Radium 226-Suspended (pCi/L)	2.3	1.7	<0.2	0.7	0.7
Radium 226-Total (pCi/L)	2.3				
Radon 222-Total (pCi/L)		712	783	960	960
Selenium-Dissolved (mg/L)	0.003	<0.001	0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.004	0.002	0.002
Selenium-VI-Dissolved (mg/L)		<0.001	0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	16	14.9	14.4	7.3	7.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005	<0.005
odium Adsorption Ratio (SAR) (meq/L)		6.2	6.5	6.6	6.4
Sodium-Dissolved (mg/L)	630	713	769	809	789
olids-Total Dissolved Calculated (mg/	5280	5200	5180	5830	5860
ds-Total Dissolved TDS @ 180 C (m	5900	6100	6100	5700	4800
Strontium-Total (mg.L)			8.3	8.8	8.6
Sulfate (mg/L)	3600	3420	3260	3810	3840
TDS Balance (0.80 - 1.20) (dec.%)	1.11	1.17	1.18	0.97	0.82
Thallium-Total (mg/L)			<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2		
Thorium 230-Suspended (pCi/L)	<0.2	1.3	<0.2		0.1
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0372	0.0307	0.0387	0.0493	0.0485
Uranium-Suspended (mg/L)	0.0013	0.003	0.0005	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0387	0.0502	0.0516
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	0.02	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01	0.01

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.866	3.817686	-2.075	1.35	3.565	-4.99	5.71	5
Alkalinity-Total as CaCO3 (mg/L)	393.6	31.6038	365	388	425	352	428	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.3	0.122474	0.2	0.3	0.4	0.2	0.5	5
Anions (meq/L)	84.38	5.589454	78.9	84.2	89.95	77.8	90.4	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.0009	0.000224	0.00075	0.001	0.001	0.0005	0.001	5
Arsenic-Total (mg/L)	0.002		0.002	0.002	0.002	0.002	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Bicarbonate as HCO3 (mg/L)	479.8	38.50584	445	473	518	429	522	5
Boron-Dissolved (mg/L)	0.34	0.054772	0.3	0.3	0.4	0.3	0.4	5
Boron-Total (mg/L)	0.216667	0.144338	0.05	0.3	0.3	0.05	0.3	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	430.2	23.79496	405	439	451	400	452	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	85.92	6.780634	79.2	87.2	92	76.2	92.1	5
Chloride (mg/L)	65.4	5.639149	62	64	69.5	60	75	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	6270	309.2733	5960	6340	6545	5830	6560	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.42	0.192354	0.25	0.5	0.55	0.1	0.6	5
Gross Alpha-Dissolved (pCi/L)	34.54	17.6069	18.55	29.3	53.15	18.3	55.2	5
Gross Beta-Dissolved (pCi/L)	10.48	11.16185	0.3	8	21.9	-0.4	25.3	5
Gross Gamma-Dissolved (pCi/L)	224	489.7244		10	555		1100	5
Iron-Dissolved (mg/L)	0.906	1.101649	0.09	0.15	2.1	0.05	2.32	5
Iron-Total (mg/L)	4.543333	0.921973	3.48	5.03	5.12	3.48	5.12	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	1.4	2.583602		0.5	3.25		6	5
Lead 210-Suspended (pCi/L)	-1.88	11.98445	-12.2	0.5	7.25	-19.2	14	5
Lead 210-Total (pCi/L)	14			14		14	14	1
Magnesium-Dissolved (mg/L)	380.2	32.01874	350.5	376	412	339	416	5
Manganese-Dissolved (mg/L)	3.02	0.272855	2.775	3.02	3.265	2.66	3.39	5
Manganese-Total (mg/L)	3.056667	0.326548	2.75	3.02	3.4	2.75	3.4	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.035	0.025981	0.005	0.05	0.05	0.005	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nitrogen, Nitrate as N (mg/L)	0.058	0.010954	0.05	0.05	0.07	0.05	0.07	5
Nitrogen, Nitrite as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	220	28.28427	190	230	240	180	240	4
pH	7.436	0.225566	7.27	7.32	7.66	7.25	7.79	5
Polonium 210-Dissolved (pCi/L)	0.98	0.690652	0.5	0.6	1.65	0.5	2.1	5
Polonium 210-Suspended (pCi/L)	0.64	0.798749	0.1	0.5	1.25	-0.1	2	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	24.16	2.720845	21.55	24.5	26.6	21.4	28	5
Radium 226-Dissolved (pCi/L)	0.233333	0.23094	0.1	0.1	0.5	0.1	0.5	3
Radium 226-Suspended (pCi/L)	1.1	0.883176	0.4	0.7	2	0.1	2.3	5
Radium 226-Total (pCi/L)	2.3			2.3		2.3	2.3	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	853.75	126.0645	729.75	871.5	960	712	960	4
Selenium-Dissolved (mg/L)	0.0011	0.001084	0.0005	0.0005	0.002	0.0005	0.003	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.002667	0.001155	0.002	0.002	0.004	0.002	0.004	3
Selenium-VI-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Silica-Dissolved (mg/L)	12	4.284274	7.35	14.4	15.45	7.3	16	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	742	72.13182	671.5	769	799	630	809	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.425	0.170783	6.25	6.45	6.575	6.2	6.6	4
Solids-Total Dissolved Calculated (mg/L)	5470	344.5287	5190	5280	5845	5180	5860	5
Solids-Total Dissolved TDS @ 180 C (mg/L	5720	540.3702	5250	5900	6100	4800	6100	5
Strontium-Total (mg.L)	8.566667	0.251661	8.3	8.6	8.8	8.3	8.8	3
Sulfate (mg/L)	3586	249.3592	3340	3600	3825	3260	3840	5
TDS Balance (0.80 - 1.20) (dec.%)	1.05	0.15346	0.895	1.11	1.175	0.82	1.18	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)	0.06	0.054772		0.1	0.1		0.1	5
Thorium 230-Suspended (pCi/L)	0.32	0.549545	0.05	0.1	0.7		1.3	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.04088	0.00792	0.03395	0.0387	0.0489	0.0307	0.0493	5
Uranium-Suspended (mg/L)	0.00102	0.001202	0.00015	0.0005	0.00215	0.00015	0.003	5
Uranium-Total (mg/L)	0.046833	0.007078	0.0387	0.0502	0.0516	0.0387	0.0516	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.011	0.008216	0.005	0.005	0.02	0.005	0.02	5
Zinc-Total (mg/L)	0.006667	0.002887	0.005	0.005	0.01	0.005	0.01	3

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.866	3.817686	-2.075	1.35	3.565	-4.99	5.71	5
Alkalinity-Total as CaCO3 (mg/L)	393.6	31.6038	365	388	425	352	428	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.3	0.122474	0.2	0.3	0.4	0.2	0.5	5
Anions (meq/L)	84.38	5.589454	78.9	84.2	89.95	77.8	90.4	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.0009	0.000224	0.00075	0.001	0.001	0.0005	0.001	5
Arsenic-Total (mg/L)	0.002		0.002	0.002	0.002	0.002	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Bicarbonate as HCO3 (mg/L)	479.8	38.50584	445	473	518	429	522	5
Boron-Dissolved (mg/L)	0.34	0.054772	0.3	0.3	0.4	0.3	0.4	5
Boron-Total (mg/L)	0.216667	0.144338	0.05	0.3	0.3	0.05	0.3	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	430.2	23.79496	405	439	451	400	452	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	85.92	6.780634	79.2	87.2	92	76.2	92.1	5
Chloride (mg/L)	65.4	5.639149	62	64	69.5	60	75	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	6270	309.2733	5960	6340	6545	5830	6560	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.42	0.192354	0.25	0.5	0.55	0.1	0.6	5
Gross Alpha-Dissolved (pCi/L)	34.54	17.6069	18.55	29.3	53.15	18.3	55.2	5
Gross Beta-Dissolved (pCi/L)	10.48	11.16185	0.3	8	21.9	-0.4	25.3	5
Gross Gamma-Dissolved (pCi/L)	224	489.7244		10	555		1100	5
Iron-Dissolved (mg/L)	0.906	1.101649	0.09	0.15	2.1	0.05	2.32	5
Iron-Total (mg/L)	4.543333	0.921973	3.48	5.03	5.12	3.48	5.12	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	1.4	2.583602		0.5	3.25		6	5
Lead 210-Suspended (pCi/L)	-1.88	11.98445	-12.2	0.5	7.25	-19.2	14	5
Lead 210-Total (pCi/L)	14			14		14	14	1
Magnesium-Dissolved (mg/L)	380.2	32.01874	350.5	376	412	339	416	5
Manganese-Dissolved (mg/L)	3.02	0.272855	2.775	3.02	3.265	2.66	3.39	5
Manganese-Total (mg/L)	3.056667	0.326548	2.75	3.02	3.4	2.75	3.4	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.035	0.025981	0.005	0.05	0.05	0.005	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nitrogen, Nitrate as N (mg/L)	0.058	0.010954	0.05	0.05	0.07	0.05	0.07	5
Nitrogen, Nitrite as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	220	28.28427	190	230	240	180	240	4
pH	7.436	0.225566	7.27	7.32	7.66	7.25	7.79	5
Polonium 210-Dissolved (pCi/L)	0.98	0.690652	0.5	0.6	1.65	0.5	2.1	5
Polonium 210-Suspended (pCi/L)	0.64	0.798749	0.1	0.5	1.25	-0.1	2	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	24.16	2.720845	21.55	24.5	26.6	21.4	28	5
Radium 226-Dissolved (pCi/L)	0.233333	0.23094	0.1	0.1	0.5	0.1	0.5	3
Radium 226-Suspended (pCi/L)	1.1	0.883176	0.4	0.7	2	0.1	2.3	5
Radium 226-Total (pCi/L)	2.3			2.3		2.3	2.3	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	853.75	126.0645	729.75	871.5	960	712	960	4
Selenium-Dissolved (mg/L)	0.0011	0.001084	0.0005	0.0005	0.002	0.0005	0.003	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.002667	0.001155	0.002	0.002	0.004	0.002	0.004	3
Selenium-VI-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Silica-Dissolved (mg/L)	12	4.284274	7.35	14.4	15.45	7.3	16	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	742	72.13182	671.5	769	799	630	809	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.425	0.170783	6.25	6.45	6.575	6.2	6.6	4
Solids-Total Dissolved Calculated (mg/L)	5470	344.5287	5190	5280	5845	5180	5860	5
Solids-Total Dissolved TDS @ 180 C (mg/L	5720	540.3702	5250	5900	6100	4800	6100	5
Strontium-Total (mg.L)	8.566667	0.251661	8.3	8.6	8.8	8.3	8.8	3
Sulfate (mg/L)	3586	249.3592	3340	3600	3825	3260	3840	5
TDS Balance (0.80 - 1.20) (dec.%)	1.05	0.15346	0.895	1.11	1.175	0.82	1.18	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)	0.06	0.054772		0.1	0.1		0.1	5
Thorium 230-Suspended (pCi/L)	0.32	0.549545	0.05	0.1	0.7		1.3	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.04088	0.00792	0.03395	0.0387	0.0489	0.0307	0.0493	5
Uranium-Suspended (mg/L)	0.00102	0.001202	0.00015	0.0005	0.00215	0.00015	0.003	5
Uranium-Total (mg/L)	0.046833	0.007078	0.0387	0.0502	0.0516	0.0387	0.0516	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.011	0.008216	0.005	0.005	0.02	0.005	0.02	5
Zinc-Total (mg/L)	0.006667	0.002887	0.005	0.005	0.01	0.005	0.01	3

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #676				
Analyte	**9/28/2007 13:46**	**11/27/2007 12:20**	**2/5/2008 16:57**	**4/29/2008 12:27**
A/C Balance (± 5) (%)	-3.7	-2.19	0.0941	1.76
Alkalinity-Total as CaCO3 (mg/L)	240	228	208	220
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	38.2	40.9	39.5	41.4
Antimony-Total (mg/L)	0	0	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0	0	0.021	<0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	0	0	0.5	<0.1
Beryllium-Total (mg/L)	0	0	0.003	<0.001
Bicarbonate as HCO3 (mg/L)	293	278	254	268
Boron-Dissolved (mg/L)	0.4	0.4	0.5	0.5
Boron-Total (mg/L)	0	0	0.5	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	0	0	<0.005	<0.005
Calcium-Dissolved (mg/L)	465	514	518	561
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	35.5	39.1	39.5	430
Chloride (mg/L)	15	16	14	13
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	0	0	0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2880	2860	3010	3100
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	0	0	0.12	<0.01
Fluoride (mg/L)	0.2	0.2	0.4	0.3
Gross Alpha-Dissolved (pCi/L)	37.1	31.9	95.5	51.6
Gross Beta-Dissolved (pCi/L)	11.1	21.6	22.1	9.2
Gross Gamma-Dissolved (pCi/L)	1100	1000	<20	0
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0	0	66	0.57
Lead 210-Dissolved (pCi/L)	<1	<1	4.1	-0.9
Lead 210-Suspended (pCi/L)	<1	<1	3.8	-6.7
Lead 210-Total (pCi/L)	<1	0	0	0
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0	0	0.06	<0.001
Magnesium-Dissolved (mg/L)	104	113	114	129
Manganese-Dissolved (mg/L)	0.02	<0.01	0.02	<0.01
Manganese-Total (mg/L)	0	0	2.52	0.03
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0	0	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	0	0	0.1	<0.05
Nitrogen, Nitrate as N (mg/L)	1	1	0.7	0.76
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)	0	250	230	280

Powertech (USA) Inc.

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Groundwater Quality Data

Well #676				
Analyte	**9/28/2007 13:46**	**11/27/2007 12:20**	**2/5/2008 16:57**	**4/29/2008 12:27**
pH	7.13	7.17	7.2	7.46
Polonium 210-Dissolved (pCi/L)	<1	1.2	2.9	1.1
Polonium 210-Suspended (pCi/L)	<1	<1	2.2	0.1
Polonium 210-Total (pCi/L)	<1	0	0	0
Potassium-Dissolved (mg/L)	11.6	12.3	12.7	10.9
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Radium 226-Suspended (pCi/L)	<0.2	<0.2	11.4	0
Radium 226-Total (pCi/L)	<0.2	0	0	0
Radon 222-Total (pCi/L)	0	453	686	755
Selenium-Dissolved (mg/L)	0.017	0.014	0.012	0.009
Selenium-IV-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0	0	0.013	0.012
Selenium-VI-Dissolved (mg/L)	0	0.014	0.012	0.009
Silica-Dissolved (mg/L)	13.7	14.4	14.3	6.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	0	0	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	0	0.92	0.96	0.93
Sodium-Dissolved (mg/L)	80	88.8	92.2	94
Solids-Total Dissolved Calculated (mg/L)	2410	2600	2550	2720
Solids-Total Dissolved TDS @ 180 C (mg/L)	3000	2900	2500	2600
Strontium-Total (mg.L)	0	0	9.2	8.6
Sulfate (mg/L)	1790	1720	1670	1760
TDS Balance (0.80 - 1.20) (dec.%)	1.24	1.12	0.98	0.95
Thallium-Total (mg/L)	0	0	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	4.2	0
Thorium 230-Total (pCi/L)	<0.2	0	0	0
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0494	0.0548	0.0586	0.0557
Uranium-Suspended (mg/L)	0.0096	0.0011	0.0702	<0.0003
Uranium-Total (mg/L)	0	0	0.0687	0.0591
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.03	<0.01	<0.01
Zinc-Total (mg/L)	0	0	0.28	0.03

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Dewey-Burdock Project

Groundwater Quality Data

Well #676								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.00898	2.416639	-3.3225	-1.04795	1.343525	-3.7	1.76	4
Alkalinity-Total as CaCO3 (mg/L)	224	13.46601	211	224	237	208	240	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	40	1.44453	38.525	40.2	41.275	38.2	41.4	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.01075	0.014496		0.01075		0.0005	0.021	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.275	0.318198		0.275		0.05	0.5	2
Beryllium-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Bicarbonate as HCO3 (mg/L)	273.25	16.43928	257.5	273	289.25	254	293	4
Boron-Dissolved (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Boron-Total (mg/L)	0.45	0.070711		0.45		0.4	0.5	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	514.5	39.26406	477.25	516	550.25	465	561	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	136.025	195.9916	36.4	39.3	332.375	35.5	430	4
Chloride (mg/L)	14.5	1.290994	13.25	14.5	15.75	13	16	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.0375	0.017678		0.0375		0.025	0.05	2
Conductivity @ 25 C (umhos/cm)	2962.5	113.2475	2865	2945	3077.5	2860	3100	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.0625	0.081317		0.0625		0.005	0.12	2
Fluoride (mg/L)	0.275	0.095743	0.2	0.25	0.375	0.2	0.4	4
Gross Alpha-Dissolved (pCi/L)	54.025	28.87922	33.2	44.35	84.525	31.9	95.5	4
Gross Beta-Dissolved (pCi/L)	16	6.802451	9.675	16.35	21.975	9.2	22.1	4
Gross Gamma-Dissolved (pCi/L)	527.5	604.7245	2.5	505	1075		1100	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	33.285	46.266		33.285		0.57	66	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.03025	0.042073		0.03025		0.0005	0.06	2
Lead 210-Dissolved (pCi/L)	1.05	2.137756	-0.55	0.5	3.2	-0.9	4.1	4
Lead 210-Suspended (pCi/L)	-0.475	4.431986	-4.9	0.5	2.975	-6.7	3.8	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	115	10.36018	106.25	113.5	125.25	104	129	4
Manganese-Dissolved (mg/L)	0.0125	0.00866	0.005	0.0125	0.02	0.005	0.02	4
Manganese-Total (mg/L)	1.275	1.760696		1.275		0.03	2.52	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.0625	0.053033		0.0625		0.025	0.1	2
Nitrogen, Nitrate as N (mg/L)	0.865	0.157797	0.715	0.88	1	0.7	1	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

Powertech (USA) Inc.

Powertech (USA)
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Groundwater Quality Data

Well #676								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	253.3333	25.16611	230	250	280	230	280	3
pH	7.24	0.149443	7.14	7.185	7.395	7.13	7.46	4
Polonium 210-Dissolved (pCi/L)	1.425	1.030776	0.65	1.15	2.475	0.5	2.9	4
Polonium 210-Suspended (pCi/L)	0.825	0.93586	0.2	0.5	1.775	0.1	2.2	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.875	0.7932	11.075	11.95	12.6	10.9	12.7	4
Radium 226-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	3
Radium 226-Suspended (pCi/L)	3.866667	6.524058	0.1	0.1	11.4	0.1	11.4	3
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	631.3333	158.2477	453	686	755	453	755	3
Selenium-Dissolved (mg/L)	0.013	0.003367	0.00975	0.013	0.01625	0.009	0.017	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0125	0.000707		0.0125		0.012	0.013	2
Selenium-VI-Dissolved (mg/L)	0.011667	0.002517	0.009	0.012	0.014	0.009	0.014	3
Silica-Dissolved (mg/L)	12.2	3.879003	8.225	14	14.375	6.4	14.4	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	88.75	6.219057	82.2	90.5	93.55	80	94	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.936667	0.020817	0.92	0.93	0.96	0.92	0.96	3
Solids-Total Dissolved Calculated (mg/L)	2570	128.3225	2445	2575	2690	2410	2720	4
;olids-Total Dissolved TDS @ 180 C (mg/L	2750	238.0476	2525	2750	2975	2500	3000	4
Strontium-Total (mg.L)	8.9	0.424264		8.9		8.6	9.2	2
Sulfate (mg/L)	1735	51.96152	1682.5	1740	1782.5	1670	1790	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0725	0.134009	0.9575	1.05	1.21	0.95	1.24	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	1.1	2.067204	0.025	0.1	3.175		4.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.054625	0.003842	0.05075	0.05525	0.057875	0.0494	0.0586	4
Uranium-Suspended (mg/L)	0.020263	0.033562	0.000388	0.00535	0.05505	0.00015	0.0702	4
Uranium-Total (mg/L)	0.0639	0.006788		0.0639		0.0591	0.0687	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.01125	0.0125	0.005	0.005	0.02375	0.005	0.03	4
Zinc-Total (mg/L)	0.155	0.176777		0.155		0.03	0.28	2

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Groundwater Quality Data

Well #677				
Analyte	**9/28/2007 12:26**	**11/27/2007 15:20**	**2/5/2008 13:39**	**4/29/2008 15:14**
A/C Balance (± 5) (%)	-3.56	-3.76	3.88	2.3
Alkalinity-Total as CaCO3 (mg/L)	532	482	494	480
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	<0.1	<0.1	<0.1
Anions (meq/L)	140	148	136	150
Antimony-Total (mg/L)	0	0	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	0.001	0.001
Arsenic-Total (mg/L)	0	0	0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	0	0	<0.1	<0.1
Beryllium-Total (mg/L)	0	0	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	649	588	602	585
Boron-Dissolved (mg/L)	0.9	0.8	0.8	0.7
Boron-Total (mg/L)	0	0	0.7	0.7
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	0	0	<0.005	<0.005
Calcium-Dissolved (mg/L)	420	454	478	516
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	130	138	147	157
Chloride (mg/L)	1720	1780	1290	1710
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	0	0	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	11000	10800	11600	12100
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	0	0	<0.01	<0.01
Fluoride (mg/L)	<0.1	0.1	<0.1	0.7
Gross Alpha-Dissolved (pCi/L)	41	38.7	129	43.1
Gross Beta-Dissolved (pCi/L)	<2	<2	-2	-30
Gross Gamma-Dissolved (pCi/L)	1100	1000	<20	0
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0	0	0.12	0.04
Lead 210-Dissolved (pCi/L)	<1	1.1	2.1	0
Lead 210-Suspended (pCi/L)	<1	<1	<1	-2.3
Lead 210-Total (pCi/L)	<1	0	0	0
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0	0	<0.001	<0.001
Magnesium-Dissolved (mg/L)	360	395	414	454
Manganese-Dissolved (mg/L)	2.89	2.55	2.59	1.62
Manganese-Total (mg/L)	0	0	2.65	1.71
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0	0	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	0	0	<0.05	<0.05

Powertech (USA)
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Groundwater Quality Data

Well #677				
Analyte	**9/28/2007 12:26**	**11/27/2007 15:20**	**2/5/2008 13:39**	**4/29/2008 15:14**
Nitrogen, Nitrate as N (mg/L)	<0.1	0.2	<0.1	0.11
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)	0	200	170	210
pH	7.09	7.14	7.13	7.28
Polonium 210-Dissolved (pCi/L)	<1	<1	2.2	0.4
Polonium 210-Suspended (pCi/L)	<1	2.5	<1	-0.2
Polonium 210-Total (pCi/L)	<1	0	0	0
Potassium-Dissolved (mg/L)	13.2	11	11.3	9.8
Radium 226-Dissolved (pCi/L)	0.9	<0.2	<0.2	0
Radium 226-Suspended (pCi/L)	<0.2	2.7	<0.2	0.3
Radium 226-Total (pCi/L)	<0.2	0	0	0
Radon 222-Total (pCi/L)	0	892	808	1250
Selenium-Dissolved (mg/L)	0.003	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0	0	0.006	<0.001
Selenium-VI-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	10.2	10	9.4	4.2
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	0	0	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	0	16	16	17
Sodium-Dissolved (mg/L)	1810	1880	2030	2140
Solids-Total Dissolved Calculated (mg/L)	8510	9070	8830	9550
olids-Total Dissolved TDS @ 180 C (mg/l	8900	9700	9600	9100
Strontium-Total (mg.L)	0	0	10	11.6
Sulfate (mg/L)	4390	4590	4310	4410
TDS Balance (0.80 - 1.20) (dec.%)	1.04	1.07	1.09	0.95
Thallium-Total (mg/L)	0	0	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Thorium 230-Suspended (pCi/L)	<0.2	2.2	0.3	0.1
Thorium 230-Total (pCi/L)	<0.2	0	0	0
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0218	0.0443	0.0402	0.045
Uranium-Suspended (mg/L)	0.027	0.0049	<0.0003	<0.0003
Uranium-Total (mg/L)	0	0	0.0414	0.0471
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	0.02	<0.01	<0.01
Zinc-Total (mg/L)	0	0	<0.01	0.01

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #677								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.285	3.950979	-3.71	-0.63	3.485	-3.76	3.88	4
Alkalinity-Total as CaCO3 (mg/L)	497	24.13849	480.5	488	522.5	480	532	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Anions (meq/L)	143.5	6.608076	137	144	149.5	136	150	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.001125	0.000629	0.000625	0.001	0.00175	0.0005	0.002	4
Arsenic-Total (mg/L)	0.001			0.001		0.001	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	606	29.60856	585.75	595	637.25	585	649	4
Boron-Dissolved (mg/L)	0.8	0.08165	0.725	0.8	0.875	0.7	0.9	4
Boron-Total (mg/L)	0.7			0.7		0.7	0.7	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	467	40.41452	428.5	466	506.5	420	516	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	143	11.63329	132	142.5	154.5	130	157	4
Chloride (mg/L)	1625	225.4625	1395	1715	1765	1290	1780	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	11375	590.9033	10850	11300	11975	10800	12100	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.225	0.317543	0.05	0.075	0.55	0.05	0.7	4
Gross Alpha-Dissolved (pCi/L)	62.95	44.06998	39.275	42.05	107.525	38.7	129	4
Gross Beta-Dissolved (pCi/L)	-7.5	15.06652	-23	-0.5	1	-30	1	4
Gross Gamma-Dissolved (pCi/L)	527.5	604.7245	2.5	505	1075		1100	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.08	0.056569		0.08		0.04	0.12	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	0.925	0.903235	0.125	0.8	1.85		2.1	4
Lead 210-Suspended (pCi/L)	-0.2	1.4	-1.6	0.5	0.5	-2.3	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	405.75	39.17801	368.75	404.5	444	360	454	4
Manganese-Dissolved (mg/L)	2.4125	0.549689	1.8525	2.57	2.815	1.62	2.89	4
Manganese-Total (mg/L)	2.18	0.66468		2.18		1.71	2.65	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.1025	0.070887	0.05	0.08	0.1775	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #677								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	193.3333	20.81666	170	200	210	170	210	3
pH	7.16	0.082865	7.1	7.135	7.245	7.09	7.28	4
Polonium 210-Dissolved (pCi/L)	0.9	0.867948	0.425	0.5	1.775	0.4	2.2	4
Polonium 210-Suspended (pCi/L)	0.825	1.164403	-0.025	0.5	2	-0.2	2.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.325	1.408013	10.1	11.15	12.725	9.8	13.2	4
Radium 226-Dissolved (pCi/L)	0.366667	0.46188	0.1	0.1	0.9	0.1	0.9	3
Radium 226-Suspended (pCi/L)	0.8	1.270171	0.1	0.2	2.1	0.1	2.7	4
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	983.3333	234.7282	808	892	1250	808	1250	3
Selenium-Dissolved (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00325	0.003889		0.00325		0.0005	0.006	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	8.45	2.853653	5.5	9.7	10.15	4.2	10.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	1965	148.4363	1827.5	1955	2112.5	1810	2140	4
Sodium Adsorption Ratio (SAR) (meq/L)	16.33333	0.57735	16	16	17	16	17	3
Solids-Total Dissolved Calculated (mg/L)	8990	438.178	8590	8950	9430	8510	9550	4
Solids-Total Dissolved TDS @ 180 C (mg/L	9325	386.221	8950	9350	9675	8900	9700	4
Strontium-Total (mg.L)	10.8	1.131371		10.8		10	11.6	2
Sulfate (mg/L)	4425	118.1807	4330	4400	4545	4310	4590	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0375	0.061847	0.9725	1.055	1.085	0.95	1.09	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.675	1.021029	0.1	0.2	1.725	0.1	2.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.037825	0.010891	0.0264	0.04225	0.044825	0.0218	0.045	4
Uranium-Suspended (mg/L)	0.00805	0.01283	0.00015	0.002525	0.021475	0.00015	0.027	4
Uranium-Total (mg/L)	0.04425	0.004031		0.04425		0.0414	0.0471	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.0125	0.00866	0.005	0.0125	0.02	0.005	0.02	4
Zinc-Total (mg/L)	0.0075	0.003536		0.0075		0.005	0.01	2

Powertech (USA) Inc.

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Dewey-Burdock Project

Groundwater Quality Data

Well #678					
Analyte	**9/28/2007 16:22**	**11/27/2007 13:40**	**2/5/2008 15:39**	**2/5/2008 15:45**	**4/29/2008 13:41**
A/C Balance (± 5) (%)	-0.532	0.551	<0	<0	1.9
Alkalinity-Total as CaCO3 (mg/L)	490	480	468	472	478
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	78.6	83.1	85.9	87.6	89.1
Antimony-Total (mg/L)			<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)			0.002	0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	597	585	570	575	583
Boron-Dissolved (mg/L)	1.3	1.4	1.6	1.6	1.4
Boron-Total (mg/L)			1.6	1.6	1.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	397	422	428	412	457
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	77.8	84	85.3	84.6	92.6
Chloride (mg/L)	64	61	96	94	54
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	5710	5780	6020	5990	6300
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01	<0.01
Fluoride (mg/L)	0.6	0.9	<0.1	0.9	1
Gross Alpha-Dissolved (pCi/L)	23.2	18.9	41.5	30.2	54.7
Gross Beta-Dissolved (pCi/L)	8.1	35.3	16	<2	12.8
Gross Gamma-Dissolved (pCi/L)	1100	1100	<20	100	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			0.04	0.04	<0.03
Lead 210-Dissolved (pCi/L)	<1	4	3.3	<1	-1.2
Lead 210-Suspended (pCi/L)	<1	<1	<1	<1	-1.5
Lead 210-Total (pCi/L)	<1				
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	398	434	434	438	500
Manganese-Dissolved (mg/L)	2.85	3.31	2.39	2.79	2.66
Manganese-Total (mg/L)			2.72	2.61	2.61
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	0.2	0.2	0.1	0.1	0.09
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)		210	200	200	260
pH	7.23	7.42	7.34	7.36	7.55
Polonium 210-Dissolved (pCi/L)	<1	<1	2.4	1	1.3
Polonium 210-Suspended (pCi/L)	<1	1.3	<1	<1	
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	18.9	20.1	20.2	20	17.4
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	<0.2	<0.2	
Radium 226-Suspended (pCi/L)	<0.2	0.7	<0.2	<0.2	0.7
Radium 226-Total (pCi/L)	<0.2				

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Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #678					
Analyte	**9/28/2007 16:22**	**11/27/2007 13:40**	**2/5/2008 15:39**	**2/5/2008 15:45**	**4/29/2008 13:41**
Radon 222-Total (pCi/L)		391	487	418	687
Selenium-Dissolved (mg/L)	0.003	<0.001	0.002	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.005	0.004	0.003
Selenium-VI-Dissolved (mg/L)		<0.001	0.002	<0.001	<0.001
Silica-Dissolved (mg/L)	14.9	15.4	16.3	16.3	7.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		5	5.2	5.1	4.9
Sodium-Dissolved (mg/L)	564	609	634	628	643
Solids-Total Dissolved Calculated (mg/L)	4950	5280	5440	5500	5730
Solids-Total Dissolved TDS @ 180 C (mg/L)	6000	6100	6000	6000	5400
Strontium-Total (mg.L)			10.2	9.7	11
Sulfate (mg/L)	3220	3440	3540	3620	3740
TDS Balance (0.80 - 1.20) (dec.%)	1.21	1.16	1.1	1.1	0.95
Thallium-Total (mg/L)			<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	0.3	<0.2	0.2
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0352	0.0349	0.0368	0.0368	0.0355
Uranium-Suspended (mg/L)	0.0032	0.0008	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0379	0.0352	0.0387
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.2
Zinc-Dissolved (mg/L)	0.01	0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01	<0.01

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #678								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.3838	0.930069	-0.266		1.2255	-0.532	1.9	5
Alkalinity-Total as CaCO3 (mg/L)	477.6	8.414274	470	478	485	468	490	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Anions (meq/L)	84.86	4.148855	80.85	85.9	88.35	78.6	89.1	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.0011	0.000548	0.00075	0.001	0.0015	0.0005	0.002	5
Arsenic-Total (mg/L)	0.001333	0.000577	0.001	0.001	0.002	0.001	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Bicarbonate as HCO3 (mg/L)	582	10.34408	572.5	583	591	570	597	5
Boron-Dissolved (mg/L)	1.46	0.134164	1.35	1.4	1.6	1.3	1.6	5
Boron-Total (mg/L)	1.533333	0.11547	1.4	1.6	1.6	1.4	1.6	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	423.2	22.24185	404.5	422	442.5	397	457	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	84.86	5.261939	80.9	84.6	88.95	77.8	92.6	5
Chloride (mg/L)	73.8	19.70279	57.5	64	95	54	96	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	5960	231.8405	5745	5990	6160	5710	6300	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.69	0.387943	0.325	0.9	0.95	0.05	1	5
Gross Alpha-Dissolved (pCi/L)	33.7	14.5205	21.05	30.2	48.1	18.9	54.7	5
Gross Beta-Dissolved (pCi/L)	14.64	12.85391	4.55	12.8	25.65	1	35.3	5
Gross Gamma-Dissolved (pCi/L)	462	583.7123	5	100	1100		1100	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	0.031667	0.014434	0.015	0.04	0.04	0.015	0.04	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	1.42	2.164948	-0.35	0.5	3.65	-1.2	4	5
Lead 210-Suspended (pCi/L)	0.1	0.894427	-0.5	0.5	0.5	-1.5	0.5	5
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	440.8	36.86733	416	434	469	398	500	5
Manganese-Dissolved (mg/L)	2.8	0.335559	2.525	2.79	3.08	2.39	3.31	5
Manganese-Total (mg/L)	2.646667	0.063509	2.61	2.61	2.72	2.61	2.72	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000367	0.000207	0.0001	0.0005	0.0005	0.0001	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.023333	0.023094	0.01	0.01	0.05	0.01	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nitrogen, Nitrate as N (mg/L)	0.138	0.056745	0.095	0.1	0.2	0.09	0.2	5
Nitrogen, Nitrite as N (mg/L)	0.045	0.01118	0.0375	0.05	0.05	0.025	0.05	5

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #678								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	217.5	28.72281	200	205	247.5	200	260	4
pH	7.38	0.11726	7.285	7.36	7.485	7.23	7.55	5
Polonium 210-Dissolved (pCi/L)	1.14	0.782943	0.5	1	1.85	0.5	2.4	5
Polonium 210-Suspended (pCi/L)	0.56	0.466905	0.25	0.5	0.9		1.3	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	19.32	1.194571	18.15	20	20.15	17.4	20.2	5
Radium 226-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Radium 226-Suspended (pCi/L)	0.34	0.328634	0.1	0.1	0.7	0.1	0.7	5
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	495.75	133.7544	397.75	452.5	637	391	687	4
Selenium-Dissolved (mg/L)	0.0013	0.001151	0.0005	0.0005	0.0025	0.0005	0.003	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.004	0.001	0.003	0.004	0.005	0.003	0.005	3
Selenium-VI-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Silica-Dissolved (mg/L)	14.16	3.550775	11.4	15.4	16.3	7.9	16.3	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	615.6	31.42133	586.5	628	638.5	564	643	5
Sodium Adsorption Ratio (SAR) (meq/L)	5.05	0.129099	4.925	5.05	5.175	4.9	5.2	4
Solids-Total Dissolved Calculated (mg/L)	5380	289.5686	5115	5440	5615	4950	5730	5
Solids-Total Dissolved TDS @ 180 C (mg/L	5900	282.8427	5700	6000	6050	5400	6100	5
Strontium-Total (mg.L)	10.3	0.655744	9.7	10.2	11	9.7	11	3
Sulfate (mg/L)	3512	196.774	3330	3540	3680	3220	3740	5
TDS Balance (0.80 - 1.20) (dec.%)	1.104	0.097622	1.025	1.1	1.185	0.95	1.21	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)	0.16	0.089443	0.1	0.1	0.25	0.1	0.3	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.03584	0.000902	0.03505	0.0355	0.0368	0.0349	0.0368	5
Uranium-Suspended (mg/L)	0.00089	0.001322	0.00015	0.00015	0.002	0.00015	0.0032	5
Uranium-Total (mg/L)	0.037267	0.001834	0.0352	0.0379	0.0387	0.0352	0.0387	3
Vanadium-Dissolved (mg/L)	0.08	0.067082	0.05	0.05	0.125	0.05	0.2	5
Zinc-Dissolved (mg/L)	0.007	0.002739	0.005	0.005	0.01	0.005	0.01	5
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3

Powertech (USA) Inc.

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Groundwater Quality Data

Well #679				
Analyte	**9/28/2007 15:04**	**11/14/2007 13:45**	**2/3/2008 16:25**	**5/18/2008 18:00**
A/C Balance (± 5) (%)	-1.81	-1.35	1.37	6.81
Alkalinity-Total as CaCO3 (mg/L)	140	136	144	158
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	32.7	34.4	33	33.6
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			0.007	0.011
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			0.2	0.3
Beryllium-Total (mg/L)			<0.001	0.002
Bicarbonate as HCO3 (mg/L)	171	166	176	193
Boron-Dissolved (mg/L)	0.4	0.4	0.4	0.4
Boron-Total (mg/L)			<0.1	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.001
Calcium-Dissolved (mg/L)	414	447	440	515
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	31.5	33.5	33.9	38.5
Chloride (mg/L)	12	12	13	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2520	2470	1970	2880
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			0.02	0.03
Fluoride (mg/L)	0.3	0.2	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	19.9	13.3	18.4	22.4
Gross Beta-Dissolved (pCi/L)	10.7	16.3	7.2	10.8
Gross Gamma-Dissolved (pCi/L)	1200	1500	86	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			14.9	26.4
Lead 210-Dissolved (pCi/L)	<1	9.1	<1	4.5
Lead 210-Suspended (pCi/L)	<1	<1	<1	-9.8
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			0.015	0.022
Magnesium-Dissolved (mg/L)	89	92.5	100	109
Manganese-Dissolved (mg/L)	0.14	0.04	0.03	0.04
Manganese-Total (mg/L)			0.35	0.57
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001		<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	0.02
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	1.2	1.3	1.3	1.1

POWERTECH (USA) INC.

Powertech (USA)
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Groundwater Quality Data

Well #679				
Analyte	**9/28/2007 15:04**	**11/14/2007 13:45**	**2/3/2008 16:25**	**5/18/2008 18:00**
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		230	200	240
pH	7.53	7.34	7.66	7.83
Polonium 210-Dissolved (pCi/L)	1.1	2.3	<1	-0.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	-0.3
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	12.5	11.4	11.8	11.1
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	0.9	3.7
Radium 226-Suspended (pCi/L)	2.5		9	0.2
Radium 226-Total (pCi/L)	2.5			
Radon 222-Total (pCi/L)		819	2170	1250
Selenium-Dissolved (mg/L)	0.016	0.012	0.013	0.01
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.014	0.013
Selenium-VI-Dissolved (mg/L)		0.012	0.012	0.01
Silica-Dissolved (mg/L)	10.4	12.6	12.7	6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		0.84	0.87	0.86
Sodium-Dissolved (mg/L)	73	74.9	77.6	82
Solids-Total Dissolved Calculated (mg/L)	2110	2230	2160	2290
Solids-Total Dissolved TDS @ 180 C (mg/L)	2500	2600	2500	2500
Strontium-Total (mg.L)			7.3	7.8
Sulfate (mg/L)	1580	1500	1420	1440
TDS Balance (0.80 - 1.20) (dec.%)	1.19	1.15	1.18	1.09
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	1.9	0.3	0.4	1.4
Thorium 230-Total (pCi/L)	1.9			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0157	0.0144	0.0139	0.0112
Uranium-Suspended (mg/L)	0.011	0.0008	0.0007	0.0012
Uranium-Total (mg/L)			0.0154	0.0164
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			0.06	0.09

Powertech (USA) Inc.

Powertech (USA)
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Groundwater Quality Data

Well #679								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.255	3.960282	-1.695	0.01	5.45	-1.81	6.81	4
Alkalinity-Total as CaCO3 (mg/L)	144.5	9.574271	137	142	154.5	136	158	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	33.425	0.75	32.775	33.3	34.2	32.7	34.4	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.009	0.002828		0.009		0.007	0.011	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.25	0.070711		0.25		0.2	0.3	2
Beryllium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Bicarbonate as HCO3 (mg/L)	176.5	11.73314	167.25	173.5	188.75	166	193	4
Boron-Dissolved (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Boron-Total (mg/L)	0.225	0.247487		0.225		0.05	0.4	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Calcium-Dissolved (mg/L)	454	43.07358	420.5	443.5	498	414	515	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	34.35	2.959167	32	33.7	37.35	31.5	38.5	4
Chloride (mg/L)	12	0.816497	11.25	12	12.75	11	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2460	374.2548	2095	2495	2790	1970	2880	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.025	0.007071		0.025		0.02	0.03	2
Fluoride (mg/L)	0.325	0.095743	0.225	0.35	0.4	0.2	0.4	4
Gross Alpha-Dissolved (pCi/L)	18.5	3.839271	14.575	19.15	21.775	13.3	22.4	4
Gross Beta-Dissolved (pCi/L)	11.25	3.759876	8.075	10.75	14.925	7.2	16.3	4
Gross Gamma-Dissolved (pCi/L)	696.5	765.2771	21.5	643	1425		1500	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	20.65	8.131728		20.65		14.9	26.4	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0185	0.00495		0.0185		0.015	0.022	2
Lead 210-Dissolved (pCi/L)	3.65	4.093491	0.5	2.5	7.95	0.5	9.1	4
Lead 210-Suspended (pCi/L)	-2.075	5.15	-7.225	0.5	0.5	-9.8	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	97.625	8.863549	89.875	96.25	106.75	89	109	4
Manganese-Dissolved (mg/L)	0.0625	0.051881	0.0325	0.04	0.115	0.03	0.14	4
Manganese-Total (mg/L)	0.46	0.155563		0.46		0.35	0.57	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000217	0.000247	0.00005	0.0001	0.0005	0.00005	0.0005	3
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.015	0.007071		0.015		0.01	0.02	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	1.225	0.095743	1.125	1.25	1.3	1.1	1.3	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #679								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	223.3333	20.81666	200	230	240	200	240	3
pH	7.59	0.207043	7.3875	7.595	7.7875	7.34	7.83	4
Polonium 210-Dissolved (pCi/L)	0.95	1.024695	0.05	0.8	2	-0.1	2.3	4
Polonium 210-Suspended (pCi/L)	0.3	0.4	-0.1	0.5	0.5	-0.3	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.7	0.60553	11.175	11.6	12.325	11.1	12.5	4
Radium 226-Dissolved (pCi/L)	1.2	1.708801	0.1	0.5	3	0.1	3.7	4
Radium 226-Suspended (pCi/L)	3.9	4.563989	0.2	2.5	9	0.2	9	3
Radium 226-Total (pCi/L)	2.5			2.5		2.5	2.5	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1413	690.092	819	1250	2170	819	2170	3
Selenium-Dissolved (mg/L)	0.01275	0.0025	0.0105	0.0125	0.01525	0.01	0.016	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0135	0.000707		0.0135		0.013	0.014	2
Selenium-VI-Dissolved (mg/L)	0.011333	0.001155	0.01	0.012	0.012	0.01	0.012	3
Silica-Dissolved (mg/L)	10.425	3.13515	7.1	11.5	12.675	6	12.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	76.875	3.903311	73.475	76.25	80.9	73	82	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.856667	0.015275	0.84	0.86	0.87	0.84	0.87	3
Solids-Total Dissolved Calculated (mg/L)	2197.5	78.89867	2122.5	2195	2275	2110	2290	4
Solids-Total Dissolved TDS @ 180 C (mg/L	2525	50	2500	2500	2575	2500	2600	4
Strontium-Total (mg.L)	7.55	0.353553		7.55		7.3	7.8	2
Sulfate (mg/L)	1485	71.87953	1425	1470	1560	1420	1580	4
TDS Balance (0.80 - 1.20) (dec.%)	1.1525	0.045	1.105	1.165	1.1875	1.09	1.19	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	1	0.778888	0.325	0.9	1.775	0.3	1.9	4
Thorium 230-Total (pCi/L)	1.9			1.9		1.9	1.9	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0138	0.001892	0.011875	0.01415	0.015375	0.0112	0.0157	4
Uranium-Suspended (mg/L)	0.003425	0.005055	0.000725	0.001	0.00855	0.0007	0.011	4
Uranium-Total (mg/L)	0.0159	0.000707		0.0159		0.0154	0.0164	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.075	0.021213		0.075		0.06	0.09	2

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #680						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
A/C Balance (± 5) (%)		0.26	0.77	10.2	5.04	6.54
Alkalinity-Total as CaCO3 (mg/L)	258	264	262	262	254	188
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	35.2	32.4	33.9	30.6	33.9	33.4
Antimony-Total (mg/L)		<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.026	0.008	0.007	0.004	0.004	0.002
Arsenic-Total (mg/L)		0.009	0.006	0.005	0.004	0.005
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)		<0.001	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	315	322	319	319	310	229
Boron-Dissolved (mg/L)	0.1	0.1	0.1	0.2	0.2	0.2
Boron-Total (mg/L)		0.1	0.1	0.1	0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)		<0.005	<0.005	<0.001	<0.005	<0.005
Calcium-Dissolved (mg/L)	343	353	368	421	406	415
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	33.5	32.5	34.5	37.6	37.5	38.1
Chloride (mg/L)	15	15	11	12	12	12
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2630	2560	2510	2580	2860	3060
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)		<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.3	0.3	0.5	0.3
Gross Alpha-Dissolved (pCi/L)	4090	6440	4270	6500	4500	4370
Gross Beta-Dissolved (pCi/L)	1330	2320	1390	2250	1530	1320
Gross Gamma-Dissolved (pCi/L)	4700	150	1000	940	21000	5700
Iron-Dissolved (mg/L)	0.43	0.27	0.25	0.19	0.21	0.06
Iron-Total (mg/L)		0.3	0.29	0.34	0.35	0.28
Lead 210-Dissolved (pCi/L)	17		32	37.7	61.8	15.7
Lead 210-Suspended (pCi/L)	<1	-2	-1	20.3	6.8	12
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	113	111	123	129	133	134
Manganese-Dissolved (mg/L)	0.43	0.4	0.42	0.47	0.48	0.49
Manganese-Total (mg/L)		0.43	0.44	0.5	0.52	0.48
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)		<0.1	<0.1	<0.01	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		180	280	270	160	130
pH	7.26	7.31	7.56	7.14	7.08	7.32
Polonium 210-Dissolved (pCi/L)	1.7	1.5	0.5	2	1.5	0.4
Polonium 210-Suspended (pCi/L)	<1	0.5	0.3	9.1	1.1	1.3
Potassium-Dissolved (mg/L)	20.7	19.1	19.2	19.5	19.5	19.3
Radium 226-Dissolved (pCi/L)	1180	1150	1230	1430	1240	1410
Radium 226-Suspended (pCi/L)	12.7	1.9	1.6	13.2	1	4.4
Radon 222-Total (pCi/L)	143000	71800	81000	151000	359000	91700
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.9	8.2	8.3	3.8	4.1	4.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)		<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L	1.8	1.4	1.4	1.4	1.5	1.5

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #680						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
Sodium-Dissolved (mg/L)	148	120	125	126	132	134
Solids-Total Dissolved Calculated (mg/L	2210	2080	2190	2080	2240	2250
Solids-Total Dissolved TDS @ 180 C (mg	2400	2200	2300	2300	2300	2500
Strontium-Total (mg.L)		7.3	7.3	8.1	8.2	8.1
Sulfate (mg/L)	1420	1280	1360	1200	1370	1410
TDS Balance (0.80 - 1.20) (dec.%)	1.09	1.05	1.04	1.11	1.04	1.1
Thallium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	0.2	0.3	0.1	0.1	
Thorium 230-Suspended (pCi/L)	0.3	0.2	0.3	0.4		0.1
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.172	0.0569	0.0303	0.0213	0.026	0.0227
Uranium-Suspended (mg/L)	0.0008	<0.0003	<0.0003	0.0004	<0.0003	<0.0003
Uranium-Total (mg/L)		0.0541	0.0291	0.0238	0.0273	0.0244
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	<0.01	0.01	<0.01	0.01
Zinc-Total (mg/L)		0.02	0.02	0.02	0.01	0.01

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #680								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.801667	4.151089	0.195	2.905	7.455		10.2	6
Alkalinity-Total as CaCO3 (mg/L)	248	29.61081	237.5	260	262.5	188	264	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.075	0.061237	0.05	0.05	0.0875	0.05	0.2	6
Anions (meq/L)	33.23333	1.575648	31.95	33.65	34.225	30.6	35.2	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0085	0.008849	0.0035	0.0055	0.0125	0.002	0.026	6
Arsenic-Total (mg/L)	0.0058	0.001924	0.0045	0.005	0.0075	0.004	0.009	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0007	0.000447	0.0005	0.0005	0.001	0.0005	0.0015	5
Bicarbonate as HCO3 (mg/L)	302.3333	36.16444	289.75	317	319.75	229	322	6
Boron-Dissolved (mg/L)	0.15	0.054772	0.1	0.15	0.2	0.1	0.2	6
Boron-Total (mg/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	384.3333	33.79744	350.5	387	416.5	343	421	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	35.61667	2.411984	33.25	36	37.725	32.5	38.1	6
Chloride (mg/L)	12.83333	1.722401	11.75	12	15	11	15	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	2700	214.5693	2547.5	2605	2910	2510	3060	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.333333	0.08165	0.3	0.3	0.35	0.3	0.5	6
Gross Alpha-Dissolved (pCi/L)	5028.333	1124.872	4225	4435	6455	4090	6500	6
Gross Beta-Dissolved (pCi/L)	1690	467.4612	1327.5	1460	2267.5	1320	2320	6
Gross Gamma-Dissolved (pCi/L)	5581.667	7881.067	742.5	2850	9525	150	21000	6
Iron-Dissolved (mg/L)	0.235	0.120623	0.1575	0.23	0.31	0.06	0.43	6
Iron-Total (mg/L)	0.312	0.031145	0.285	0.3	0.345	0.28	0.35	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	27.36667	21.47749	11.775	24.5	43.725		61.8	6
Lead 210-Suspended (pCi/L)	6.1	8.767212	-1.25	3.65	14.075	-2	20.3	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	123.8333	9.968283	112.5	126	133.25	111	134	6
Manganese-Dissolved (mg/L)	0.448333	0.03656	0.415	0.45	0.4825	0.4	0.49	6
Manganese-Total (mg/L)	0.474	0.038471	0.435	0.48	0.51	0.43	0.52	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000275	0.000241	0.00005	0.000275	0.0005	0.00005	0.0005	8
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.041	0.020125	0.0275	0.05	0.05	0.005	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nitrogen, Nitrate as N (mg/L)	0.054167	0.02458	0.04375	0.05	0.0625	0.025	0.1	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #680								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	170	102.7619	97.5	170	272.5		280	6
pH	7.278333	0.167859	7.125	7.285	7.38	7.08	7.56	6
Polonium 210-Dissolved (pCi/L)	1.266667	0.659293	0.475	1.5	1.775	0.4	2	6
Polonium 210-Suspended (pCi/L)	2.133333	3.434919	0.45	0.8	3.25	0.3	9.1	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	19.55	0.585662	19.175	19.4	19.8	19.1	20.7	6
Radium 226-Dissolved (pCi/L)	1273.333	118.4342	1172.5	1235	1415	1150	1430	6
Radium 226-Suspended (pCi/L)	5.8	5.660742	1.45	3.15	12.825	1	13.2	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	149583.3	107708	78700	117350	203000	71800	359000	6
Selenium-Dissolved (mg/L)	0.001167	0.001033	0.0005	0.0005	0.0025	0.0005	0.0025	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Silica-Dissolved (mg/L)	6.283333	2.411155	4.025	6.3	8.45	3.8	8.9	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	130.8333	9.80646	123.75	129	137.5	120	148	6
Sodium Adsorption Ratio (SAR) (meq/L)	1.5	0.154919	1.4	1.45	1.575	1.4	1.8	6
Solids-Total Dissolved Calculated (mg/L)	2175	76.61593	2080	2200	2242.5	2080	2250	6
olids-Total Dissolved TDS @ 180 C (mg/L	2333.333	103.2796	2275	2300	2425	2200	2500	6
Strontium-Total (mg.L)	7.8	0.458258	7.3	8.1	8.15	7.3	8.2	5
Sulfate (mg/L)	1340	84.61678	1260	1365	1412.5	1200	1420	6
TDS Balance (0.80 - 1.20) (dec.%)	1.071667	0.031885	1.04	1.07	1.1025	1.04	1.11	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.133333	0.10328	0.075	0.1	0.225		0.3	6
Thorium 230-Suspended (pCi/L)	0.216667	0.147196	0.075	0.25	0.325		0.4	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.054867	0.05886	0.02235	0.02815	0.085675	0.0213	0.172	6
Uranium-Suspended (mg/L)	0.0003	0.000265	0.00015	0.00015	0.0005	0.00015	0.0008	6
Uranium-Total (mg/L)	0.03174	0.012684	0.0241	0.0273	0.0416	0.0238	0.0541	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.009167	0.005845	0.005	0.0075	0.0125	0.005	0.02	6
Zinc-Total (mg/L)	0.016	0.005477	0.01	0.02	0.02	0.01	0.02	5

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #681						
Analyte	1/30/2008 13:50	3/31/2008 15:15	4/21/2008 21:21	5/13/2008 16:06	5/21/2008 12:50	6/10/2008 10:50
A/C Balance (± 5) (%)		-0.5	2.67	5.47	5.53	4.51
Alkalinity-Total as CaCO3 (mg/L)	174	172	172	174	180	170
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	14.2	13.9	13.5	13.3	13.8	13.2
Antimony-Total (mg/L)		<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.003	0.002	0.002	0.002	0.002	0.002
Arsenic-Total (mg/L)		0.005	0.002	0.003	0.004	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	212	210	210	212	219	207
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Boron-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)		<0.005	<0.005	<0.001	<0.001	<0.005
Calcium-Dissolved (mg/L)	60.3	59.9	62	65.5	68.4	62.3
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	13.5	13.8	14.3	14.8	15.4	14.5
Chloride (mg/L)	13	17	13	15	16	15
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1320	1320	1330	1390	1500	1390
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)		<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4	0.6	0.5	0.4
Gross Alpha-Dissolved (pCi/L)	656	2170	1400	2220	1220	1390
Gross Beta-Dissolved (pCi/L)	226	659	430	675	304	364
Gross Gamma-Dissolved (pCi/L)	13000	2300	3400	290	6600	210
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)		<0.03	<0.03	0.04	0.05	0.04
Lead 210-Dissolved (pCi/L)	46		49.9	40.5	38.2	42.2
Lead 210-Suspended (pCi/L)	1.7	16.8	16.7	20.8	20.2	6.2
Lead-Dissolved (mg/L)	0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	0.013
Magnesium-Dissolved (mg/L)	22.3	23.9	25	25.1	25.5	24
Manganese-Dissolved (mg/L)	0.09	0.08	0.09	0.1	0.1	0.08
Manganese-Total (mg/L)		0.08	0.09	0.1	0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)		<0.1	<0.1	<0.01	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		170	280	240	220	140
pH	7.98	7.8	8.02	7.91	8.15	7.99
Polonium 210-Dissolved (pCi/L)	2.6	0.6	3.5	1.6	1.2	0.7
Polonium 210-Suspended (pCi/L)	1.6	1.2		2.4	3.2	1.4
Potassium-Dissolved (mg/L)	10.3	9.2	10	9.6	9.6	9.7
Radium 226-Dissolved (pCi/L)	421	414	377	407	423	434
Radium 226-Suspended (pCi/L)	9.9	3.5	0.2	1.8	1.6	0.7
Radon 222-Total (pCi/L)	462000	254000	253000	246	462000	389000
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.005	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	7.2	7.2	4	4.3	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)		<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L	5.4	5.4	5.5	5.6	5.8	5.7

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #681						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
Sodium-Dissolved (mg/L)	192	197	204	212	221	210
Solids-Total Dissolved Calculated (mg/L	901	908	903	891	926	883
lids-Total Dissolved TDS @ 180 C (mg	930	910	940	900	890	880
Strontium-Total (mg.L)		1.2	1.2	1.3	1.3	1.1
Sulfate (mg/L)	498	478	466	449	465	449
TDS Balance (0.80 - 1.20) (dec.%)	1.03	1.01	1.04	1.01	0.97	0.99
Thallium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	0.3			0.1	
Thorium 230-Suspended (pCi/L)	<0.2	0.2	0.2	0.7	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0117	0.0092	0.0098	0.0095	0.0096	0.0097
Uranium-Suspended (mg/L)	0.001	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)		0.0099	0.0102	0.0104	0.0108	0.0102
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)		<0.01	<0.01	<0.01	0.01	<0.01

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #681								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	2.946667	2.687889	-0.125	3.59	5.485	-0.5	5.53	6
Alkalinity-Total as CaCO3 (mg/L)	173.6667	3.444803	171.5	173	175.5	170	180	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Anions (meq/L)	13.65	0.383406	13.275	13.65	13.975	13.2	14.2	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.002167	0.000408	0.002	0.002	0.00225	0.002	0.003	6
Arsenic-Total (mg/L)	0.003	0.001581	0.0015	0.003	0.0045	0.001	0.005	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Bicarbonate as HCO3 (mg/L)	211.6667	4.033196	209.25	211	213.75	207	219	6
Boron-Dissolved (mg/L)	0.058333	0.020412	0.05	0.05	0.0625	0.05	0.1	6
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0017	0.001095	0.0005	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	63.06667	3.279431	60.2	62.15	66.225	59.9	68.4	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	14.38333	0.685322	13.725	14.4	14.95	13.5	15.4	6
Chloride (mg/L)	14.83333	1.602082	13	15	16.25	13	17	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1375	69.4982	1320	1360	1417.5	1320	1500	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.45	0.083666	0.4	0.4	0.525	0.4	0.6	6
Gross Alpha-Dissolved (pCi/L)	1509.333	596.5925	1079	1395	2182.5	656	2220	6
Gross Beta-Dissolved (pCi/L)	443	186.172	284.5	397	663	226	675	6
Gross Gamma-Dissolved (pCi/L)	4300	4870.281	270	2850	8200	210	13000	6
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	6
Iron-Total (mg/L)	0.032	0.016047	0.015	0.04	0.045	0.015	0.05	5
Lead-Dissolved (mg/L)	0.001083	0.001429	0.0005	0.0005	0.001375	0.0005	0.004	6
Lead-Total (mg/L)	0.003	0.00559	0.0005	0.0005	0.00675	0.0005	0.013	5
Lead 210-Dissolved (pCi/L)	36.13333	18.18039	28.65	41.35	46.975		49.9	6
Lead 210-Suspended (pCi/L)	13.73333	7.893204	5.075	16.75	20.35	1.7	20.8	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	24.3	1.167904	23.5	24.5	25.2	22.3	25.5	6
Manganese-Dissolved (mg/L)	0.09	0.008944	0.08	0.09	0.1	0.08	0.1	6
Manganese-Total (mg/L)	0.088	0.008367	0.08	0.09	0.095	0.08	0.1	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000957	0.001796	0.00005	0.0005	0.0005	0.00005	0.005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.032	0.024648	0.005	0.05	0.05	0.005	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nitrogen, Nitrate as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #681								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	175	99.14636	105	195	250		280	6
pH	7.975	0.116404	7.8825	7.985	8.0525	7.8	8.15	6
Polonium 210-Dissolved (pCi/L)	1.7	1.141928	0.675	1.4	2.825	0.6	3.5	6
Polonium 210-Suspended (pCi/L)	1.633333	1.091177	0.9	1.5	2.6		3.2	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	9.733333	0.377712	9.5	9.65	10.075	9.2	10.3	6
Radium 226-Dissolved (pCi/L)	412.6667	19.68417	399.5	417.5	425.75	377	434	6
Radium 226-Suspended (pCi/L)	2.95	3.588175	0.575	1.7	5.1	0.2	9.9	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	303374.3	175794.3	189811.5	321500	462000	246	462000	6
Selenium-Dissolved (mg/L)	0.0015	0.001095	0.0005	0.0015	0.0025	0.0005	0.0025	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.0008	0.000671	0.0005	0.0005	0.00125	0.0005	0.002	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Silica-Dissolved (mg/L)	5.783333	1.913548	3.975	5.75	7.425	3.9	8.1	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	206	10.56409	195.75	207	214.25	192	221	6
Sodium Adsorption Ratio (SAR) (meq/L)	5.566667	0.163299	5.4	5.55	5.725	5.4	5.8	6
Solids-Total Dissolved Calculated (mg/L)	902	14.8054	889	902	912.5	883	926	6
Solids-Total Dissolved TDS @ 180 C (mg/L	908.3333	23.16607	887.5	905	932.5	880	940	6
Strontium-Total (mg.L)	1.22	0.083666	1.15	1.2	1.3	1.1	1.3	5
Sulfate (mg/L)	467.5	18.61988	449	465.5	483	449	498	6
TDS Balance (0.80 - 1.20) (dec.%)	1.008333	0.025626	0.985	1.01	1.0325	0.97	1.04	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.083333	0.116905		0.05	0.15		0.3	6
Thorium 230-Suspended (pCi/L)	0.216667	0.248328	0.075	0.15	0.325		0.7	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.009917	0.000898	0.009425	0.00965	0.010275	0.0092	0.0117	6
Uranium-Suspended (mg/L)	0.000292	0.000347	0.00015	0.00015	0.000363	0.00015	0.001	6
Uranium-Total (mg/L)	0.0103	0.000332	0.01005	0.0102	0.0106	0.0099	0.0108	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.005833	0.002041	0.005	0.005	0.00625	0.005	0.01	6
Zinc-Total (mg/L)	0.006	0.002236	0.005	0.005	0.0075	0.005	0.01	5

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #688

Analyte	4/2/2008 18:07	4/22/2008 13:26	6/10/2008 16:37	6/30/2008 18:39
A/C Balance (± 5) (%)	-0.06	12.1	5.73	3.05
Alkalinity-Total as CaCO3 (mg/L)	98	90	100	136
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.5	0.1	0.1	0.2
Anions (meq/L)	11.3	10.2	10.6	11.5
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.002	0.001	0.002
Arsenic-Total (mg/L)	0.002	0.002	<0.002	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	12	76	107	156
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	25.8	50.1	34.1	40.4
Carbonate as CO3 (mg/L)	53	17	7	<5
Cations (meq/L)	11.3	13.1	11.9	12.3
Chloride (mg/L)	13	10	11	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1180	1070	1260	1140
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.5	0.5	0.6
Gross Alpha-Dissolved (pCi/L)	2.9	10.1	17.3	13.2
Gross Beta-Dissolved (pCi/L)	8.8	16.9	17.1	16.5
Gross Gamma-Dissolved (pCi/L)				1000
Iron-Dissolved (mg/L)	<0.03	<0.03	0.04	<0.03
Iron-Total (mg/L)	0.07	0.05	0.15	0.08
Lead 210-Dissolved (pCi/L)		-2.7	-0.5	-0.1
Lead 210-Suspended (pCi/L)	-0.4	-0.1	4.8	-2.3
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.003
Magnesium-Dissolved (mg/L)	13.6	20.5	16.6	19.2
Manganese-Dissolved (mg/L)	<0.01	0.06	0.02	0.02
Manganese-Total (mg/L)	0.03	0.01	0.01	0.02
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
	<0.001	<0.001		
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.1	<0.1

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #688

Analyte	4/2/2008 18:07	4/22/2008 13:26	6/10/2008 16:37	6/30/2008 18:39
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	110	280	180	220
pH	10.3	9.15	8.82	8.6
Polonium 210-Dissolved (pCi/L)	1	1.9		
Polonium 210-Suspended (pCi/L)	1	0.4	0.2	0.3
Potassium-Dissolved (mg/L)	16.8	12.2	12.5	12.9
Radium 226-Dissolved (pCi/L)	0.3	1.2	2.5	0.6
Radium 226-Suspended (pCi/L)	0.9	0.02	-0.3	-0.3
Radon 222-Total (pCi/L)	608	307	749	426
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	0.003
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.9	3.7	3.7	3.8
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	7.6	5.9	6.9	6.2
Sodium-Dissolved (mg/L)	193	197	195	191
Solids-Total Dissolved Calculated (mg/L)	771	744	738	774
Solids-Total Dissolved TDS @ 180 C (mg/L)	690	690	740	770
Strontium-Total (mg.L)	1.2	1.2	1.1	1.1
Sulfate (mg/L)	428	390	398	407
TDS Balance (0.80 - 1.20) (dec.%)	0.89	0.92	1.01	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)				
Thorium 230-Suspended (pCi/L)	0.7	15.9	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0008	0.0147	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #688								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	5.205	5.169813	0.7175	4.39	10.5075	-0.06	12.1	4
Alkalinity-Total as CaCO3 (mg/L)	106	20.46135	92	99	127	90	136	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.225	0.189297	0.1	0.15	0.425	0.1	0.5	4
Anions (meq/L)	10.9	0.60553	10.3	10.95	11.45	10.2	11.5	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.0015	0.000577	0.001	0.0015	0.002	0.001	0.002	4
Arsenic-Total (mg/L)	0.002	0.000816	0.00125	0.002	0.00275	0.001	0.003	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	87.75	60.29027	28	91.5	143.75	12	156	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	37.6	10.25638	27.875	37.25	47.675	25.8	50.1	4
Carbonate as CO3 (mg/L)	19.875	22.89969	3.625	12	44	2.5	53	4
Cation/Anion Balance (%)								
Cations (meq/L)	12.15	0.754983	11.45	12.1	12.9	11.3	13.1	4
Chloride (mg/L)	11.25	1.258306	10.25	11	12.5	10	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1162.5	79.32003	1087.5	1160	1240	1070	1260	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.5	0.08165	0.425	0.5	0.575	0.4	0.6	4
Gross Alpha-Dissolved (pCi/L)	10.875	6.079679	4.7	11.65	16.275	2.9	17.3	4
Gross Beta-Dissolved (pCi/L)	14.825	4.024405	10.725	16.7	17.05	8.8	17.1	4
Gross Gamma-Dissolved (pCi/L)	250	500			750		1000	4
Iron-Dissolved (mg/L)	0.02125	0.0125	0.015	0.015	0.03375	0.015	0.04	4
Iron-Total (mg/L)	0.0875	0.043493	0.055	0.075	0.1325	0.05	0.15	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.00075	0.0005	0.0005	0.0005	0.00125	0.0005	0.0015	4
Lead 210-Dissolved (pCi/L)	-0.825	1.268529	-2.15	-0.3	-0.025	-2.7		4
Lead 210-Suspended (pCi/L)	0.5	3.02765	-1.825	-0.25	3.575	-2.3	4.8	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	17.475	3.05	14.35	17.9	20.175	13.6	20.5	4
Manganese-Dissolved (mg/L)	0.02625	0.023585	0.00875	0.02	0.05	0.005	0.06	4
Manganese-Total (mg/L)	0.0175	0.009574	0.01	0.015	0.0275	0.01	0.03	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000358	0.00022	0.0000875	0.0005	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #688								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	197.5	71.35592	127.5	200	265	110	280	4
pH	9.2175	0.756235	8.655	8.985	10.0125	8.6	10.3	4
Polonium 210-Dissolved (pCi/L)	0.725	0.914239		0.5	1.675		1.9	4
Polonium 210-Suspended (pCi/L)	0.475	0.359398	0.225	0.35	0.85	0.2	1	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	13.6	2.152518	12.275	12.7	15.825	12.2	16.8	4
Radium 226-Dissolved (pCi/L)	1.15	0.974679	0.375	0.9	2.175	0.3	2.5	4
Radium 226-Suspended (pCi/L)	0.08	0.567098	-0.3	-0.14	0.68	-0.3	0.9	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	522.5	195.2477	336.75	517	713.75	307	749	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	4.775	2.083867	3.7	3.75	6.875	3.7	7.9	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	194	2.581989	191.5	194	196.5	191	197	4
Sodium Adsorption Ratio (SAR) (meq/L)	6.65	0.759386	5.975	6.55	7.425	5.9	7.6	4
Solids-Total Dissolved Calculated (mg/L)	756.75	18.39157	739.5	757.5	773.25	738	774	4
Solids-Total Dissolved TDS @ 180 C (mg/L	722.5	39.47573	690	715	762.5	690	770	4
Strontium-Total (mg.L)	1.15	0.057735	1.1	1.15	1.2	1.1	1.2	4
Sulfate (mg/L)	405.75	16.37834	392	402.5	422.75	390	428	4
TDS Balance (0.80 - 1.20) (dec.%)	0.9525	0.056789	0.8975	0.955	1.005	0.89	1.01	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)								4
Thorium 230-Suspended (pCi/L)	4.175	7.822777	0.025	0.4	12.1		15.9	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00385	0.007234	0.00015	0.000275	0.011125	0.00015	0.0147	4
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #689				
Analyte	**3/30/2008 17:25**	**4/21/2008 19:50**	**5/28/2008 22:25**	**6/25/2008 18:18**
A/C Balance (± 5) (%)	-4.96	3.98	2.36	2.76
Alkalinity-Total as CaCO3 (mg/L)	150	148	148	150
Aluminum-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.1	<0.1	<0.1
Anions (meq/L)	12	10.9	11.5	10.8
Antimony-Total (mg/L)	<0.003	0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)	<0.003	0.002	0.004	0.003
Barium-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	183	180	180	183
Boron-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	43.8	48.5	49.2	46.7
Carbonate as CO3 (mg/L)	<5	5	<5	<5
Cations (meq/L)	10.8	11.8	12	11.4
Chloride (mg/L)	7	5	5	5
Chromium-Dissolved (mg/L)	<0.05	0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1080	1110	1010	1270
Copper-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.5	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	64.3	25.5	34.9	36.5
Gross Beta-Dissolved (pCi/L)	21.2	13.2	12.2	15
Gross Gamma-Dissolved (pCi/L)	86		150	
Iron-Dissolved (mg/L)	<0.03	0.03	<0.03	<0.03
Iron-Total (mg/L)	0.72	0.52	1.33	1.15
Lead 210-Dissolved (pCi/L)	-31	-2.4	6.3	-6.5
Lead 210-Suspended (pCi/L)		-0.3	-2	1
Lead-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	0.001	<0.001	0.017
Magnesium-Dissolved (mg/L)	15.6	16.8	16.4	16
Manganese-Dissolved (mg/L)	0.03	0.04	0.04	0.04
Manganese-Total (mg/L)	0.06	0.06	0.08	0.07
Mercury-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	0.001	<0.0001	<0.0002
		0.001		
Molybdenum-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	0.05	<0.05	<0.05

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #689				
Analyte	**3/30/2008 17:25**	**4/21/2008 19:50**	**5/28/2008 22:25**	**6/25/2008 18:18**
Nitrogen, Nitrate as N (mg/L)	<0.1	0.05	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	190	300	210	150
pH	7.85	8.02	7.8	8.08
Polonium 210-Dissolved (pCi/L)	1.1	0.7	-0.4	
Polonium 210-Suspended (pCi/L)	0.6	0.6	0.2	0.1
Potassium-Dissolved (mg/L)	7.4	7.9	8.1	7.7
Radium 226-Dissolved (pCi/L)	7.9	4.2	5.7	5.5
Radium 226-Suspended (pCi/L)	2	0.02	0.5	-0.05
Radon 222-Total (pCi/L)	1950	1540	1390	2520
Selenium-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.7	8	4.6	4.3
Silver-Dissolved (mg/L)	<0.005	0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	0.005	<0.005	<0.005
odium Adsorption Ratio (SAR) (meq/	5.4	5.7	5.8	5.6
Sodium-Dissolved (mg/L)	165	180	184	174
olids-Total Dissolved Calculated (mg/	771	744	764	718
ids-Total Dissolved TDS @ 180 C (m	720	760	730	700
Strontium-Total (mg.L)	0.9	1	1	1
Sulfate (mg/L)	421	374	400	366
TDS Balance (0.80 - 1.20) (dec.%)	0.93	1.02	0.95	0.98
Thallium-Total (mg/L)	<0.001	0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2	0.1		
Thorium 230-Suspended (pCi/L)	0.2	0.3	0.4	0.4
Thorium 232-Dissolved (pCi/L)	<0.005	0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0032	0.0037	0.0043	0.0034
Uranium-Suspended (mg/L)	0.0005	0.0003	0.0004	0.0005
Uranium-Total (mg/L)	0.0041	0.004	0.0117	0.006
Vanadium-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	0.01	<0.01	<0.01

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #689								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.035	4.055626	-3.13	2.56	3.675	-4.96	3.98	4
Alkalinity-Total as CaCO3 (mg/L)	149	1.154701	148	149	150	148	150	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	11.3	0.559762	10.825	11.2	11.875	10.8	12	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.002625	0.001109	0.001625	0.0025	0.00375	0.0015	0.004	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	181.5	1.732051	180	181.5	183	180	183	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	47.05	2.409011	44.525	47.6	49.025	43.8	49.2	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	11.5	0.52915	10.95	11.6	11.95	10.8	12	4
Chloride (mg/L)	5.5	1	5	5	6.5	5	7	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1117.5	109.9621	1027.5	1095	1230	1010	1270	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.5		0.5	0.5	0.5	0.5	0.5	4
Gross Alpha-Dissolved (pCi/L)	40.3	16.71965	27.85	35.7	57.35	25.5	64.3	4
Gross Beta-Dissolved (pCi/L)	15.4	4.0365	12.45	14.1	19.65	12.2	21.2	4
Gross Gamma-Dissolved (pCi/L)	59	72.96575		43	134		150	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.93	0.374433	0.57	0.935	1.285	0.52	1.33	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.004625	0.00825	0.0005	0.0005	0.012875	0.0005	0.017	4
Lead 210-Dissolved (pCi/L)	-8.4	15.98395	-24.875	-4.45	4.125	-31	6.3	4
Lead 210-Suspended (pCi/L)	-0.325	1.24733	-1.575	-0.15	0.75	-2	1	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	16.2	0.516398	15.7	16.2	16.7	15.6	16.8	4
Manganese-Dissolved (mg/L)	0.0375	0.005	0.0325	0.04	0.04	0.03	0.04	4
Manganese-Total (mg/L)	0.0675	0.009574	0.06	0.065	0.0775	0.06	0.08	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #689								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	212.5	63.44289	160	200	277.5	150	300	4
pH	7.9375	0.13376	7.8125	7.935	8.065	7.8	8.08	4
Polonium 210-Dissolved (pCi/L)	0.35	0.675771	-0.3	0.35	1	-0.4	1.1	4
Polonium 210-Suspended (pCi/L)	0.375	0.262996	0.125	0.4	0.6	0.1	0.6	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	7.775	0.298608	7.475	7.8	8.05	7.4	8.1	4
Radium 226-Dissolved (pCi/L)	5.825	1.534872	4.525	5.6	7.35	4.2	7.9	4
Radium 226-Suspended (pCi/L)	0.6175	0.953533	-0.0325	0.26	1.625	-0.05	2	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1850	505.503	1427.5	1745	2377.5	1390	2520	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	6.15	1.970618	4.375	6.15	7.925	4.3	8	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	175.75	8.261356	167.25	177	183	165	184	4
Sodium Adsorption Ratio (SAR) (meq/L)	5.625	0.170783	5.45	5.65	5.775	5.4	5.8	4
Solids-Total Dissolved Calculated (mg/L)	749.25	23.76798	724.5	754	769.25	718	771	4
Solids-Total Dissolved TDS @ 180 C (mg/L	727.5	25	705	725	752.5	700	760	4
Strontium-Total (mg.L)	0.975	0.05	0.925	1	1	0.9	1	4
Sulfate (mg/L)	390.25	25.11805	368	387	415.75	366	421	4
TDS Balance (0.80 - 1.20) (dec.%)	0.97	0.039158	0.935	0.965	1.01	0.93	1.02	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.075	0.095743		0.05	0.175		0.2	4
Thorium 230-Suspended (pCi/L)	0.325	0.095743	0.225	0.35	0.4	0.2	0.4	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00365	0.00048	0.00325	0.00355	0.00415	0.0032	0.0043	4
Uranium-Suspended (mg/L)	0.000388	0.000165	0.000213	0.00045	0.0005	0.00015	0.0005	4
Uranium-Total (mg/L)	0.00645	0.003619	0.004025	0.00505	0.010275	0.004	0.0117	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #694					
Analyte	**3/30/2008 10:11**	**4/21/2008 12:24**	**4/21/2008 12:30**	**5/21/2008 15:54**	**6/24/2008 15:16**
A/C Balance (± 5) (%)	-1.48	3.2	4.23	6.92	6.22
Alkalinity-Total as CaCO3 (mg/L)	204	202	204	192	206
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.2	0.2	0.2	0.2
Anions (meq/L)	15.4	15	15	14.4	14.5
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	0.002	0.002	0.002	0.001
Arsenic-Total (mg/L)	0.005	0.002	0.002	0.004	<0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	249	246	249	234	251
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	91.6	97	98.8	103	103
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	15	15.9	16.3	16.5	16.4
Chloride (mg/L)	11	9	9	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1370	1370	1380	1550	1400
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.2	0.2	0.3	0.3
Gross Alpha-Dissolved (pCi/L)	8.8	19.2	18.1	10.6	23.7
Gross Beta-Dissolved (pCi/L)	10.3	15.7	16.2	12.5	15
Gross Gamma-Dissolved (pCi/L)					
Iron-Dissolved (mg/L)	<0.03	0.05	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0.18	0.14	0.12	0.16	0.14
Lead 210-Dissolved (pCi/L)	-9.8		-2.4	-2.3	-0.1
Lead 210-Suspended (pCi/L)			-2.2	1.4	4.8
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	35.4	37.6	38.4	38.6	37.1
Manganese-Dissolved (mg/L)	0.14	0.15	0.15	0.16	0.16
Manganese-Total (mg/L)	0.2	0.15	0.15	0.17	0.16
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.05	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	280	360	350	210	140
pH	7.65	7.94	7.84	7.54	7.82
Polonium 210-Dissolved (pCi/L)	1.8	1.4	0.6	0.6	
Polonium 210-Suspended (pCi/L)	0.9	0.2	0.7	-0.1	
Potassium-Dissolved (mg/L)	12.3	13	13.5	13.1	13.6
Radium 226-Dissolved (pCi/L)	1.6	4.2	3.7	1.9	2.2
Radium 226-Suspended (pCi/L)	1	-0.4	-0.09	-0.2	-0.3

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #694					
Analyte	**3/30/2008 10:11**	**4/21/2008 12:24**	**4/21/2008 12:30**	**5/21/2008 15:54**	**6/24/2008 15:16**
Radon 222-Total (pCi/L)	313	251	250	619	611
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	8.4	8.3	4.7	4.6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.7	3.8	3.9	3.8	3.9
Sodium-Dissolved (mg/L)	165	176	180	180	180
Solids-Total Dissolved Calculated (mg/L)	990	988	996	965	965
olids-Total Dissolved TDS @ 180 C (mg/	970	1000	990	970	960
Strontium-Total (mg.L)	2.7	2.8	2.8	3	2.9
Sulfate (mg/L)	531	512	511	493	486
TDS Balance (0.80 - 1.20) (dec.%)	0.98	1.01	1	1.01	1
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2				0.1
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.3	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0005	0.0005	0.0006	0.0006	0.0006
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0006	0.0006	0.0006	0.0006	0.0006
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	0.02	<0.01	<0.01	<0.01	<0.01

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #694								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.818	3.317095	0.86	4.23	6.57	-1.48	6.92	5
Alkalinity-Total as CaCO3 (mg/L)	201.6	5.549775	197	204	205	192	206	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.2		0.2	0.2	0.2	0.2	0.2	5
Anions (meq/L)	14.86	0.409878	14.45	15	15.2	14.4	15.4	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0018	0.000447	0.0015	0.002	0.002	0.001	0.002	5
Arsenic-Total (mg/L)	0.0029	0.001517	0.00175	0.002	0.0045	0.0015	0.005	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0007	0.000447	0.0005	0.0005	0.001	0.0005	0.0015	5
Bicarbonate as HCO3 (mg/L)	245.8	6.83374	240	249	250	234	251	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Calcium-Dissolved (mg/L)	98.68	4.751	94.3	98.8	103	91.6	103	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	16.02	0.614003	15.45	16.3	16.45	15	16.5	5
Chloride (mg/L)	9.4	0.894427	9	9	10	9	11	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1414	77.00649	1370	1380	1475	1370	1550	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.26	0.054772	0.2	0.3	0.3	0.2	0.3	5
Gross Alpha-Dissolved (pCi/L)	16.08	6.223102	9.7	18.1	21.45	8.8	23.7	5
Gross Beta-Dissolved (pCi/L)	13.94	2.482539	11.4	15	15.95	10.3	16.2	5
Gross Gamma-Dissolved (pCi/L)								5
Iron-Dissolved (mg/L)	0.022	0.015652	0.015	0.015	0.0325	0.015	0.05	5
Iron-Total (mg/L)	0.148	0.022804	0.13	0.14	0.17	0.12	0.18	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	-2.92	4.014598	-6.1	-2.3	-0.05	-9.8		5
Lead 210-Suspended (pCi/L)	0.8	2.580698	-1.1		3.1	-2.2	4.8	5
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	37.42	1.281405	36.25	37.6	38.5	35.4	38.6	5
Manganese-Dissolved (mg/L)	0.152	0.008367	0.145	0.15	0.16	0.14	0.16	5
Manganese-Total (mg/L)	0.166	0.020736	0.15	0.16	0.185	0.15	0.2	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000379	0.000208	0.0001	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nitrogen, Nitrate as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #694								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	268	93.64828	175	280	355	140	360	5
pH	7.758	0.160375	7.595	7.82	7.89	7.54	7.94	5
Polonium 210-Dissolved (pCi/L)	0.88	0.715542	0.3	0.6	1.6		1.8	5
Polonium 210-Suspended (pCi/L)	0.34	0.439318	-0.05	0.2	0.8	-0.1	0.9	5
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	13.1	0.514782	12.65	13.1	13.55	12.3	13.6	5
Radium 226-Dissolved (pCi/L)	2.72	1.156287	1.75	2.2	3.95	1.6	4.2	5
Radium 226-Suspended (pCi/L)	0.002	0.569667	-0.35	-0.2	0.455	-0.4	1	5
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	408.8	189.9768	250.5	313	615	250	619	5
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-Total (mg/L)	0.0006	0.000224	0.0005	0.0005	0.00075	0.0005	0.001	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Silica-Dissolved (mg/L)	6.82	1.984187	4.65	8.1	8.35	4.6	8.4	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	176.2	6.496153	170.5	180	180	165	180	5
Sodium Adsorption Ratio (SAR) (meq/L)	3.82	0.083666	3.75	3.8	3.9	3.7	3.9	5
Solids-Total Dissolved Calculated (mg/L)	980.8	14.72073	965	988	993	965	996	5
Solids-Total Dissolved TDS @ 180 C (mg/L	978	16.43168	965	970	995	960	1000	5
Strontium-Total (mg.L)	2.84	0.114018	2.75	2.8	2.95	2.7	3	5
Sulfate (mg/L)	506.6	17.70028	489.5	511	521.5	486	531	5
TDS Balance (0.80 - 1.20) (dec.%)	1	0.012247	0.99	1	1.01	0.98	1.01	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.06	0.089443			0.15		0.2	5
Thorium 230-Suspended (pCi/L)	0.1	0.122474		0.1	0.2		0.3	5
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00056	0.0000548	0.0005	0.0006	0.0006	0.0005	0.0006	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.0006		0.0006	0.0006	0.0006	0.0006	0.0006	5
Vanadium-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.008	0.006708	0.005	0.005	0.0125	0.005	0.02	5

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #695			
Analyte	**4/22/2008 12:46**	**5/21/2008 14:45**	**6/24/2008 17:30**
A/C Balance (± 5) (%)	2.68	1.68	7.98
Alkalinity-Total as CaCO3 (mg/L)	174	180	174
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.2	0.1
Anions (meq/L)	14.3	15	13
Antimony-Total (mg/L)	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.001	<0.001
Arsenic-Total (mg/L)	0.001	0.002	<0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	212	219	212
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	50.1	52.1	52.5
Carbonate as CO3 (mg/L)	<5	<5	<5
Cations (meq/L)	15.1	15.5	15.3
Chloride (mg/L)	11	11	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1370	1560	1380
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	29.4	25.6	39.7
Gross Beta-Dissolved (pCi/L)	6	8	11
Gross Gamma-Dissolved (pCi/L)		140	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0.14	0.12	0.12
Lead 210-Dissolved (pCi/L)	-1.8	3.1	0.7
Lead 210-Suspended (pCi/L)	-2.1	-0.7	2.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	17.6	19.4	18.8
Manganese-Dissolved (mg/L)	0.08	0.09	0.08
Manganese-Total (mg/L)	0.08	0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	0.06	<0.1	<0.1

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #695			
Analyte	**4/22/2008 12:46**	**5/21/2008 14:45**	**6/24/2008 17:30**
Nitrogen, Nitrite as N (mg/L)	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	290	190	120
pH	8.08	7.91	8.14
Polonium 210-Dissolved (pCi/L)	1.6	-0.3	0.1
Polonium 210-Suspended (pCi/L)	0.4	-0.2	
Potassium-Dissolved (mg/L)	8.4	8.8	8.7
Radium 226-Dissolved (pCi/L)	5	3.7	5.2
Radium 226-Suspended (pCi/L)	-0.4	-0.2	-0.1
Radon 222-Total (pCi/L)	1400	2090	2120
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	3.9	4.4	4.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	7.8	7.6	7.5
Sodium-Dissolved (mg/L)	251	254	250
Solids-Total Dissolved Calculated (mg/L)	957	996	901
olids-Total Dissolved TDS @ 180 C (mg/	910	920	920
Strontium-Total (mg.L)	1	1	1
Sulfate (mg/L)	504	530	442
TDS Balance (0.80 - 1.20) (dec.%)	0.96	0.92	1.02
Thallium-Total (mg/L)	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)			
Thorium 230-Suspended (pCi/L)	0.3		
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0029	0.0029	0.0027
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0032	0.0029	0.0027
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #695								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	4.113333	3.385754	1.68	2.68	7.98	1.68	7.98	3
Alkalinity-Total as CaCO3 (mg/L)	176	3.464102	174	174	180	174	180	3
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Ammonia (mg/L)	0.166667	0.057735	0.1	0.2	0.2	0.1	0.2	3
Anions (meq/L)	14.1	1.014889	13	14.3	15	13	15	3
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.000833	0.000289	0.0005	0.001	0.001	0.0005	0.001	3
Arsenic-Total (mg/L)	0.001167	0.000764	0.0005	0.001	0.002	0.0005	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.000833	0.000577	0.0005	0.0005	0.0015	0.0005	0.0015	3
Bicarbonate as HCO3 (mg/L)	214.3333	4.041452	212	212	219	212	219	3
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	51.56667	1.28582	50.1	52.1	52.5	50.1	52.5	3
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	3
Cation/Anion Balance (%)								
Cations (meq/L)	15.3	0.2	15.1	15.3	15.5	15.1	15.5	3
Chloride (mg/L)	11		11	11	11	11	11	3
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	1436.667	106.9268	1370	1380	1560	1370	1560	3
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	3
Gross Alpha-Dissolved (pCi/L)	31.56667	7.295432	25.6	29.4	39.7	25.6	39.7	3
Gross Beta-Dissolved (pCi/L)	8.333333	2.516611	6	8	11	6	11	3
Gross Gamma-Dissolved (pCi/L)	46.66667	80.82904			140		140	3
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	3
Iron-Total (mg/L)	0.126667	0.011547	0.12	0.12	0.14	0.12	0.14	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	0.666667	2.45017	-1.8	0.7	3.1	-1.8	3.1	3
Lead 210-Suspended (pCi/L)	0.033333	2.579406	-2.1	-0.7	2.9	-2.1	2.9	3
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	18.6	0.916515	17.6	18.8	19.4	17.6	19.4	3
Manganese-Dissolved (mg/L)	0.083333	0.005774	0.08	0.08	0.09	0.08	0.09	3
Manganese-Total (mg/L)	0.083333	0.005774	0.08	0.08	0.09	0.08	0.09	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Mercury-Total (mg/L)	0.000288	0.000246	0.0000625	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nitrogen, Nitrate as N (mg/L)	0.053333	0.005774	0.05	0.05	0.06	0.05	0.06	3
Nitrogen, Nitrite as N (mg/L)	0.041667	0.014434	0.025	0.05	0.05	0.025	0.05	3

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #695								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	200	85.44004	120	190	290	120	290	3
pH	8.043333	0.119304	7.91	8.08	8.14	7.91	8.14	3
Polonium 210-Dissolved (pCi/L)	0.466667	1.001665	-0.3	0.1	1.6	-0.3	1.6	3
Polonium 210-Suspended (pCi/L)	0.066667	0.305505	-0.2		0.4	-0.2	0.4	3
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	8.633333	0.208167	8.4	8.7	8.8	8.4	8.8	3
Radium 226-Dissolved (pCi/L)	4.633333	0.814453	3.7	5	5.2	3.7	5.2	3
Radium 226-Suspended (pCi/L)	-0.23333	0.152753	-0.4	-0.2	-0.1	-0.4	-0.1	3
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1870	407.3082	1400	2090	2120	1400	2120	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	4.233333	0.288675	3.9	4.4	4.4	3.9	4.4	3
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	251.6667	2.081666	250	251	254	250	254	3
Sodium Adsorption Ratio (SAR) (meq/L)	7.633333	0.152753	7.5	7.6	7.8	7.5	7.8	3
Solids-Total Dissolved Calculated (mg/L)	951.3333	47.75284	901	957	996	901	996	3
Solids-Total Dissolved TDS @ 180 C (mg/L	916.6667	5.773503	910	920	920	910	920	3
Strontium-Total (mg.L)	1		1	1	1	1	1	3
Sulfate (mg/L)	492	45.21062	442	504	530	442	530	3
TDS Balance (0.80 - 1.20) (dec.%)	0.966667	0.050332	0.92	0.96	1.02	0.92	1.02	3
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)								3
Thorium 230-Suspended (pCi/L)	0.1	0.173205			0.3		0.3	3
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Uranium-Dissolved (mg/L)	0.002833	0.000115	0.0027	0.0029	0.0029	0.0027	0.0029	3
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	3
Uranium-Total (mg/L)	0.002933	0.000252	0.0027	0.0029	0.0032	0.0027	0.0032	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #696

Analyte	3/31/2008 13:41	4/22/2008 16:58	5/21/2008 11:55	6/24/2008 15:08
A/C Balance (± 5) (%)	0.93	5.13	3.21	7.89
Alkalinity-Total as CaCO3 (mg/L)	184	182	182	174
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.4	0.4	0.4	0.4
Anions (meq/L)	14	13.9	14.5	13.3
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.003	0.002	0.002	<0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	215	222	222	212
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	28	29.9	31	31.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	14.3	15.4	15.5	15.6
Chloride (mg/L)	15	12	12	12
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1440	1410	1420	1390
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	3.9	5.2	14.3	23.9
Gross Beta-Dissolved (pCi/L)	-2.1	10.7	9	9.9
Gross Gamma-Dissolved (pCi/L)				
Iron-Dissolved (mg/L)	<0.03	0.07	0.09	0.1
Iron-Total (mg/L)	0.04	0.08	0.1	0.67
Lead 210-Dissolved (pCi/L)	-11.2	-4.9	-2.7	-5.3
Lead 210-Suspended (pCi/L)			2.1	5.6
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	10	10.4	10.9	11.1
Manganese-Dissolved (mg/L)	0.05	0.06	0.07	0.07
Manganese-Total (mg/L)	0.05	0.06	0.07	0.07
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #696				
Analyte	**3/31/2008 13:41**	**4/22/2008 16:58**	**5/21/2008 11:55**	**6/24/2008 15:08**
Oxidation-Reduction Potential (mV)	170	200	120	99
pH	8.71	8.47	8.35	8.29
Polonium 210-Dissolved (pCi/L)	0.6	0.9	-0.2	0.2
Polonium 210-Suspended (pCi/L)	0.5	0.6		0.5
Potassium-Dissolved (mg/L)	9.7	9.3	9.2	9.4
Radium 226-Dissolved (pCi/L)	1	0.5	1.8	3.3
Radium 226-Suspended (pCi/L)	0.6	-0.2	-0.1	-0.4
Radon 222-Total (pCi/L)	190	185	497	517
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	4.4	4.7	5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	11	12	12	12
Sodium-Dissolved (mg/L)	270	293	294	295
Solids-Total Dissolved Calculated (mg/L)	941	951	984	934
Solids-Total Dissolved TDS @ 180 C (mg/L)	880	930	930	920
Strontium-Total (mg.L)	0.7	0.8	0.8	0.8
Sulfate (mg/L)	475	475	505	456
TDS Balance (0.80 - 1.20) (dec.%)	0.94	0.98	0.94	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)				
Thorium 230-Suspended (pCi/L)	0.2	0.2	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #696								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	4.29	2.950797	1.5	4.17	7.2	0.93	7.89	4
Alkalinity-Total as CaCO3 (mg/L)	180.5	4.434712	176	182	183.5	174	184	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Anions (meq/L)	13.925	0.492443	13.45	13.95	14.375	13.3	14.5	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.001	0.000707	0.0005	0.00075	0.00175	0.0005	0.002	4
Arsenic-Total (mg/L)	0.002	0.000816	0.00125	0.002	0.00275	0.001	0.003	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.00075	0.0005	0.0005	0.0005	0.00125	0.0005	0.0015	4
Bicarbonate as HCO3 (mg/L)	217.75	5.057997	212.75	218.5	222	212	222	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	30.125	1.581929	28.475	30.45	31.45	28	31.6	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	15.2	0.60553	14.575	15.45	15.575	14.3	15.6	4
Chloride (mg/L)	12.75	1.5	12	12	14.25	12	15	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1415	20.81666	1395	1415	1435	1390	1440	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	11.825	9.284889	4.225	9.75	21.5	3.9	23.9	4
Gross Beta-Dissolved (pCi/L)	6.875	6.023496	0.675	9.45	10.5	-2.1	10.7	4
Gross Gamma-Dissolved (pCi/L)								4
Iron-Dissolved (mg/L)	0.06875	0.037942	0.02875	0.08	0.0975	0.015	0.1	4
Iron-Total (mg/L)	0.2225	0.299374	0.05	0.09	0.5275	0.04	0.67	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead 210-Dissolved (pCi/L)	-6.025	3.634442	-9.725	-5.1	-3.25	-11.2	-2.7	4
Lead 210-Suspended (pCi/L)	1.925	2.642442		1.05	4.725		5.6	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	10.6	0.496655	10.1	10.65	11.05	10	11.1	4
Manganese-Dissolved (mg/L)	0.0625	0.009574	0.0525	0.065	0.07	0.05	0.07	4
Manganese-Total (mg/L)	0.0625	0.009574	0.0525	0.065	0.07	0.05	0.07	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000283	0.000238	0.00005	0.0003	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #696								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	147.25	46.08235	104.25	145	192.5	99	200	4
pH	8.455	0.185742	8.305	8.41	8.65	8.29	8.71	4
Polonium 210-Dissolved (pCi/L)	0.375	0.478714	-0.1	0.4	0.825	-0.2	0.9	4
Polonium 210-Suspended (pCi/L)	0.4	0.270801	0.125	0.5	0.575		0.6	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	9.4	0.216025	9.225	9.35	9.625	9.2	9.7	4
Radium 226-Dissolved (pCi/L)	1.65	1.223383	0.625	1.4	2.925	0.5	3.3	4
Radium 226-Suspended (pCi/L)	-0.025	0.434933	-0.35	-0.15	0.425	-0.4	0.6	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	347.25	184.6553	186.25	343.5	512	185	517	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	5.55	1.717556	4.475	4.85	7.325	4.4	8.1	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	288	12.02775	275.75	293.5	294.75	270	295	4
Sodium Adsorption Ratio (SAR) (meq/L)	11.75	0.5	11.25	12	12	11	12	4
Solids-Total Dissolved Calculated (mg/L)	952.5	22.12841	935.75	946	975.75	934	984	4
Solids-Total Dissolved TDS @ 180 C (mg/L	915	23.80476	890	925	930	880	930	4
Strontium-Total (mg.L)	0.775	0.05	0.725	0.8	0.8	0.7	0.8	4
Sulfate (mg/L)	477.75	20.25463	460.75	475	497.5	456	505	4
TDS Balance (0.80 - 1.20) (dec.%)	0.9625	0.0263	0.94	0.96	0.9875	0.94	0.99	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)								4
Thorium 230-Suspended (pCi/L)	0.125	0.095743	0.025	0.15	0.2		0.2	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #697					
Analyte	**3/30/2008 16:36**	**3/31/2008 16:31**	**4/22/2008 16:02**	**5/21/2008 16:44**	**6/24/2008 18:20**
A/C Balance (± 5) (%)	-1.53	1.52	3.91	2.35	6.52
Alkalinity-Total as CaCO3 (mg/L)	166	176	166	168	168
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.2	0.2	0.1	0.1
Anions (meq/L)	13	13.9	12.5	13.1	12.1
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.002	0.002
Arsenic-Total (mg/L)	<0.003	0.002	0.002	0.002	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	0.2
Beryllium-Total (mg/L)	<0.001	<0.005	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	202	215	202	205	205
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.001	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	49.2	48	50.6	52.8	53.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	12.6	14.3	13.5	13.7	13.8
Chloride (mg/L)	10	14	8	8	8
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1250	1390	1230	1380	1230
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.4	0.5	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	6.1	52.2	8.4	4.1	11.9
Gross Beta-Dissolved (pCi/L)	6.8	16.1	8.4	5.4	8.1
Gross Gamma-Dissolved (pCi/L)					
Iron-Dissolved (mg/L)	0.03	0.07	0.04	0.04	0.04
Iron-Total (mg/L)	0.06	0.11	0.05	0.04	0.08
Lead 210-Dissolved (pCi/L)	-23	-12.4	-0.7	-4.3	0.5
Lead 210-Suspended (pCi/L)	-2.8				2.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	16.9	17.8	17.3	18	17.7
Manganese-Dissolved (mg/L)	0.05	0.07	0.05	0.06	0.06
Manganese-Total (mg/L)	0.05	0.08	0.06	0.06	0.06
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	<0.1	0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	200	230	320	200	140
pH	7.83	8.16	8.07	7.9	8.25
Polonium 210-Dissolved (pCi/L)	1.1	1.1			-0.1
Polonium 210-Suspended (pCi/L)	0.9	0.6		1.2	
Potassium-Dissolved (mg/L)	8.1	8.7	8.5	8.5	8.8
Radium 226-Dissolved (pCi/L)	1.5	6.3	1.7	1.1	0.8
Radium 226-Suspended (pCi/L)	0.6	0.6	-0.1	3.8	-0.4
Radon 222-Total (pCi/L)	323	1400	284	570	413
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.001	<0.001	<0.001	<0.001	0.005
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.4	7.4	4	4.6	4.6

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #697					
Analyte	**3/30/2008 16:36**	**3/31/2008 16:31**	**4/22/2008 16:02**	**5/21/2008 16:44**	**6/24/2008 18:20**
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	6.2	7.3	6.6	6.5	6.6
Sodium-Dissolved (mg/L)	197	234	215	216	218
Solids-Total Dissolved Calculated (mg/L)	853	925	840	873	829
Solids-Total Dissolved TDS @ 180 C (mg/L)	800	870	810	790	810
Strontium-Total (mg.L)	1.1	0.9	1.3	1.2	1.2
Sulfate (mg/L)	452	476	430	456	409
TDS Balance (0.80 - 1.20) (dec.%)	0.93	0.94	0.97	0.91	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.4				
Thorium 230-Suspended (pCi/L)	0.1	0.1	0.1	0.3	0.2
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	0.0007	<0.0003
Uranium-Total (mg/L)	<0.0003	0.0031	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	0.01	<0.01

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #697								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	2.554	2.973118	-0.005	2.35	5.215	-1.53	6.52	5
Alkalinity-Total as CaCO3 (mg/L)	168.8	4.147288	166	168	172	166	176	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.14	0.054772	0.1	0.1	0.2	0.1	0.2	5
Anions (meq/L)	12.92	0.679706	12.3	13	13.5	12.1	13.9	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0013	0.000671	0.00075	0.001	0.002	0.0005	0.002	5
Arsenic-Total (mg/L)	0.0021	0.000548	0.00175	0.002	0.0025	0.0015	0.003	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.08	0.067082	0.05	0.05	0.125	0.05	0.2	5
Beryllium-Total (mg/L)	0.0011	0.000894	0.0005	0.0005	0.002	0.0005	0.0025	5
Bicarbonate as HCO3 (mg/L)	205.8	5.357238	202	205	210	202	215	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	50.8	2.302173	48.6	50.6	53.1	48	53.4	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	13.58	0.622093	13.05	13.7	14.05	12.6	14.3	5
Chloride (mg/L)	9.6	2.607681	8	8	12	8	14	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1296	81.73127	1230	1250	1385	1230	1390	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.48	0.044721	0.45	0.5	0.5	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	16.54	20.1443	5.1	8.4	32.05	4.1	52.2	5
Gross Beta-Dissolved (pCi/L)	8.96	4.164493	6.1	8.1	12.25	5.4	16.1	5
Gross Gamma-Dissolved (pCi/L)								5
Iron-Dissolved (mg/L)	0.044	0.015166	0.035	0.04	0.055	0.03	0.07	5
Iron-Total (mg/L)	0.068	0.027749	0.045	0.06	0.095	0.04	0.11	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	-7.98	9.792701	-17.7	-4.3	-0.1	-23	0.5	5
Lead 210-Suspended (pCi/L)	0.02	2.01544	-1.4		1.45	-2.8	2.9	5
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	17.54	0.439318	17.1	17.7	17.9	16.9	18	5
Manganese-Dissolved (mg/L)	0.058	0.008367	0.05	0.06	0.065	0.05	0.07	5
Manganese-Total (mg/L)	0.062	0.010954	0.055	0.06	0.07	0.05	0.08	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nitrogen, Nitrate as N (mg/L)	0.055	0.027386	0.0375	0.05	0.075	0.025	0.1	5
Nitrogen, Nitrite as N (mg/L)	0.045	0.01118	0.0375	0.05	0.05	0.025	0.05	5

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #697								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Oxidation-Reduction Potential (mV)	218	65.72671	170	200	275	140	320	5
pH	8.042	0.175414	7.865	8.07	8.205	7.83	8.25	5
Polonium 210-Dissolved (pCi/L)	0.42	0.622093	-0.05		1.1	-0.1	1.1	5
Polonium 210-Suspended (pCi/L)	0.54	0.536656		0.6	1.05		1.2	5
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	8.52	0.268328	8.3	8.5	8.75	8.1	8.8	5
Radium 226-Dissolved (pCi/L)	2.28	2.274203	0.95	1.5	4	0.8	6.3	5
Radium 226-Suspended (pCi/L)	0.9	1.679286	-0.25	0.6	2.2	-0.4	3.8	5
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	598	461.6368	303.5	413	985	284	1400	5
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-Total (mg/L)	0.0015	0.001969	0.0005	0.0005	0.003	0.0005	0.005	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Silica-Dissolved (mg/L)	5.6	1.661325	4.3	4.6	7.4	4	7.4	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	216	13.13393	206	216	226	197	234	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.64	0.403733	6.35	6.6	6.95	6.2	7.3	5
Solids-Total Dissolved Calculated (mg/L)	864	37.82856	834.5	853	899	829	925	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	816	31.30495	795	810	840	790	870	5
Strontium-Total (mg.L)	1.14	0.151658	1	1.2	1.25	0.9	1.3	5
Sulfate (mg/L)	444.6	25.7449	419.5	452	466	409	476	5
TDS Balance (0.80 - 1.20) (dec.%)	0.944	0.026077	0.92	0.94	0.97	0.91	0.97	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.08	0.178885			0.2		0.4	5
Thorium 230-Suspended (pCi/L)	0.16	0.089443	0.1	0.1	0.25	0.1	0.3	5
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00072	0.001275	0.00015	0.00015	0.001575	0.00015	0.003	5
Uranium-Suspended (mg/L)	0.00026	0.000246	0.00015	0.00015	0.000425	0.00015	0.0007	5
Uranium-Total (mg/L)	0.00074	0.001319	0.00015	0.00015	0.001625	0.00015	0.0031	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.006	0.002236	0.005	0.005	0.0075	0.005	0.01	5

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #698						
Analyte	**3/30/2008 14:04**	**3/30/2008 14:10**	**4/22/2008 11:30**	**5/28/2008 12:35**	**5/28/2008 12:45**	**6/24/2008 11:55**
A/C Balance (± 5) (%)	2.58	-1.6	0.92	9.13	5.02	3.88
Alkalinity-Total as CaCO3 (mg/L)	124	122	120	114	118	114
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.1	0.2	0.2	0.2	0.1
Anions (meq/L)	29.9	32.6	32.8	28.9	30.9	33.1
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.004	0.003	<0.001	0.002	0.003	0.005
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	151	149	146	139	144	139
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.2	0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	338	340	366	382	375	393
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	31.4	31.6	33.4	34.8	34.2	35.8
Chloride (mg/L)	12	11	9	9	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2390	2400	2420	2280	2460	2530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.2	0.3	0.3	0.5	0.6	0.3
Gross Alpha-Dissolved (pCi/L)	1750	1880	2110	1210	1390	1790
Gross Beta-Dissolved (pCi/L)	657	659	604	380	383	470
Gross Gamma-Dissolved (pCi/L)	790	840	680	4100	3500	170
Iron-Dissolved (mg/L)	1.56	1.58	2.49	1.69	1.56	1.6
Iron-Total (mg/L)	4.06	3.99	4.53	4.6	4.88	5.48
Lead 210-Dissolved (pCi/L)	-14	-9.6	-3.5	5.5	9.4	-1.7
Lead 210-Suspended (pCi/L)				2.6	9	7.4
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Magnesium-Dissolved (mg/L)	125	126	129	137	135	141
Manganese-Dissolved (mg/L)	2.18	2.22	2.39	2.31	2.23	2.56
Manganese-Total (mg/L)	2.31	2.29	2.5	2.32	2.45	2.66
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	0.09	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)	280	190	110	200	220	94
pH	6.91	6.91	7.15	6.78	6.75	7.09
Polonium 210-Dissolved (pCi/L)	1	1.3	1.4	0.2		1.1
Polonium 210-Suspended (pCi/L)	1.2	0.8	-0.2	1.4	1.3	1.2
Potassium-Dissolved (mg/L)	14.6	14.4	15.6	15.5	15.4	15.9
Radium 226-Dissolved (pCi/L)	387	398	370	413	412	429
Radium 226-Suspended (pCi/L)	15.3	12.4	6.4	14	13.5	11.6
Radon 222-Total (pCi/L)	32200	29400	25800	25600	22400	40700
Selenium-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.002	0.002	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	9.5	9.5	4.8	5.2	5.1	5.5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	1	0.98	1	0.98	0.98	0.98
Sodium-Dissolved (mg/L)	84.6	83.7	89	88	87	89
Solids-Total Dissolved Calculated (mg/L)	1970	2110	2140	1980	2060	2200
Solids-Total Dissolved TDS @ 180 C (mg/L)	2200	2200	2300	2200	2100	2100
Strontium-Total (mg.L)	4.9	4.8	5.2	4.8	5	5.2

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #698						
Analyte	**3/30/2008 14:04**	**3/30/2008 14:10**	**4/22/2008 11:30**	**5/28/2008 12:35**	**5/28/2008 12:45**	**6/24/2008 11:55**
Sulfate (mg/L)	1300	1430	1450	1270	1360	1470
TDS Balance (0.80 - 1.20) (dec.%)	1.13	1.07	1.05	1.09	1.04	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)		-0.1				
Thorium 230-Suspended (pCi/L)	0.4	0.3	0.2	0.7	0.5	0.7
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.109	0.109	0.11	0.101	0.103	0.104
Uranium-Suspended (mg/L)	0.0024	0.0024	0.0006	0.0038	0.0032	0.0043
Uranium-Total (mg/L)	0.123	0.122	0.119	0.116	0.119	0.113
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	0.01

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #698								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.321667	3.673518	0.29	3.23	6.0475	-1.6	9.13	6
Alkalinity-Total as CaCO3 (mg/L)	118.6667	4.131182	114	119	122.5	114	124	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.15	0.054772	0.1	0.15	0.2	0.1	0.2	6
Anions (meq/L)	31.36667	1.733974	29.65	31.75	32.875	28.9	33.1	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	6
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Arsenic-Total (mg/L)	0.002917	0.001563	0.001625	0.003	0.00425	0.0005	0.005	6
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Bicarbonate as HCO3 (mg/L)	144.6667	5.006662	139	145	149.5	139	151	6
Boron-Dissolved (mg/L)	0.083333	0.060553	0.05	0.05	0.125	0.05	0.2	6
Boron-Total (mg/L)	0.058333	0.020412	0.05	0.05	0.0625	0.05	0.1	6
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Calcium-Dissolved (mg/L)	365.6667	22.47369	339.5	370.5	384.75	338	393	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	33.53333	1.760303	31.55	33.8	35.05	31.4	35.8	6
Chloride (mg/L)	9.833333	1.32916	9	9	11.25	9	12	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Conductivity @ 25 C (umhos/cm)	2413.333	82.86535	2362.5	2410	2477.5	2280	2530	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Fluoride (mg/L)	0.366667	0.150555	0.275	0.3	0.525	0.2	0.6	6
Gross Alpha-Dissolved (pCi/L)	1688.333	330.6005	1345	1770	1937.5	1210	2110	6
Gross Beta-Dissolved (pCi/L)	525.5	131.0218	382.25	537	657.5	380	659	6
Gross Gamma-Dissolved (pCi/L)	1680	1670.126	552.5	815	3650	170	4100	6
Iron-Dissolved (mg/L)	1.746667	0.367351	1.56	1.59	1.89	1.56	2.49	6
Iron-Total (mg/L)	4.59	0.551507	4.0425	4.565	5.03	3.99	5.48	6
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Lead-Total (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Lead 210-Dissolved (pCi/L)	-2.31667	8.828458	-10.7	-2.6	6.475	-14	9.4	6
Lead 210-Suspended (pCi/L)	3.166667	4.058407		1.3	7.8		9	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	132.1667	6.462714	125.75	132	138	125	141	6
Manganese-Dissolved (mg/L)	2.315	0.141527	2.21	2.27	2.4325	2.18	2.56	6
Manganese-Total (mg/L)	2.421667	0.144141	2.305	2.385	2.54	2.29	2.66	6
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #698								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nitrogen, Nitrate as N (mg/L)	0.056667	0.01633	0.05	0.05	0.06	0.05	0.09	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Oxidation-Reduction Potential (mV)	182.3333	69.80449	106	195	235	94	280	6
pH	6.931667	0.161049	6.7725	6.91	7.105	6.75	7.15	6
Polonium 210-Dissolved (pCi/L)	0.833333	0.588784	0.15	1.05	1.325		1.4	6
Polonium 210-Suspended (pCi/L)	0.95	0.599166	0.55	1.2	1.325	-0.2	1.4	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	15.23333	0.595539	14.55	15.45	15.675	14.4	15.9	6
Radium 226-Dissolved (pCi/L)	401.5	21.04044	382.75	405	417	370	429	6
Radium 226-Suspended (pCi/L)	12.2	3.11705	10.3	12.95	14.325	6.4	15.3	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	29350	6510.223	24800	27600	34325	22400	40700	6
Selenium-Dissolved (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.001083	0.000736	0.0005	0.00075	0.002	0.0005	0.002	6
Selenium-VI-Dissolved (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Silica-Dissolved (mg/L)	6.6	2.257432	5.025	5.35	9.5	4.8	9.5	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Sodium-Dissolved (mg/L)	86.88333	2.261342	84.375	87.5	89	83.7	89	6
Sodium Adsorption Ratio (SAR) (meq/L)	0.986667	0.010328	0.98	0.98	1	0.98	1	6
Solids-Total Dissolved Calculated (mg/L)	2076.667	90.92121	1977.5	2085	2155	1970	2200	6
Solids-Total Dissolved TDS @ 180 C (mg/L)	2183.333	75.27727	2100	2200	2225	2100	2300	6
Strontium-Total (mg.L)	4.983333	0.183485	4.8	4.95	5.2	4.8	5.2	6
Sulfate (mg/L)	1380	82.94577	1292.5	1395	1455	1270	1470	6
TDS Balance (0.80 - 1.20) (dec.%)	1.058333	0.053821	1.0225	1.06	1.1	0.97	1.13	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Thorium 230-Dissolved (pCi/L)	-0.01667	0.040825	-0.025			-0.1		6
Thorium 230-Suspended (pCi/L)	0.466667	0.206559	0.275	0.45	0.7	0.2	0.7	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.106	0.003795	0.1025	0.1065	0.10925	0.101	0.11	6
Uranium-Suspended (mg/L)	0.002783	0.001309	0.00195	0.0028	0.003925	0.0006	0.0043	6
Uranium-Total (mg/L)	0.118667	0.003724	0.11525	0.119	0.12225	0.113	0.123	6
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.006667	0.002582	0.005	0.005	0.01	0.005	0.01	6
Zinc-Total (mg/L)	0.005833	0.002041	0.005	0.005	0.00625	0.005	0.01	6

Powertech (USA) Inc.

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Dewey-Burdock Project

Groundwater Quality Data

Well #3026				
Analyte	**3/30/2008 18:45**	**4/22/2008 14:30**	**5/28/2008 15:15**	**6/24/2008 20:06**
A/C Balance (± 5) (%)	-2.96	3.12	5.9	1.44
Alkalinity-Total as CaCO3 (mg/L)	130	126	166	172
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	1.2	0.8	0.7	0.6
Anions (meq/L)	34.2	34.6	34.5	41.2
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.004	0.012	0.002	<0.001
Arsenic-Total (mg/L)	0.023	0.022	0.028	0.025
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	158	134	202	210
Boron-Dissolved (mg/L)	<0.1	<0.1	0.2	0.2
Boron-Total (mg/L)	<0.1	<0.1	0.1	0.2
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	284	331	407	461
Carbonate as CO3 (mg/L)	<5	10	<5	<5
Cations (meq/L)	32.2	36.8	38.8	42.4
Chloride (mg/L)	37	16	15	15
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2770	2730	2610	2970
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.6	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	47.6	43.8	92.4	116
Gross Beta-Dissolved (pCi/L)	21.1	24.4	28.3	33.9
Gross Gamma-Dissolved (pCi/L)				
Iron-Dissolved (mg/L)	0.1	2.67	0.23	0.04
Iron-Total (mg/L)	1.75	5.38	11.1	21.8
Lead 210-Dissolved (pCi/L)	<1		-0.7	-5.3
Lead 210-Suspended (pCi/L)	-3	-8.2	4	6.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	67.9	86.8	105	137
Manganese-Dissolved (mg/L)	0.42	0.36	0.82	1.42
Manganese-Total (mg/L)	0.13	0.46	0.87	1.46
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	0.2	0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0.3	0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	0.1	0.09	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	200	240	210	85
pH	7.63	8.49	6.95	6.82
Polonium 210-Dissolved (pCi/L)	0.4	0.2		0.2
Polonium 210-Suspended (pCi/L)	1.9		-0.1	0.2

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Groundwater Quality Data

Well #3026				
Analyte	**3/30/2008 18:45**	**4/22/2008 14:30**	**5/28/2008 15:15**	**6/24/2008 20:06**
Potassium-Dissolved (mg/L)	21.3	23.7	25.3	22.3
Radium 226-Dissolved (pCi/L)	3.6	2.8	9.6	4.7
Radium 226-Suspended (pCi/L)	3.3	0.1	1.2	-0.1
Radon 222-Total (pCi/L)	440	304	213	950
Selenium-Dissolved (mg/L)	0.006	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.007	0.002	<0.001	0.005
Selenium-VI-Dissolved (mg/L)	0.006	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	5.7	2.1	2.3	1.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.7	3.6	2.4	1.8
Sodium-Dissolved (mg/L)	271	284	209	171
Solids-Total Dissolved Calculated (mg/L)	2240	2340	2340	2710
Solids-Total Dissolved TDS @ 180 C (mg/L)	2300	2300	2400	2700
Strontium-Total (mg.L)	4.8	6.3	7	7.4
Sulfate (mg/L)	1470	1520	1480	1790
TDS Balance (0.80 - 1.20) (dec.%)	1.03	0.99	1.03	1.01
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)		0.1	0.1	
Thorium 230-Suspended (pCi/L)	1	0.3	0.2	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0151	0.015	0.0281	0.0183
Uranium-Suspended (mg/L)	0.004	0.001	0.0013	0.0015
Uranium-Total (mg/L)	0.0097	0.0196	0.0322	0.0216
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	0.01	0.01	0.01

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Groundwater Quality Data

Well #3026								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.875	3.711114	-1.86	2.28	5.205	-2.96	5.9	4
Alkalinity-Total as CaCO3 (mg/L)	148.5	23.85372	127	148	170.5	126	172	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.825	0.262996	0.625	0.75	1.1	0.6	1.2	4
Anions (meq/L)	36.125	3.3876	34.275	34.55	39.55	34.2	41.2	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.004625	0.005121	0.000875	0.003	0.01	0.0005	0.012	4
Arsenic-Total (mg/L)	0.0245	0.002646	0.02225	0.024	0.02725	0.022	0.028	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	176	36.14784	140	180	208	134	210	4
Boron-Dissolved (mg/L)	0.125	0.086603	0.05	0.125	0.2	0.05	0.2	4
Boron-Total (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	370.75	78.66543	295.75	369	447.5	284	461	4
Carbonate as CO3 (mg/L)	4.375	3.75	2.5	2.5	8.125	2.5	10	4
Cation/Anion Balance (%)								
Cations (meq/L)	37.55	4.253234	33.35	37.8	41.5	32.2	42.4	4
Chloride (mg/L)	20.75	10.84358	15	15.5	31.75	15	37	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	2770	149.6663	2640	2750	2920	2610	2970	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.45	0.1	0.4	0.4	0.55	0.4	0.6	4
Gross Alpha-Dissolved (pCi/L)	74.95	35.15655	44.75	70	110.1	43.8	116	4
Gross Beta-Dissolved (pCi/L)	26.925	5.502954	21.925	26.35	32.5	21.1	33.9	4
Gross Gamma-Dissolved (pCi/L)								4
Iron-Dissolved (mg/L)	0.76	1.2758	0.055	0.165	2.06	0.04	2.67	4
Iron-Total (mg/L)	10.0075	8.753222	2.6575	8.24	19.125	1.75	21.8	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead 210-Dissolved (pCi/L)	-1.375	2.662549	-4.15	-0.35	0.375	-5.3	0.5	4
Lead 210-Suspended (pCi/L)	-0.075	6.827091	-6.9	0.5	6.175	-8.2	6.9	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	99.175	29.41614	72.625	95.9	129	67.9	137	4
Manganese-Dissolved (mg/L)	0.755	0.488092	0.375	0.62	1.27	0.36	1.42	4
Manganese-Total (mg/L)	0.73	0.57312	0.2125	0.665	1.3125	0.13	1.46	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Molybdenum-Total (mg/L)	0.125	0.119024	0.05	0.075	0.25	0.05	0.3	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nitrogen, Nitrate as N (mg/L)	0.0725	0.0263	0.05	0.07	0.0975	0.05	0.1	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	183.75	67.99203	113.75	205	232.5	85	240	4
pH	7.4725	0.765697	6.8525	7.29	8.275	6.82	8.49	4

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Groundwater Quality Data

Well #3026								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Polonium 210-Dissolved (pCi/L)	0.2	0.163299	0.05	0.2	0.35		0.4	4
Polonium 210-Suspended (pCi/L)	0.5	0.94163	-0.075	0.1	1.475	-0.1	1.9	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	23.15	1.738774	21.55	23	24.9	21.3	25.3	4
Radium 226-Dissolved (pCi/L)	5.175	3.051093	3	4.15	8.375	2.8	9.6	4
Radium 226-Suspended (pCi/L)	1.125	1.558578	-0.05	0.65	2.775	-0.1	3.3	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	476.75	328.9999	235.75	372	822.5	213	950	4
Selenium-Dissolved (mg/L)	0.001875	0.00275	0.0005	0.0005	0.004625	0.0005	0.006	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.003625	0.002926	0.000875	0.0035	0.0065	0.0005	0.007	4
Selenium-VI-Dissolved (mg/L)	0.001875	0.00275	0.0005	0.0005	0.004625	0.0005	0.006	4
Silica-Dissolved (mg/L)	3	1.807392	1.95	2.2	4.85	1.9	5.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	233.75	53.1123	180.5	240	280.75	171	284	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.875	0.928709	1.95	3	3.675	1.8	3.7	4
Solids-Total Dissolved Calculated (mg/L)	2407.5	207.103	2265	2340	2617.5	2240	2710	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	2425	189.2969	2300	2350	2625	2300	2700	4
Strontium-Total (mg.L)	6.375	1.144188	5.175	6.65	7.3	4.8	7.4	4
Sulfate (mg/L)	1565	151.5476	1472.5	1500	1722.5	1470	1790	4
TDS Balance (0.80 - 1.20) (dec.%)	1.015	0.019149	0.995	1.02	1.03	0.99	1.03	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.05	0.057735		0.05	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.375	0.434933	0.05	0.25	0.825		1	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.019125	0.006177	0.015025	0.0167	0.02565	0.015	0.0281	4
Uranium-Suspended (mg/L)	0.00195	0.001382	0.001075	0.0014	0.003375	0.001	0.004	4
Uranium-Total (mg/L)	0.020775	0.009224	0.012175	0.0206	0.02955	0.0097	0.0322	4
Vanadium-Dissolved (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.00875	0.0025	0.00625	0.01	0.01	0.005	0.01	4

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Groundwater Quality Data

Well #4002					
Analyte	**9/27/2007 14:35**	**9/27/2007 14:39**	**11/14/2007 11:45**	**2/12/2008 11:47**	**5/19/2008 13:00**
A/C Balance (± 5) (%)	-4.1	0.215	-1.56	-2.61	2.11
Alkalinity-Total as CaCO3 (mg/L)	140	138	140	138	144
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	11.3	11	12.3	12.8	12.4
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	171	168	171	168	176
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.001
Calcium-Dissolved (mg/L)	36.8	38.7	41.4	42.4	46.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	10.4	11.1	12	12.1	13
Chloride (mg/L)	7	7	7	7	6
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1190	1210	1130	1230	1340
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	120	141	227	314	127
Gross Beta-Dissolved (pCi/L)	45.5	49.6	87.9	101	30.1
Gross Gamma-Dissolved (pCi/L)	120	<20	2200	650	210
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				2.23	2.29
Lead 210-Dissolved (pCi/L)	2	<1	6.2	<1	-2.6
Lead 210-Suspended (pCi/L)	9.7	<1	<1	<1	1.4
Lead-Dissolved (mg/L)	12	<1			
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)				<0.001	<0.001
Manganese-Dissolved (mg/L)	11.9	12.4	13.9	14.2	15.8
Manganese-Total (mg/L)	0.08	0.07	0.08	0.08	0.08
Mercury-Dissolved (mg/L)				0.08	0.08
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.0002	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)				<0.01	<0.01
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)				<0.05	<0.05
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Oxidation-Reduction Potential (mV)	<0.1	<0.1	<0.1	<0.1	<0.1
pH			140	190	250
Polonium 210-Dissolved (pCi/L)	7.81	7.85	7.65	7.83	8.02
Polonium 210-Suspended (pCi/L)	<1	<1	<1	2.1	
Potassium-Dissolved (mg/L)	<1	<1	<1	<1	0.1
Radium 226-Dissolved (pCi/L)	<1	<1			
Radium 226-Suspended (pCi/L)	7.2	7.3	7.3	7.4	7.1
Radon 222-Total (pCi/L)	63.6	60	54.2	57	52.3
Selenium-Dissolved (mg/L)	<0.2	19.4		37	8.4
Selenium-IV-Dissolved (mg/L)	62.7	79.4			
Selenium-Total (mg/L)			8010	9890	8780
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.005

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #4002					
Analyte	**9/27/2007 14:35**	**9/27/2007 14:39**	**11/14/2007 11:45**	**2/12/2008 11:47**	**5/19/2008 13:00**
Silica-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silver-Dissolved (mg/L)				<0.001	<0.001
Silver-Total (mg/L)			<0.001	<0.001	<0.001
Sodium Adsorption Ratio (SAR) (meq/L)	6.6	6.9	7.6	7.3	3.8
Sodium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Solids-Total Dissolved Calculated (mg/L)				<0.005	<0.005
Solids-Total Dissolved TDS @ 180 C (mg/L)			6.7	6.7	6.8
Strontium-Total (mg.L)	170	182	197	198	211
Sulfate (mg/L)	716	717	799	842	834
TDS Balance (0.80 - 1.20) (dec.%)	820	800	850	830	790
Thallium-Total (mg/L)				0.8	0.9
Thorium 230-Dissolved (pCi/L)	454	453	448	470	450
Thorium 230-Suspended (pCi/L)	1.15	1.12	1.06	0.98	0.94
Thorium 232-Dissolved (pCi/L)				<0.001	<0.001
Uranium-Dissolved (mg/L)	0.5	0.6	<0.2	0.2	
Uranium-Suspended (mg/L)	<0.2	<0.2	<0.2	<0.2	0.1
Uranium-Total (mg/L)	<0.2	<0.2			
Vanadium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc-Dissolved (mg/L)	0.0026	0.0026	0.0026	0.0026	0.0023
Zinc-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #4002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.189	2.423088	-3.355	-1.56	1.1625	-4.1	2.11	5
Alkalinity-Total as CaCO3 (mg/L)	140	2.44949	138	140	142	138	144	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.1	0.111803	0.05	0.05	0.175	0.05	0.3	5
Anions (meq/L)	11.96	0.770065	11.15	12.3	12.6	11	12.8	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Arsenic-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	170.8	3.271085	168	171	173.5	168	176	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	41.18	3.749933	37.75	41.4	44.5	36.8	46.6	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	11.72	0.998499	10.75	12	12.55	10.4	13	5
Chloride (mg/L)	6.8	0.447214	6.5	7	7	6	7	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1220	76.81146	1160	1210	1285	1130	1340	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.36	0.054772	0.3	0.4	0.4	0.3	0.4	5
Gross Alpha-Dissolved (pCi/L)	185.8	83.55657	123.5	141	270.5	120	314	5
Gross Beta-Dissolved (pCi/L)	62.82	30.13332	37.8	49.6	94.45	30.1	101	5
Gross Gamma-Dissolved (pCi/L)	638	906.3498	65	210	1425	10	2200	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	2.26	0.042426		2.26		2.23	2.29	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.32	3.201094	-1.05	0.5	4.1	-2.6	6.2	5
Lead 210-Suspended (pCi/L)	2.52	4.032617	0.5	0.5	5.55	0.5	9.7	5
Lead 210-Total (pCi/L)	6.25	8.131728		6.25		0.5	12	2
Magnesium-Dissolved (mg/L)	13.64	1.550161	12.15	13.9	15	11.9	15.8	5
Manganese-Dissolved (mg/L)	0.078	0.004472	0.075	0.08	0.08	0.07	0.08	5
Manganese-Total (mg/L)	0.08			0.08		0.08	0.08	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.00025	0.000229	0.000075	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

Powertech (USA) Inc.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #4002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	193.3333	55.07571	140	190	250	140	250	3
pH	7.832	0.131605	7.73	7.83	7.935	7.65	8.02	5
Polonium 210-Dissolved (pCi/L)	0.72	0.801249	0.25	0.5	1.3		2.1	5
Polonium 210-Suspended (pCi/L)	0.42	0.178885	0.3	0.5	0.5	0.1	0.5	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	2
Potassium-Dissolved (mg/L)	7.26	0.114018	7.15	7.3	7.35	7.1	7.4	5
Radium 226-Dissolved (pCi/L)	57.42	4.516857	53.25	57	61.8	52.3	63.6	5
Radium 226-Suspended (pCi/L)	16.225	15.94707	2.175	13.9	32.6	0.1	37	4
Radium 226-Total (pCi/L)	71.05	11.80868		71.05		62.7	79.4	2
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	8893.333	945.1102	8010	8780	9890	8010	9890	3
Selenium-Dissolved (mg/L)	0.0009	0.000894	0.0005	0.0005	0.0015	0.0005	0.0025	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.44	1.524139	5.2	6.9	7.45	3.8	7.6	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	191.6	15.85244	176	197	204.5	170	211	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.733333	0.057735	6.7	6.7	6.8	6.7	6.8	3
Solids-Total Dissolved Calculated (mg/L)	781.6	61.58977	716.5	799	838	716	842	5
olids-Total Dissolved TDS @ 180 C (mg/l	818	23.87467	795	820	840	790	850	5
Strontium-Total (mg.L)	0.85	0.070711		0.85		0.8	0.9	2
Sulfate (mg/L)	455	8.717798	449	453	462	448	470	5
TDS Balance (0.80 - 1.20) (dec.%)	1.05	0.089443	0.96	1.06	1.135	0.94	1.15	5
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.28	0.258844	0.05	0.2	0.55		0.6	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	2
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00254	0.000134	0.00245	0.0026	0.0026	0.0023	0.0026	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #7002				
Analyte	**9/28/2007 17:48**	**11/12/2007 8:10**	**2/20/2008 8:30**	**5/29/2008 10:44**
A/C Balance (± 5) (%)	-4.65	2.47	-5.62	7.56
Alkalinity-Total as CaCO3 (mg/L)	280	250	260	254
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	0.3	0.2	0.2
Anions (meq/L)	26.3	26.9	28	26.5
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.001	0.001	<0.001
Arsenic-Total (mg/L)			0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	341	305	317	310
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)			<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	206	237	213	264
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	23.9	28.2	25	30.9
Chloride (mg/L)	10	11	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2200	2210	2420	2480
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.2	0.2	0.5	0.3
Gross Alpha-Dissolved (pCi/L)	45.6	39.8	91.4	29.5
Gross Beta-Dissolved (pCi/L)	29.7	34.1	41.4	28.4
Gross Gamma-Dissolved (pCi/L)	1200	1600	370	
Iron-Dissolved (mg/L)	<0.03	0.25	0.28	0.06
Iron-Total (mg/L)			1.25	1.32
Lead 210-Dissolved (pCi/L)	<1	<1	13	-0.6
Lead 210-Suspended (pCi/L)	<1	<1	7.9	-1.1
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	77.7	90.4	81.7	103
Manganese-Dissolved (mg/L)	0.39	0.37	0.38	0.41
Manganese-Total (mg/L)			0.37	0.4
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1

Powertech (USA) Inc.

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Groundwater Quality Data

Well #7002				
Analyte	**9/28/2007 17:48**	**11/12/2007 8:10**	**2/20/2008 8:30**	**5/29/2008 10:44**
Oxidation-Reduction Potential (mV)		190	170	230
pH	7.29	7.22	7.56	7.36
Polonium 210-Dissolved (pCi/L)	1.3	4.1	<1	0.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	0.2
Potassium-Dissolved (mg/L)	19.9	22.2	21	21.7
Radium 226-Dissolved (pCi/L)	8.5	8.1	8.8	8
Radium 226-Suspended (pCi/L)	<0.2	<0.2	<0.9	
Radon 222-Total (pCi/L)		938	752	1270
Selenium-Dissolved (mg/L)	0.001	<0.001	0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.3	8.2	7.8	3.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		2.7	2.4	2.6
Sodium-Dissolved (mg/L)	152	192	162	197
Solids-Total Dissolved Calculated (mg/L)	1620	1750	1750	1780
Solids-Total Dissolved TDS @ 180 C (mg/L)	1900	1900	1900	1800
Strontium-Total (mg.L)			6.6	7.7
Sulfate (mg/L)	1160	1040	1080	1020
TDS Balance (0.80 - 1.20) (dec.%)	1.19	1.09	1.07	1.03
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0007	0.0006	0.0006	0.0005
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0005	0.0006
Vanadium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Zinc-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Zinc-Total (mg/L)			<0.005	<0.005

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #7002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.06	6.230222	-5.3775	-1.09	6.2875	-5.62	7.56	4
Alkalinity-Total as CaCO3 (mg/L)	261	13.31666	251	257	275	250	280	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.25	0.057735	0.2	0.25	0.3	0.2	0.3	4
Anions (meq/L)	26.925	0.758837	26.35	26.7	27.725	26.3	28	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	318.25	15.94522	306.25	313.5	335	305	341	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	230	26.26785	207.75	225	257.25	206	264	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	27	3.175951	24.175	26.6	30.225	23.9	30.9	4
Chloride (mg/L)	9.75	0.957427	9	9.5	10.75	9	11	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2327.5	143.6141	2202.5	2315	2465	2200	2480	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.3	0.141421	0.2	0.25	0.45	0.2	0.5	4
Gross Alpha-Dissolved (pCi/L)	51.575	27.37205	32.075	42.7	79.95	29.5	91.4	4
Gross Beta-Dissolved (pCi/L)	33.4	5.864583	28.725	31.9	39.575	28.4	41.4	4
Gross Gamma-Dissolved (pCi/L)	792.5	735.9065	92.5	785	1500		1600	4
Iron-Dissolved (mg/L)	0.15125	0.13319	0.02625	0.155	0.2725	0.015	0.28	4
Iron-Total (mg/L)	1.285	0.049497		1.285		1.25	1.32	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	3.35	6.454198	-0.325	0.5	9.875	-0.6	13	4
Lead 210-Suspended (pCi/L)	1.95	4.037739	-0.7	0.5	6.05	-1.1	7.9	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	88.2	11.20089	78.7	86.05	99.85	77.7	103	4
Manganese-Dissolved (mg/L)	0.3875	0.017078	0.3725	0.385	0.405	0.37	0.41	4
Manganese-Total (mg/L)	0.385	0.021213		0.385		0.37	0.4	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

POWERTECH (USA) INC.

Powertech (USA)
Dewey-Burdock Project

Groundwater Quality Data

Well #7002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	196.6667	30.5505	170	190	230	170	230	3
pH	7.3575	0.1466	7.2375	7.325	7.51	7.22	7.56	4
Polonium 210-Dissolved (pCi/L)	1.5	1.8037	0.2	0.9	3.4	0.1	4.1	4
Polonium 210-Suspended (pCi/L)	0.425	0.15	0.275	0.5	0.5	0.2	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	21.2	0.996661	20.175	21.35	22.075	19.9	22.2	4
Radium 226-Dissolved (pCi/L)	8.35	0.369685	8.025	8.3	8.725	8	8.8	4
Radium 226-Suspended (pCi/L)	0.1625	0.197379	0.025	0.1	0.3625		0.45	4
Radium 226-Total (pCi/L)	6.3			6.3		6.3	6.3	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	986.6667	262.4068	752	938	1270	752	1270	3
Selenium-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.675	2.214159	4.375	7.55	8.1	3.4	8.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	175.75	22.12653	154.5	177	195.75	152	197	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.566667	0.152753	2.4	2.6	2.7	2.4	2.7	3
Solids-Total Dissolved Calculated (mg/L)	1725	71.41428	1652.5	1750	1772.5	1620	1780	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1875	50	1825	1900	1900	1800	1900	4
Strontium-Total (mg.L)	7.15	0.777817		7.15		6.6	7.7	2
Sulfate (mg/L)	1075	61.91392	1025	1060	1140	1020	1160	4
TDS Balance (0.80 - 1.20) (dec.%)	1.095	0.068069	1.04	1.08	1.165	1.03	1.19	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Suspended (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0006	0.0000816	0.000525	0.0006	0.000675	0.0005	0.0007	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00055	0.0000707		0.00055		0.0005	0.0006	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

APPENDIX 5.2-D

STATISTICS FOR GROUNDWATER CONSTITUENTS AT OR ABOVE PQL

POWERTECH (USA) INC.

Statistics for Groundwater Constituents at or above PQL by Constituent

Constituent, Unit	PQL	n Analyzed	n Detected	% exceeding detection	Mean	StDev	Q1	Median	Q3
Major Cations and Anions									
Anions (meq/L)		140	140	100%	28.3	27.5	13.3	15.3	32.8
Bicarbonate as HCO3 (mg/L)	5	140	140	100%	233	119	171	206	248
Carbonate as CO3 (mg/L)	5	140	4	2.9%	21.8	21.3	7.75	13.5	44.0
Sulfate (mg/L)	36	140	140	100%	1110	1000	467	574	1420
Chloride (mg/L)	1	140	140	100%	62.8	266	9.00	12.0	15.0
Fluoride (mg/L)	0.1	140	134	95.7%	0.39	0.139	0.300	0.40	0.50
Nitrogen, Nitrate as N (mg/L)	0.1	140	29	20.7%	0.37	0.440	0.090	0.10	0.73
Cations (meq/L)		140	140	100%	31.6	43.7	13.8	15.9	33.5
Ammonia (mg/L)	1	140	83	59.3%	0.29	0.191	0.200	0.20	0.400
Sodium-Dissolved (mg/L)	0.8	140	140	100%	280	326	127	196	277
Calcium-Dissolved (mg/L)	0.5	140	139	99.3%	184	165	48.5	91.6	353
Magnesium-Dissolved (mg/L)	0.5	140	139	99.3%	86.8	115	17.5	32.7	109
Potassium-Dissolved (mg/L)	0.5	140	139	99.3%	13.0	4.92	8.70	11.5	16.2
Silica-Dissolved (mg/L)	0.5	140	138	98.6%	6.88	3.11	4.38	7.2	8.00
General Water Quality Indicators									
Alkalinity-Total as CaCO3 (mg/L)	5	140	140	100%	193	96.5	140	169	204
Anion/Cation Balance (± 5) (%)		140	136	97.1%	0.93	5.16	-1.76	1.36	4.17
Conductivity @ 25 C (umhos/cm)	5	140	140	100%	2357	1989	1330	1545	2530
Oxidation-Reduction Potential (mV)		118	117	99.2%	193	69.1	150	200	230
pH	0.01	140	140	100%	7.71	0.500	7.33	7.80	8.02
Sodium Adsorption Ratio (meq/L)	0.1	120	119	99.2%	5.46	3.70	2.10	5.40	7.60
Solids-Total Dissolved TDS (mg/L)	5	140	140	100%	1926	1814	890	1000	2300
Solids-Total Dissolved Calc. (mg/L)	5	140	140	100%	1840	1736	892	1005	2135
TDS Balance (0.80 - 1.20) (dec.%)		140	140	100%	1.04	0.10	0.97	1.02	1.09
Metals, Dissolved									
Aluminum-Dissolved (mg/L)	0.1	140	1	0.7%	0.60			0.60	
Arsenic-Dissolved (mg/L)	0.001	140	72	51.4%	0.00	0.0052	0.001	0.0010	0.0020

Constituent, Unit	PQL	n Analyzed	n Detected	% exceeding detection	Mean	StDev	Q1	Median	Q3
Boron-Dissolved (mg/L)	0.1	140	49	35.0%	0.44	0.402	0.20	0.40	0.50
Copper-Dissolved (mg/L)	0.01	140	2	1.4%	0.05			0.045	
Iron-Dissolved (mg/L)	0.03	140	53	37.9%	1.10	2.13	0.070	0.250	1.57
Lead-Dissolved (mg/L)	0.001	140	6	4.3%	0.00	0.0026	0.0010	0.0025	0.005
Manganese-Dissolved (mg/L)	0.01	140	135	96.4%	0.59	0.928	0.070	0.10	0.43
Molybdenum-Dissolved (mg/L)	0.1	140	2	1.4%	0.15			0.150	
Selenium-Dissolved (mg/L)	0.001	140	24	17.1%	0.01	0.0055	0.0013	0.0025	0.0115
Selenium-IV-Dissolved (mg/L)	0.001	118	2	1.7%	0.00			0.0010	
Selenium-VI-Dissolved (mg/L)	0.001	118	13	11.0%	0.01	0.01	0.001	0.0060	0.012
Uranium-Dissolved (mg/L)	0.003	140	106	75.7%	0.02	0.030	0.0024	0.0060	0.0304
Vanadium-Dissolved (mg/L)	0.1	140	4	2.9%	0.13	0.050	0.10	0.10	0.175
Zinc-Dissolved (mg/L)	0.01	140	36	25.7%	0.02	0.020	0.01	0.020	0.028
Metals, Suspended									
Uranium-Suspended (mg/L)	0.0003	138	39	28.3%	0.005	0.012	0.0007	0.0013	0.0033
Metals, Total									
Arsenic-Total (mg/L)	0.001	95	79	83.2%	0.01	0.0073	0.002	0.0030	0.005
Barium-Total (mg/L)	0.1	95	6	6.3%	0.25	0.138	0.175	0.20	0.35
Beryllium-Total (mg/L)	0.001	95	2	2.1%	0.00			0.0025	
Boron-Total (mg/L)	0.2	95	29	30.5%	0.39	0.442	0.10	0.20	0.50
Chromium-Total (mg/L)	0.05	95	1	1.1%	0.05			0.050	
Copper-Total (mg/L)	0.01	95	5	5.3%	0.05	0.047	0.015	0.030	0.10
Iron-Total (mg/L)	0.03	95	92	96.8%	3.25	8.01	0.14	0.84	3.39
Lead-Total (mg/L)	0.001	95	17	17.9%	0.02	0.017	0.002	0.013	0.025
Manganese-Total (mg/L)	0.01	95	95	100%	0.59	0.924	0.070	0.090	0.50
Mercury-Total (mg/L)	0.001	163	1	0.6%	0.00			0.00010	
Molybdenum-Total (mg/L)	0.1	95	8	8.4%	0.06	0.102	0.010	0.015	0.080
Nickel-Total (mg/L)	0.05	95	1	1.1%	0.10			0.10	
Selenium-Total (mg/L)	0.002	95	25	26.3%	0.00	0.0040	0.002	0.0030	0.0055
Strontium-Total (mg/L)	0.1	95	94	98.9%	3.59	3.10	1.10	1.70	5.85
Uranium-Total (mg/L)	0.0003	99	74	74.7%	0.02	0.033	0.0025	0.0064	0.030

POWERTECH (USA) INC.

Constituent, Unit	PQL	n Analyzed	n Detected	% exceeding detection	Mean	StDev	Q1	Median	Q3
Zinc-Total (mg/L)	0.01	95	34	35.8%	0.05	0.073	0.010	0.020	0.070
Radionuclides									
Gross Alpha-Dissolved (pCi/L)	1	140	140	100%	406	1084	13.2	30.1	94.7
Gross Beta-Dissolved (pCi/L)	2	140	136	97.1%	140	367	10.3	16.2	39.9
Gross Gamma-Dissolved (pCi/L)	20	140	124	88.6%	1539	6584	0.00	160	1075
Lead 210-Dissolved (pCi/L)	1	140	102	72.9%	4.20	14.5	-1.85	0.50	4.90
Lead 210-Suspended (pCi/L)	1	138	89	64.5%	3.80	9.66	-0.55	1.20	6.50
Lead 210-Total (pCi/L)	1	20	3	15.0%	27.7	25.4	12.0	14.0	57.0
Polonium 210-Dissolved (pCi/L)	1	140	105	75.0%	1.01	1.07	0.10	0.90	1.60
Polonium 210-Suspended (pCi/L)	1	138	88	63.8%	1.07	1.98	0.00	0.40	1.20
Polonium 210-Total (pCi/L)	1	20	4	20.0%	7.65	3.60	5.40	6.2	11.4
Radium 226-Dissolved (pCi/L)	0.2	134	118	88.1%	119	289	1.60	3.9	54.9
Radium 226-Suspended (pCi/L)	0.2	133	101	75.9%	2.86	5.46	-0.035	0.70	2.75
Radium 226-Total (pCi/L)	0.2	20	16	80.0%	25.5	37.6	2.43	5.15	51.4
Radon 222-Total (pCi/L)	100	120	120	100%	29875	86353	462	949	4145
Thorium 230-Dissolved (pCi/L)	0.2	140	88	62.9%	0.11	0.23	0.00	0.00	0.18
Thorium 230-Suspended (pCi/L)	0.2	138	91	65.9%	0.50	1.73	0.10	0.20	0.30
Thorium 230-Total (pCi/L)	0.2	20	1	5.0%	1.90			1.90	

PQL = Practical Quantitation Limit. The concentration that can be reliably measured within specified limits during routine laboratory operating conditions, below which results are reported as "less than PQL".
n Analyzed = The number of samples analyzed for a particular constituent.
n Detected = The number of samples where a particular constituent was detected at or above the PQL.
Mean = Arithmetic mean of those constituents detected above detection limit
StDev = Standard deviation of those constituents detected at or above PQL.
Q1 = First Quartile. The value holding ranked position 0.25 x (n Detected + 1) for each constituent. Value may be interpolated.
Q3 = Third Quartile. The value holding ranked position 0.75 x (n Detected + 1) for each constituent. Value may be interpolated.
Median = The middle value of ranked n Detected. Value may be interpolated.

POWERTECH (USA) INC.

APPENDIX 5.2-E

MINIMUM AND MAXIMUM RESLUTS FOR SAMPLED CONSTITUENTS AT OR ABOVE PQL

POWERTECH (USA) INC.

Minimum and Maximum Results for Sampled Constituent above PQL, Sampled Site and Date of Sampling

Constituent, Unit	Minimum at or above PQL			Maximum at or above PQL		
	Concentration	Site ID	Collection Date	Concentration	Site ID	Collection Date
Major Cations and Anions						
Anions (meq/L)	1.1	135	3/13/2008	150	677	4/29/2008
Bicarbonate as HCO3 (mg/L)	12	688	4/2/2008	649	677	9/28/2007
Carbonate as CO3 (mg/L)	7	688	6/10/2008	53.0	688	4/2/2008
Sulfate (mg/L)	39	135	3/13/2008	4590	677	11/27/2007
Chloride (mg/L)	2	135	3/13/2008	1780	677	11/27/2007
Fluoride (mg/L)	0.1	650	5/30/2008	1.00	678	4/29/2008
Nitrogen, Nitrate as N (mg/L)	0.06	695	4/22/2008	1.30	679	2/3/2008
Cations (meq/L)	0.547	135	3/13/2008	430	676	4/29/2008
Ammonia (mg/L)	0.1	697	6/24/2008	1.20	3026	3/30/2008
Sodium-Dissolved (mg/L)	12	135	3/13/2008	2140	677	4/29/2008
Calcium-Dissolved (mg/L)	11.2	622	4/1/2008	561	676	4/29/2008
Magnesium-Dissolved (mg/L)	7.1	622	4/1/2008	500	678	4/29/2008
Potassium-Dissolved (mg/L)	6.8	42	5/30/2008	28.0	675	9/28/2007
Silica-Dissolved (mg/L)	0.9	650	3/24/2008	16.3	678	2/5/2008
General Water Quality Indicators						
Alkalinity-Total as CaCO3 (mg/L)	12	135	3/13/2008	532	677	9/28/2007
Anion/Cation Balance (± 5) (%)	-33.6	135	3/13/2008	12.1	688	4/22/2008
Conductivity @ 25 C (umhos/cm)	131	135	3/13/2008	12100	677	4/29/2008
Oxidation-Reduction Potential (mV)	-80.2	619	3/24/2008	360	694	4/21/2008
pH	6.49	135	3/13/2008	10.3	688	4/2/2008
Sodium Adsorption Ratio (meq/L)	0.84	679	11/14/2007	17.0	677	4/29/2008
Solids-Total Dissolved TDS (mg/L)	92	135	3/13/2008	9700	677	11/27/2007
Solids-Total Dissolved Calc. (mg/L)	61	135	3/13/2008	9550	677	4/29/2008
TDS Balance (0.80 - 1.20) (dec.%)	0.78	628	2/20/2008	1.51	135	3/13/2008
Metals, Dissolved						
Aluminum-Dissolved (mg/L)	0.6	650	9/28/2007	0.600	650	9/28/2007
Arsenic-Dissolved (mg/L)	0.001	16	6/30/2008	0.0260	680	1/30/2008
Boron-Dissolved (mg/L)	0.1	650	5/30/2008	1.60	678	2/5/2008
Copper-Dissolved (mg/L)	0.01	619	6/17/2008	0.080	619	9/27/2007

Constituent, Unit	Minimum at or above PQL			Maximum at or above PQL		
	Concentration	Site ID	Collection Date	Concentration	Site ID	Collection Date
Iron-Dissolved (mg/L)	0.03	622	4/21/2008	13.2	650	9/28/2007
Lead-Dissolved (mg/L)	0.001	622	5/28/2008	0.0080	619	9/27/2007
Manganese-Dissolved (mg/L)	0.02	688	6/30/2008	3.39	675	2/5/2008
Molybdenum-Dissolved (mg/L)	0.1	3026	4/22/2008	0.200	3026	3/30/2008
Selenium-Dissolved (mg/L)	0.001	698	3/30/2008	0.0170	676	9/28/2007
Selenium-IV-Dissolved (mg/L)	0.001	2	2/12/2008	0.0010	2	2/12/2008
Selenium-VI-Dissolved (mg/L)	0.001	698	3/30/2008	0.0140	676	11/27/2007
Uranium-Dissolved (mg/L)	0.0003	8	11/27/2007	0.172	680	1/30/2008
Vanadium-Dissolved (mg/L)	0.1	3026	6/24/2008	0.200	678	4/29/2008
Zinc-Dissolved (mg/L)	0.01	622	6/25/2008	0.110	619	9/27/2007
Metals, Suspended						
Uranium-Suspended (mg/L)	0.0003	2	9/26/2007	0.070	676	2/5/2008
Metals, Total						
Arsenic-Total (mg/L)	0.001	16	6/30/2008	0.028	3026	5/28/2008
Barium-Total (mg/L)	0.1	622	6/25/2008	0.50	676	2/5/2008
Beryllium-Total (mg/L)	0.002	679	5/18/2008	0.00	676	2/5/2008
Boron-Total (mg/L)	0.1	680	6/10/2008	1.60	678	2/5/2008
Chromium-Total (mg/L)	0.05	676	2/5/2008	0.050	676	2/5/2008
Copper-Total (mg/L)	0.01	619	6/17/2008	0.12	676	2/5/2008
Iron-Total (mg/L)	0.04	681	6/25/2008	66.00	676	2/5/2008
Lead-Total (mg/L)	0.001	698	6/24/2008	0.060	676	2/5/2008
Manganese-Total (mg/L)	0.01	688	6/10/2008	3.40	675	2/5/2008
Mercury-Total (mg/L)	0.0001	688	6/30/2008	0.0001	688	6/30/2008
Molybdenum-Total (mg/L)	0.01	635	2/10/2008	0.300	3026	3/30/2008
Nickel-Total (mg/L)	0.1	676	2/5/2008	0.100	676	2/5/2008
Selenium-Total (mg/L)	0.001	689	6/25/2008	0.014	679	2/3/2008
Strontium-Total (mg/L)	0.6	18	2/12/2008	11.6	677	4/29/2008
Uranium-Total (mg/L)	0.0004	650	3/24/2008	0.12	698	3/30/2008
Zinc-Total (mg/L)	0.01	3026	6/24/2008	0.28	676	2/5/2008
Radionuclides						
Gross Alpha-Dissolved (pCi/L)	1.4	2	9/26/2007	6500	680	5/13/2008
Gross Beta-Dissolved (pCi/L)	-30	677	4/29/2008	2320	680	3/31/2008

POWERTECH (USA) INC.

Constituent, Unit	Minimum at or above PQL			Maximum at or above PQL		
	Concentration	Site ID	Collection Date	Concentration	Site ID	Collection Date
Gross Gamma-Dissolved (pCi/L)	0	689	6/25/2008	70000	42	11/12/2007
Lead 210-Dissolved (pCi/L)	-31	689	3/30/2008	61.8	680	5/21/2008
Lead 210-Suspended (pCi/L)	-19.2	675	4/29/2008	57.0	42	9/28/2007
Lead 210-Total (pCi/L)	12	4002	9/27/2007	57.0	42	9/28/2007
Polonium 210-Dissolved (pCi/L)	-0.6	13	5/19/2008	5.50	42	2/5/2008
Polonium 210-Suspended (pCi/L)	-0.3	679	5/18/2008	13.0	42	9/28/2007
Polonium 210-Total (pCi/L)	5.2	13	9/27/2007	13.0	42	9/28/2007
Radium 226-Dissolved (pCi/L)	-0.12	135	3/13/2008	1430	680	5/13/2008
Radium 226-Suspended (pCi/L)	-0.4	615	6/25/2008	37.0	4002	2/12/2008
Radium 226-Total (pCi/L)	1.1	13	9/27/2007	120	619	9/27/2007
Radon 222-Total (pCi/L)	123	8	11/27/2007	462000	681	5/18/2008
Thorium 230-Dissolved (pCi/L)	-0.1	698	3/30/2008	1.80	135	3/13/2008
Thorium 230-Suspended (pCi/L)	0	688	6/30/2008	15.9	688	4/22/2008
Thorium 230-Total (pCi/L)	1.9	679	9/28/2007	1.90	679	9/28/2007

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Table Upgradient: Statistics for groundwater constituents at or above PQL by constituent from wells that are hydraulically upgradient from originally proposed mining activities. This analysis includes wells # 16, 615, 619, 622, 628, 631, 650, 698, 3026, 4002. Due to recent permit boundary changes, wells #615, 622, and 628 may no longer qualify as upgradient. Also, well #698 is upgradient of planned in-situ mining, but not upgradient of the proposed plant site.

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Anions (meq/L)	44	21.21364	9.28446	12.325	18	10.6	41.2
Bicarbonate as HCO3 (mg/L)	44	165.9091	38.35927	144.5	168	37	219
Carbonate as CO3 (mg/L)	44	2.670455	1.130668	2.5	2.5	2.5	10
Sulfate (mg/L)	44	892.1818	452.2263	450.75	813	369	1790
Chloride (mg/L)	44	13.56818	13.6013	7	10	4	82
Fluoride (mg/L)	44	0.359091	0.134801	0.3	0.4	0.05	0.6
Nitrogen, Nitrate as N (mg/L)	44	0.058409	0.025785	0.05	0.05	0.05	0.2
Nitrogen, Nitrite as N (mg/L)	44	0.047727	0.00727	0.05	0.05	0.025	0.05
Cations (meq/L)	44	21.64614	10.01718	12	17.75	9.23	42.4
Ammonia (mg/L)	44	0.227273	0.256872	0.05	0.1	0.05	1.2
Sodium-Dissolved (mg/L)	44	146.4136	81.90985	88.25	127	44	435
Calcium-Dissolved (mg/L)	44	190.1386	140.9727	70.95	119	11.2	461
Magnesium-Dissolved (mg/L)	44	64.81364	45.77509	21.625	54.65	7.1	141
Potassium-Dissolved (mg/L)	44	13.68636	4.762088	8.725	15.25	7.1	25.3
Silica-Dissolved (mg/L)	44	5.296591	2.375025	3.9	5.35	0.25	9.5
General Water Quality Indicators							
Alkalinity-Total as CaCO3 (mg/L)	44	136.7273	31.30671	120.5	138	30	180
A/C Balance (± 5) (%)	44	0.489023	4.812788	-2.5975	1.18	-18.5	9.13
Conductivity @ 25 C (umhos/cm)	44	1794.205	625.9235	1195	1735	925	2970
Conductivity (field, umhos/cm)	48	1703.375	666.1638	1165.5	1461.5	740	3098
Dissolved Oxygen (field, mg/L)	33	0.780455	1.406676	0.115	0.23	0.015	7.09
Oxidation-Reduction Potential (mV)	37	176.2108	82.10339	130	200	-80.2	340
pH	44	7.498182	0.459582	7.1525	7.455	6.75	8.66
pH (field)	46	7.443261	0.805128	6.9475	7.265	6.09	10.79
Sodium Adsorption Ratio (SAR) (meq/L)	37	3.257838	2.78793	1	2.3	0.93	11
Solids-Total Dissolved TDS @ 180 C (mg/L)	44	1462.273	656.4275	802.5	1350	670	2700
Solids-Total Dissolved Calculated (mg/L)	44	1389.409	618.0043	787.75	1185	686	2710

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Temperature (field, deg C)	43	12.72465	1.779163	11.61	12.08	8.34	15.78
TDS Balance (0.80 - 1.20) (dec.%)	44	1.047955	0.099102	0.99	1.04	0.78	1.44
Turbidity (NTU)	40	10.1925	14.27428	0.775	4.65	-0.2	70.9
Metals, Dissolved							
Aluminum-Dissolved (mg/L)	44	0.0625	0.082916	0.05	0.05	0.05	0.6
Arsenic-Dissolved (mg/L)	44	0.002943	0.005681	0.0005	0.0005	0.0005	0.02
Barium-Dissolved (mg/L)	44	0.05	0	0.05	0.05	0.05	0.05
Boron-Dissolved (mg/L)	44	0.086364	0.073424	0.05	0.05	0.05	0.4
Cadmium-Dissolved (mg/L)	44	0.002557	0.000377	0.0025	0.0025	0.0025	0.005
Chromium-Dissolved (mg/L)	44	0.025	0	0.025	0.025	0.025	0.025
Copper-Dissolved (mg/L)	44	0.006818	0.011314	0.005	0.005	0.005	0.08
Iron-Dissolved (mg/L)	44	1.022727	2.158949	0.015	0.105	0.015	13.2
Lead-Dissolved (mg/L)	44	0.001284	0.003834	0.0005	0.0005	0.0005	0.025
Manganese-Dissolved (mg/L)	44	0.715795	0.856523	0.08	0.24	0.005	2.56
Mercury-Dissolved (mg/L)	44	0.000491	6.03E-05	0.0005	0.0005	0.0001	0.0005
Molybdenum-Dissolved (mg/L)	44	0.054545	0.02367	0.05	0.05	0.05	0.2
Nickel-Dissolved (mg/L)	44	0.025	0	0.025	0.025	0.025	0.025
Selenium-Dissolved (mg/L)	44	0.00092	0.001028	0.0005	0.0005	0.0005	0.006
Selenium-IV-Dissolved (mg/L)	37	0.0005	0	0.0005	0.0005	0.0005	0.0005
Selenium-VI-Dissolved (mg/L)	37	0.000662	0.000906	0.0005	0.0005	0.0005	0.006
Silver-Dissolved (mg/L)	44	0.002557	0.000377	0.0025	0.0025	0.0025	0.005
Uranium-Dissolved (mg/L)	44	0.017915	0.035821	0.00175	0.0026	0.00015	0.11
Vanadium-Dissolved (mg/L)	44	0.051136	0.007538	0.05	0.05	0.05	0.1
Zinc-Dissolved (mg/L)	44	0.013409	0.020595	0.005	0.005	0.005	0.11
Metals, Suspended							
Uranium-Suspended (mg/L)	44	0.000795	0.001206	0.00015	0.00015	0.00015	0.0043
Metals, Total							
Antimony-Total (mg/L)	31	0.0015	0	0.0015	0.0015	0.0015	0.0015
Arsenic-Total (mg/L)	31	0.008887	0.010182	0.002	0.004	0.0005	0.028
Barium-Total (mg/L)	31	0.056452	0.028113	0.05	0.05	0.05	0.2
Beryllium-Total (mg/L)	31	0.0005	0	0.0005	0.0005	0.0005	0.0005
Boron-Total (mg/L)	31	0.072581	0.040494	0.05	0.05	0.05	0.2

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Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Cadmium-Total (mg/L)	31	0.002242	0.000682	0.0025	0.0025	0.0005	0.0025
Chromium-Total (mg/L)	31	0.025	0	0.025	0.025	0.025	0.025
Copper-Total (mg/L)	31	0.007581	0.01347	0.005	0.005	0.005	0.08
Iron-Total (mg/L)	31	4.795161	4.877881	1.35	3.99	0.25	21.8
Lead-Total (mg/L)	31	0.0055	0.011403	0.0005	0.0005	0.0005	0.05
Manganese-Total (mg/L)	31	0.788065	0.937651	0.08	0.25	0.02	2.66
Mercury-Total (mg/L)	49	0.000292	0.000215	0.000075	0.0005	0.00005	0.0005
Molybdenum-Total (mg/L)	31	0.049516	0.05137	0.05	0.05	0.005	0.3
Nickel-Total (mg/L)	31	0.025	0	0.025	0.025	0.025	0.025
Selenium-Total (mg/L)	31	0.001177	0.001441	0.0005	0.0005	0.0005	0.007
Silver-Total (mg/L)	31	0.0025	0	0.0025	0.0025	0.0025	0.0025
Strontium-Total (mg.L)	31	3.343548	2.226086	1.4	2.7	0.05	7.4
Thallium-Total (mg/L)	31	0.0005	0	0.0005	0.0005	0.0005	0.0005
Uranium-Total (mg/L)	32	0.026602	0.045477	0.00235	0.00285	0.00015	0.123
Zinc-Total (mg/L)	31	0.037903	0.065964	0.005	0.01	0.005	0.25
Radionuclides							
Gross Alpha-Dissolved (pCi/L)	44	315.0932	574.1565	24.025	61.7	2.1	2110
Gross Beta-Dissolved (pCi/L)	44	106.6909	178.9286	14.55	27.25	3.7	659
Gross Gamma-Dissolved (pCi/L)	44	683.0682	1092.877	0	170	0	4200
Lead 210-Dissolved (pCi/L)	44	0.320455	7.862912	-1.925	0.5	-27	24
Lead 210-Suspended (pCi/L)	44	2.725	5.623213	0	0.5	-8.2	27.1
Lead 210-Total (pCi/L)	7	2.142857	4.346591	0.5	0.5	0.5	12
Polonium 210-Dissolved (pCi/L)	44	0.631818	0.768802	0.2	0.5	-0.5	3.5
Polonium 210-Suspended (pCi/L)	44	0.740909	1.077965	0.125	0.5	-0.2	6.4
Polonium 210-Total (pCi/L)	7	1.342857	2.22999	0.5	0.5	0.5	6.4
Radium 226-Dissolved (pCi/L)	44	76.02045	134.7834	2.9	9.55	1.2	429
Radium 226-Suspended (pCi/L)	41	4.276341	7.5066	0.1	0.7	-0.4	37
Radium 226-Total (pCi/L)	7	43.52857	44.65194	6.8	17.4	3.2	120
Radon 222-Total (pCi/L)	37	7781.946	11030.5	1010	2990	134	40700
Thorium 230-Dissolved (pCi/L)	44	0.097727	0.150176	0	0.1	-0.1	0.6
Thorium 230-Suspended (pCi/L)	44	0.227273	0.249989	0.1	0.1	0	1
Thorium 230-Total (pCi/L)	7	0.1	0	0.1	0.1	0.1	0.1

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Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Thorium 232-Dissolved (mg/L)	44	0.002455	0.000302	0.0025	0.0025	0.0005	0.0025

Mean = Arithmetic mean of those constituents detected above detection limit
StDev = Standard deviation of those constituents detected at or above PQL.
Q1 = First Quartile. The value holding ranked position 0.25 x (n Detected + 1) for each constituent. Value may be interpolated.
Q3 = Third Quartile. The value holding ranked position 0.75 x (n Detected + 1) for each constituent. Value may be interpolated.
Median = The middle value of ranked n Detected. Value may be interpolated.

Table Within**:** Statistics for groundwater constituents at or above PQL by constituent from wells that are within or near known ore bodies and proposed in-situ mining operations. This analysis includes wells # 13, 49, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 691, 692.

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Anions (meq/L)	36	18.18333	9.024934	12.025	13.55	10.2	35.2
Bicarbonate as HCO3 (mg/L)	36	204.0694	81.7138	180.75	206	2.5	334
Carbonate as CO3 (mg/L)	36	4.888889	9.019907	2.5	2.5	2.5	53
Sulfate (mg/L)	36	659.6944	390.3787	415	465	159	1420
Chloride (mg/L)	36	14.16667	17.22706	10.25	11.5	5	113
Fluoride (mg/L)	36	0.430556	0.085589	0.4	0.4	0.3	0.6
Nitrogen, Nitrate as N (mg/L)	36	0.048611	0.011869	0.05	0.05	0.025	0.1
Nitrogen, Nitrite as N (mg/L)	36	0.048611	0.011869	0.05	0.05	0.025	0.1
Cations (meq/L)	36	19.46944	9.844123	12.225	14.65	10.8	38.1
Ammonia (mg/L)	36	0.147222	0.232362	0.05	0.05	0.05	1.2
Sodium-Dissolved (mg/L)	36	178.8333	47.41217	137.5	179.5	105	373
Calcium-Dissolved (mg/L)	36	147.9222	143.7031	49.725	63.9	25.8	421
Magnesium-Dissolved (mg/L)	36	47.65972	44.44029	19.4	25.1	0.25	134
Potassium-Dissolved (mg/L)	36	13.81944	5.35328	9.7	11.75	7.4	27.7
Silica-Dissolved (mg/L)	36	5.036111	2.121341	3.8	4.4	0.8	8.9
General Water Quality Indicators							
Alkalinity-Total as CaCO3 (mg/L)	36	203.5	172.4382	150	171	42	1160
A/C Balance (± 5) (%)	36	3.330556	3.91769	0.065	4.245	-4.96	12.1
Conductivity @ 25 C (umhos/cm)	36	1706.389	881.8265	1172.5	1320	1010	5360
Conductivity (field, umhos/cm)	43	1630.395	834.8651	1159	1283	740	5454
Dissolved Oxygen (field, mg/L)	23	0.498261	0.753451	0.09	0.2	0.04	3.01
Oxidation-Reduction Potential (mV)	35	198.4	76.828	160	220	0	300

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
pH	36	8.056111	0.964955	7.57	7.88	7.08	12.4
pH (field)	43	7.819535	1.003221	7.23	7.75	6.31	12.67
Sodium Adsorption Ratio (SAR) (meq/L)	35	4.428571	1.983101	1.8	5.4	1.3	7.6
Solids-Total Dissolved TDS @ 180 C (mg/L)	36	1222.5	630.8605	772.5	915	690	2500
Solids-Total Dissolved Calculated (mg/L)	36	1194.667	574.8277	775.75	902	717	2250
Temperature (field, deg C)	42	13.55381	1.781878	12.5875	13.135	6.1	16.08
TDS Balance (0.80 - 1.20) (dec.%)	36	1.011944	0.055334	0.9825	1.01	0.89	1.14
Turbidity (NTU)	37	7.467568	10.23922	0.55	3.8	-0.4	34.2
Metals, Dissolved							
Aluminum-Dissolved (mg/L)	36	0.05	0	0.05	0.05	0.05	0.05
Arsenic-Dissolved (mg/L)	36	0.003403	0.006288	0.001	0.002	0.0005	0.03
Barium-Dissolved (mg/L)	36	0.0625	0.075	0.05	0.05	0.05	0.5
Boron-Dissolved (mg/L)	36	0.080556	0.052478	0.05	0.05	0.05	0.2
Cadmium-Dissolved (mg/L)	36	0.0025	0	0.0025	0.0025	0.0025	0.0025
Chromium-Dissolved (mg/L)	36	0.025	0	0.025	0.025	0.025	0.025
Copper-Dissolved (mg/L)	36	0.005	0	0.005	0.005	0.005	0.005
Iron-Dissolved (mg/L)	36	0.070556	0.11882	0.015	0.015	0.015	0.47
Lead-Dissolved (mg/L)	36	0.000889	0.001829	0.0005	0.0005	0.0005	0.011
Manganese-Dissolved (mg/L)	36	0.175556	0.176865	0.04	0.095	0.005	0.54
Mercury-Dissolved (mg/L)	36	0.0005	0	0.0005	0.0005	0.0005	0.0005
Molybdenum-Dissolved (mg/L)	36	0.05	0	0.05	0.05	0.05	0.05
Nickel-Dissolved (mg/L)	36	0.025	0	0.025	0.025	0.025	0.025
Selenium-Dissolved (mg/L)	36	0.001028	0.000878	0.0005	0.0005	0.0005	0.003
Selenium-IV-Dissolved (mg/L)	35	0.000571	0.000423	0.0005	0.0005	0.0005	0.003
Selenium-VI-Dissolved (mg/L)	35	0.000629	0.000426	0.0005	0.0005	0.0005	0.002
Silver-Dissolved (mg/L)	36	0.002569	0.000417	0.0025	0.0025	0.0025	0.005
Uranium-Dissolved (mg/L)	36	0.015222	0.030804	0.00015	0.005	0.00015	0.172
Vanadium-Dissolved (mg/L)	36	0.05	0	0.05	0.05	0.05	0.05
Zinc-Dissolved (mg/L)	36	0.007083	0.006367	0.005	0.005	0.005	0.04
Metals, Suspended							
Uranium-Suspended (mg/L)	36	0.005744	0.029474	0.00015	0.00015	0.00015	0.177
Metals, Total							

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Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Antimony-Total (mg/L)	32	0.0015	0	0.0015	0.0015	0.0015	0.0015
Arsenic-Total (mg/L)	32	0.004266	0.006925	0.001	0.003	0.0005	0.04
Barium-Total (mg/L)	32	0.064063	0.07955	0.05	0.05	0.05	0.5
Beryllium-Total (mg/L)	32	0.000531	0.000177	0.0005	0.0005	0.0005	0.0015
Boron-Total (mg/L)	32	0.060938	0.021001	0.05	0.05	0.05	0.1
Cadmium-Total (mg/L)	32	0.00225	0.000672	0.0025	0.0025	0.0005	0.0025
Chromium-Total (mg/L)	32	0.025	0	0.025	0.025	0.025	0.025
Copper-Total (mg/L)	32	0.005313	0.00123	0.005	0.005	0.005	0.01
Iron-Total (mg/L)	32	0.835156	1.547857	0.055	0.23	0.015	7.24
Lead-Total (mg/L)	32	0.002984	0.006924	0.0005	0.0005	0.0005	0.035
Manganese-Total (mg/L)	32	0.186719	0.193997	0.06	0.09	0.005	0.63
Mercury-Total (mg/L)	54	0.00029	0.000682	0.00005	0.0001	0.00005	0.005
Molybdenum-Total (mg/L)	32	0.042969	0.016601	0.05	0.05	0.005	0.05
Nickel-Total (mg/L)	32	0.025	0	0.025	0.025	0.025	0.025
Selenium-Total (mg/L)	32	0.001469	0.001769	0.0005	0.0005	0.0005	0.008
Silver-Total (mg/L)	32	0.0025	0	0.0025	0.0025	0.0025	0.0025
Strontium-Total (mg.L)	32	3.084375	2.827983	1.1	1.3	0.9	8.2
Thallium-Total (mg/L)	32	0.0005	0	0.0005	0.0005	0.0005	0.0005
Uranium-Total (mg/L)	32	0.020984	0.058701	0.000388	0.00825	0.00015	0.336
Zinc-Total (mg/L)	32	0.013594	0.019437	0.005	0.005	0.005	0.09
Radionuclides							
Gross Alpha-Dissolved (pCi/L)	36	1348.458	1952.519	14.225	57.3	2.9	6500
Gross Beta-Dissolved (pCi/L)	36	430.7806	648.2405	13.4	19.15	7.1	2320
Gross Gamma-Dissolved (pCi/L)	36	2208.778	4119.155	29	940	0	21000
Lead 210-Dissolved (pCi/L)	36	13.41667	19.96313	0	4.4	-31	61.8
Lead 210-Suspended (pCi/L)	36	9.002778	26.15114	-1.075	0.5	-9.2	125
Lead 210-Total (pCi/L)	1	0.5			0.5	0.5	0.5
Polonium 210-Dissolved (pCi/L)	36	1.033333	1.224045	0.125	0.7	-0.6	5.1
Polonium 210-Suspended (pCi/L)	36	2.9	9.44273	0.2	0.5	-0.1	56
Polonium 210-Total (pCi/L)	1	5.2			5.2	5.2	5.2
Radium 226-Dissolved (pCi/L)	36	357.4028	493.3701	2.225	7.8	0.3	1430
Radium 226-Suspended (pCi/L)	36	5.680556	17.34764	0.04	0.8	-0.4	96.1

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Radium 226-Total (pCi/L)	1	1.1			1.1	1.1	1.1
Radon 222-Total (pCi/L)	35	112072.6	166848.3	467	2520	119	590000
Thorium 230-Dissolved (pCi/L)	36	0.080556	0.16181	0	0	-0.1	0.8
Thorium 230-Suspended (pCi/L)	36	2.519444	11.18187	0.1	0.2	-0.1	65.9
Thorium 230-Total (pCi/L)	1	0.1			0.1	0.1	0.1
Thorium 232-Dissolved (mg/L)	36	0.0025	0	0.0025	0.0025	0.0025	0.0025

Mean = Arithmetic mean of those constituents detected above detection limit
StDev = Standard deviation of those constituents detected at or above PQL.
Q1 = First Quartile. The value holding ranked position 0.25 x (n Detected + 1) for each constituent. Value may be interpolated.
Q3 = Third Quartile. The value holding ranked position 0.75 x (n Detected + 1) for each constituent. Value may be interpolated.
Median = The middle value of ranked n Detected. Value may be interpolated.

Table Downgradient**:** Statistics for groundwater constituents at or above PQL by constituent from wells that are hydraulically downgradient from proposed mining activities. This analysis includes wells # 2, 7, 8, 18, 42, 694, 695, 696, 697, and 7002. These wells may or may not be downgradient of ore bodies. For example, due to the high concentration of radon in well #42, it is believed that a high concentration of uranium may exist near that well.

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Anions (meq/L)	43	16.52326	6.886939	13.9	14.7	12.1	53.3
Bicarbonate as HCO3 (mg/L)	43	226.2093	38.50019	207	215	107	341
Carbonate as CO3 (mg/L)	43	2.5		2.5	2.5	2.5	2.5
Sulfate (mg/L)	43	608.186	333.8978	476	514	409	2440
Chloride (mg/L)	43	11.46512	2.839759	10	11	8	26
Fluoride (mg/L)	43	0.367442	0.091862	0.3	0.4	0.2	0.5
Nitrogen, Nitrate as N (mg/L)	43	0.053721	0.026505	0.05	0.05	0.025	0.2
Nitrogen, Nitrite as N (mg/L)	43	0.047093	0.008109	0.05	0.05	0.025	0.05
Cations (meq/L)	43	16.9907	6.459427	14.3	15.3	12.6	50.6
Ammonia (mg/L)	43	0.232558	0.13535	0.1	0.2	0.05	0.8
Sodium-Dissolved (mg/L)	43	251.2558	84.98238	199	250	152	716
Calcium-Dissolved (mg/L)	43	71.21163	62.83926	34	50.1	28	264
Magnesium-Dissolved (mg/L)	43	26.72791	24.05322	12.2	17.7	9.4	103

POWERTECH (USA) INC.

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Potassium-Dissolved (mg/L)	43	11.15814	4.127736	8.1	9.7	6.8	22.2
Silica-Dissolved (mg/L)	43	6.327907	1.774599	4.4	7.2	3.4	10.2
General Water Quality Indicators							
Alkalinity-Total as CaCO3 (mg/L)	43	185.7674	31.50876	170	178	88	280
A/C Balance (± 5) (%)	43	1.714419	3.899374	-1.53	1.68	-5.62	8.11
Conductivity @ 25 C (umhos/cm)	43	1583.023	522.911	1380	1420	1230	4400
Conductivity (field, umhos/cm)	48	1402.646	263.9066	1260.25	1397.5	908	2275
Dissolved Oxygen (field, mg/L)	25	1.2216	1.696014	0.195	0.29	0.09	5.42
Oxidation-Reduction Potential (mV)	37	191.7297	66.62401	140	190	80	360
pH	43	7.969767	0.281987	7.9	7.97	7.22	8.71
pH (field)	45	7.835111	0.367093	7.515	7.86	6.99	8.81
Sodium Adsorption Ratio (SAR) (meq/L)	37	7.675676	2.949709	5.65	7.6	2.4	12
Solids-Total Dissolved TDS @ 180 C (mg/L)	43	1103.256	492.7219	930	960	790	3700
Solids-Total Dissolved Calculated (mg/L)	43	1093.721	455.4768	934	973	829	3600
Temperature (field, deg C)	43	12.22628	2.271618	11.87	12.58	0.75	14.98
TDS Balance (0.80 - 1.20) (dec.%)	43	1.003488	0.066686	0.96	0.98	0.91	1.19
Turbidity (NTU)	40	2.125	2.698694	0.1	0.7	-0.4	12.9
Metals, Dissolved							
Aluminum-Dissolved (mg/L)	43	0.05		0.05	0.05	0.05	0.05
Arsenic-Dissolved (mg/L)	43	0.000977	0.000545	0.0005	0.001	0.0005	0.002
Barium-Dissolved (mg/L)	43	0.05		0.05	0.05	0.05	0.05
Boron-Dissolved (mg/L)	43	0.068605	0.099417	0.05	0.05	0.05	0.7
Cadmium-Dissolved (mg/L)	43	0.002674	0.000644	0.0025	0.0025	0.0025	0.005
Chromium-Dissolved (mg/L)	43	0.025		0.025	0.025	0.025	0.025
Copper-Dissolved (mg/L)	43	0.005		0.005	0.005	0.005	0.005
Iron-Dissolved (mg/L)	43	0.03686	0.055453	0.015	0.015	0.015	0.28
Lead-Dissolved (mg/L)	43	0.002209	0.006315	0.0005	0.0005	0.0005	0.025
Manganese-Dissolved (mg/L)	43	0.107442	0.096538	0.06	0.08	0.03	0.41
Mercury-Dissolved (mg/L)	43	0.000472	0.000103	0.0005	0.0005	0.0001	0.0005
Molybdenum-Dissolved (mg/L)	43	0.05		0.05	0.05	0.05	0.05
Nickel-Dissolved (mg/L)	43	0.025		0.025	0.025	0.025	0.025
Selenium-Dissolved (mg/L)	43	0.00057	0.000258	0.0005	0.0005	0.0005	0.002

POWERTECH (USA) INC.

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Selenium-IV-Dissolved (mg/L)	37	0.000514	8.22E-05	0.0005	0.0005	0.0005	0.001
Selenium-VI-Dissolved (mg/L)	37	0.000541	0.000138	0.0005	0.0005	0.0005	0.001
Silver-Dissolved (mg/L)	43	0.002674	0.000644	0.0025	0.0025	0.0025	0.005
Uranium-Dissolved (mg/L)	43	0.003092	0.006324	0.00015	0.0005	0.00015	0.0324
Vanadium-Dissolved (mg/L)	43	0.052326	0.010654	0.05	0.05	0.05	0.1
Zinc-Dissolved (mg/L)	43	0.007209	0.005701	0.005	0.005	0.005	0.03
Metals, Suspended							
Uranium-Suspended (mg/L)	43	0.000266	0.000481	0.00015	0.00015	0.00015	0.0029
Metals, Total							
Antimony-Total (mg/L)	29	0.0015		0.0015	0.0015	0.0015	0.0015
Arsenic-Total (mg/L)	29	0.002207	0.001214	0.00125	0.002	0.0005	0.005
Barium-Total (mg/L)	29	0.055172	0.027854	0.05	0.05	0.05	0.2
Beryllium-Total (mg/L)	29	0.000707	0.000491	0.0005	0.0005	0.0005	0.0025
Boron-Total (mg/L)	29	0.068966	0.102132	0.05	0.05	0.05	0.6
Cadmium-Total (mg/L)	29	0.002431	0.000371	0.0025	0.0025	0.0005	0.0025
Chromium-Total (mg/L)	29	0.025		0.025	0.025	0.025	0.025
Copper-Total (mg/L)	29	0.005		0.005	0.005	0.005	0.005
Iron-Total (mg/L)	29	0.396552	0.474592	0.105	0.15	0.04	1.54
Lead-Total (mg/L)	29	0.0005		0.0005	0.0005	0.0005	0.0005
Manganese-Total (mg/L)	29	0.105862	0.087811	0.06	0.08	0.03	0.4
Mercury-Total (mg/L)	52	0.000316	0.000217	0.00005	0.0005	0.00005	0.0005
Molybdenum-Total (mg/L)	29	0.041207	0.017711	0.05	0.05	0.005	0.05
Nickel-Total (mg/L)	29	0.025		0.025	0.025	0.025	0.025
Selenium-Total (mg/L)	29	0.000776	0.000872	0.0005	0.0005	0.0005	0.005
Silver-Total (mg/L)	29	0.0025		0.0025	0.0025	0.0025	0.0025
Strontium-Total (mg.L)	29	1.924138	1.820058	0.8	1.1	0.6	7.7
Thallium-Total (mg/L)	29	0.0005		0.0005	0.0005	0.0005	0.0005
Uranium-Total (mg/L)	31	0.002124	0.004433	0.00015	0.0004	0.00015	0.0198
Zinc-Total (mg/L)	29	0.007069	0.005904	0.005	0.005	0.005	0.03
Radionuclides							
Gross Alpha-Dissolved (pCi/L)	43	59.03953	132.8379	6.1	15.5	1.4	558
Gross Beta-Dissolved (pCi/L)	43	25.36977	38.32413	9	12.5	-2.1	173

Analyte	n	Mean	StDev	Q1	Median	Minimum	Maximum
Major Cations and Anions							
Gross Gamma-Dissolved (pCi/L)	43	1941.326	10641.93		10	ND	70000
Lead 210-Dissolved (pCi/L)	43	0.816279	8.117762	-1.8	0.5	-23	24
Lead 210-Suspended (pCi/L)	43	3.374419	10.19764		0.5	-7.4	57
Lead 210-Total (pCi/L)	6	9.916667	23.06603	0.5	0.5	0.5	57
Polonium 210-Dissolved (pCi/L)	43	0.895349	1.147036	0.1	0.5	-0.3	5.5
Polonium 210-Suspended (pCi/L)	43	0.890698	2.11658	0.2	0.5	-0.2	13
Polonium 210-Total (pCi/L)	6	3.5	5.147815	0.5	0.5	0.5	13
Radium 226-Dissolved (pCi/L)	43	11.75349	28.57341	1.1	2.1	0.1	102
Radium 226-Suspended (pCi/L)	43	0.59093	1.31961	-0.2	0.1	-0.4	5.1
Radium 226-Total (pCi/L)	6	15.96667	31.28985	1.675	3.75	0.1	79.7
Radon 222-Total (pCi/L)	37	14856.3	49404.54	298.5	611	123	219000
Thorium 230-Dissolved (pCi/L)	43	0.081395	0.100607		0.1	ND	0.5
Thorium 230-Suspended (pCi/L)	43	0.109302	0.078115	0.1	0.1	ND	0.3
Thorium 230-Total (pCi/L)	6	0.1		0.1	0.1	0.1	0.1
Thorium 232-Dissolved (mg/L)	43	0.00236	0.000516	0.0025	0.0025	0.0005	0.0025

Mean = Arithmetic mean of those constituents detected above detection limit
StDev = Standard deviation of those constituents detected at or above PQL.
Q1 = First Quartile. The value holding ranked position 0.25 x (n Detected + 1) for each constituent. Value may be interpolated.
Q3 = Third Quartile. The value holding ranked position 0.75 x (n Detected + 1) for each constituent. Value may be interpolated.
Median = The middle value of ranked n Detected. Value may be interpolated.

Powertech (USA) Inc.

Well Location and Construction Information

Locations of All Wells in the Dewey-Burdock Database

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
1	7	1	9	SESE	996095.098	429227.773	3624	Lakota
2	7	1	16	SESE	995122.6159	423922.589	3554	Lakota
3	7	1	22	SWNW	ND	ND	ND	Lakota
4	7	1	15	SESE	1000915.012	423080.6142	3580	Fall River
5	7	1	14	NENW	1003580.429	427284.2174	3643	Lakota
6	7	1	14	NESE	1005616.918	425012.4771	3671	unknown
7	7	1	23	NWNW	1001702.774	422416.855	3574	Fall River
8	7	1	23	SWSE	1004451.179	418514.8505	3558	Fall River
9	7	1	23	NENE	ND	ND	ND	Fall River
10	7	1	13	NENE	ND	ND	ND	Lakota
11	7	1	24	NWSW	ND	ND	ND	Sundance/Unkpapa
12	7	1	4	SESE	995376.7972	434378.5136	3641	Lakota
13	7	1	4	NENE	996758.8703	438470.3951	3673	Lakota
14	7	1	2	NWSW	1002098.748	434723.4041	3672	Lakota
15	7	1	2	NENW	1003703.016	438317.4124	3713	Lakota
16	7	1	1	NESW	1009827.637	434446.9008	3869	Lakota
17	7	1	12	SENW	1008622.303	431329.1544	3789	Fall River
18	7	1	9	SWSW	991210.5573	428960.1458	3566	Fall River
19	7	1	18	SWNW	ND	ND	ND	Fall River
20	7	1	17	SWSW	986070.6362	424628.3007	3563	Fall River
21	7	1	19	SWNW	980440.6072	421760.0599	3569	Fall River
22	40	60	27	NWSW	ND	ND	ND	unknown
23	7	1	29	NWNW	985974.1188	416755.5806	3590	Fall River
24	7	1	28	NWNE	993100.2648	417036.9282	3563	Fall River
25	7	1	27	NWSE	ND	ND	ND	Fall River
26	7	1	35	SWNE	1003612.929	410375.132	3549	Fall River
27	7	1	33	SWSE	ND	ND	ND	Lakota
28	8	2	22	NESW	ND	ND	ND	unknown
29	8	2	16	NENW	ND	ND	ND	unknown
30	7	2	31	SESE	ND	ND	ND	unknown
31	7	2	31	SWNW	ND	ND	ND	Lakota
32	7	2	30	SWSW	ND	ND	ND	Lakota
33	7	1	25	NWSE	ND	ND	ND	Fall River
34	7	2	30	NWNW	ND	ND	ND	unknown
35	7	2	19	NWSE	ND	ND	ND	Lakota
36	7	2	30	NWNE	ND	ND	ND	Lakota
37	7	2	18	NWSW	1012581.749	423947.5161	3689	unknown
38	6	1	33	NWNW	992726.8917	442289.5946	3634	Lakota
39	6	1	29	NENE	ND	ND	ND	unknown

POWERTECH (USA) INC.

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
40	6	1	30	SWNW	981813.9304	447183.2347	3635	Other Inyan Kara
41	6	1	31	SWNE	983783.722	442081.4368	3611	Alluvial
42	7	1	5	SWNE	989542.8678	436481.4222	3596	Lakota
43	6	1	34	SWSE	999521.6678	439436.2184	3672	Lakota
44	7	2	31	NWSE	ND	ND	ND	Fall River
45	8	2	5	NWNW	ND	ND	ND	Fall River
46	7	2	31	SWNE	ND	ND	ND	Fall River
47	7	2	32	SWSW	ND	ND	ND	Fall River
48	6	1	19	SENW	ND	ND	ND	Lakota
49	6	1	32	NWNW	987330.6151	444022.8154	3628	Fall River
50	41	60	28	SWNW	ND	ND	ND	Lakota
51	7	1	9	SENE	995810.3298	431486.9525	3615	Lakota
52	7	2	30	NESE	ND	ND	ND	unknown
53	7	2	30	SWNE	ND	ND	ND	unknown
54	7	1	25	NWSE	ND	ND	ND	Fall River
55	7	1	36	NWNE	ND	ND	ND	Fall River
56	7	2	32	SESE	ND	ND	ND	Lakota
57	8	2	5	NESE	ND	ND	ND	Lakota
58	7	1	31	NWNE	ND	ND	ND	Fall River
59	8	2	5	NENW	ND	ND	ND	Fall River
60	7	2	33	NWSE	ND	ND	ND	unknown
61	7	1	11	NWSE	1005230.856	429987.4356	3740	Lakota
62	7	1	25	SWSW	ND	ND	ND	unknown
63	7	1	36	NESW	ND	ND	ND	Fall River
64	8	2	9	SWNE	ND	ND	ND	unknown
65	8	2	9	NWNE	ND	ND	ND	unknown
66	8	2	8	NENW	ND	ND	ND	unknown
67	8	2	8	SENW	ND	ND	ND	unknown
68	8	2	8	NENE	ND	ND	ND	Lakota
69	7	1	25	SWSE	ND	ND	ND	Fall River
70	7	1	25	NESW	ND	ND	ND	Other Inyan Kara
71	8	2	6	NWSE	ND	ND	ND	Fall River
72	8	2	6	NWSE	ND	ND	ND	Fall River
73	8	2	6	NESW	ND	ND	ND	Lakota
74	8	2	6	NESW	ND	ND	ND	Fall River
75	8	2	17	SWSW	ND	ND	ND	Fall River
76	8	2	17	SENW	ND	ND	ND	Fall River
77	8	2	17	NWNE	ND	ND	ND	Fall River
78	8	2	20	NWSE	ND	ND	ND	Fall River
79	8	2	27	NESE	ND	ND	ND	Fall River
80	8	2	35	SWNW	ND	ND	ND	Lakota
81	8	2	14	SWNW	ND	ND	ND	Lakota
82	8	2	10	SWSW	ND	ND	ND	Fall River
83	8	2	14	NESW	ND	ND	ND	Fall River

POWERTECH (USA) INC.

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
84	8	2	10	SWNW	ND	ND	ND	Fall River
85	8	2	28	NESE	ND	ND	ND	Fall River
86	8	2	6	NWSW	ND	ND	ND	Fall River
87	8	1	1	SENE	ND	ND	ND	Fall River
88	7	1	35	SESE	1005216.386	408176.9195	3554	Fall River
89	8	1	11	NWNE	ND	ND	ND	Lakota
90	8	2	23	SENW	1033574.095	387507.8887	3572	unknown
91	8	2	12	SENW	ND	ND	ND	Fall River
92	8	2	23	SESW	ND	ND	ND	Fall River
93	8	2	2	SWNE	ND	ND	ND	Lakota
94	7	2	34	SWSW	ND	ND	ND	Lakota
95	40	61	25	SESE	ND	ND	ND	Fall River
96	41	60	22	SWSW	980028.4941	451854.1002	3664	Lakota
98	41	60	17	SWNW	ND	ND	ND	unknown
99	41	60	17	NENE	ND	ND	ND	Lakota
100	41	60	7	NWSE	ND	ND	ND	Lakota
102	6	1	18	SWNE	ND	ND	ND	Lakota
103	41	60	10	NWNW	ND	ND	ND	Lakota
104	41	60	10	NWSW	ND	ND	ND	Lakota
105	41	60	9	SENW	ND	ND	ND	Lakota
106	6	1	18	NENE	ND	ND	ND	unknown
107	6	1	18	SWNE	ND	ND	ND	Fall River
108	6	1	18	SWNE	ND	ND	ND	Fall River
109	6	1	17	NENW	ND	ND	ND	Lakota
110	6	1	17	NENE	ND	ND	ND	Lakota
111	6	1	17	NWNE	ND	ND	ND	Fall River
112	6	1	16	NWSE	ND	ND	ND	Fall River
113	7	2	6	NESW	1014835.904	434417.4002	3844	unknown
114	7	2	7	SESW	1013809.661	428653.8989	3764	Sundance/Unkpapa
115	6	1	18	SENE	986095.9548	457641.2997	3720	Lakota
116	6	1	18	SENE	ND	ND	ND	Fall River
117	6	1	8	SWSE	ND	ND	ND	unknown
118	6	1	7	NESE	ND	ND	ND	unknown
119	6	1	8	NWNW	ND	ND	ND	unknown
120	6	1	5	NWSW	ND	ND	ND	unknown
121	5	1	31	SWSW	ND	ND	ND	Lakota
122	5	1	30	NENW	ND	ND	ND	unknown
123	42	60	21	NENW	ND	ND	ND	unknown
124	5	1	18	NWSW	ND	ND	ND	unknown
125	6	1	6	SWSW	ND	ND	ND	Fall River
126	41	60	16	SESW	ND	ND	ND	Lakota
127	41	60	7	SWNE	ND	ND	ND	Lakota
131	8	2	4	NWSE	ND	ND	ND	Fall River
132	8	2	4	NWSE	ND	ND	ND	Lakota

Powertech (USA) Inc.

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
134	40	60	29	SWNW	ND	ND	ND	unknown
135	8	2	1	SENW	1039467.842	403141.0347	3803	Lakota
136	8	2	5	NWNW	ND	ND	ND	unknown
137	7	2	17	SENW	ND	ND	ND	unknown
138	6	1	18	NENE	ND	ND	ND	Fall River
139	41	60	18	SESE	968658.3552	457463.919	3729	Lakota
140	9	3	19	SWNW	ND	ND	ND	unknown
142	7	2	35	SENW	ND	ND	ND	Fall River
143	8	1	30	SWSE	ND	ND	ND	Fall River
144	9	3	21	SWNE	ND	ND	ND	unknown
145	8	2	3	SWSE	ND	ND	ND	unknown
146	9	2	21	NENW	ND	ND	ND	unknown
147	6	1	17	NESW	989277.4441	456567.2543	3729	Lakota
200	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
201	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
202	7	2	13	NESW	ND	ND	ND	Sundance/Unkpapa
203	7	2	12	SWSW	ND	ND	ND	Sundance/Unkpapa
204	7	2	12	NWSW	ND	ND	ND	Sundance/Unkpapa
205	7	2	12	SWNE	ND	ND	ND	Sundance/Unkpapa
206	7	2	12	SWNE	ND	ND	ND	Sundance/Unkpapa
207	7	2	12	NENE	ND	ND	ND	unknown
208	7	2	2	SWNW	ND	ND	ND	Sundance/Unkpapa
209	7	2	3	NESE	ND	ND	ND	Sundance/Unkpapa
210	7	2	2	SENW	ND	ND	ND	Sundance/Unkpapa
211	7	2	12	NENW	ND	ND	ND	Sundance/Unkpapa
212	8	3	8	NWSE	ND	ND	ND	unknown
213	7	3	20	SWSE	ND	ND	ND	Sundance/Unkpapa
214	7	3	18	SESW	ND	ND	ND	Sundance/Unkpapa
215	6	2	27	SESE	ND	ND	ND	unknown
216	6	2	22	NENE	ND	ND	ND	unknown
220	6	1	19	SENE	986271.136	452335.2311	3680	unknown
230	7	1	26	SESE	1005735.286	412883.2797	3514	unknown
270	6	1	19	NW SW	982506.8593	451943.3669	3659	Other Inyan Kara
401	9	2	1	SWNW	ND	ND	ND	Madison
402	9	2	1	SWNE	ND	ND	ND	Madison
403	9	2	1	NENE	ND	ND	ND	Madison
404	9	2	1	NENE	ND	ND	ND	Madison
405	9	2	1	NENE	ND	ND	ND	Madison
406	8	2	36	NESE	ND	ND	ND	Other Inyan Kara
407	8	3	33	NWSE	ND	ND	ND	Fall River
408	8	2	36	SENE	ND	ND	ND	Fall River
409	8	2	36	SENE	ND	ND	ND	Other Inyan Kara
410	8	3	32	SENW	ND	ND	ND	Lakota
411	8	2	36	NENE	ND	ND	ND	Lakota

POWERTECH (USA) INC.

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
412	8	2	27	SWSW	ND	ND	ND	Lakota
413	8	1	30	SENW	ND	ND	ND	Sundance/Unkpapa
414	8	3	27	NWNW	ND	ND	ND	Lakota
415	8	2	27	NESE	ND	ND	ND	Lakota
416	8	3	20	NWSE	ND	ND	ND	Other Inyan Kara
417	8	3	20	NWSE	ND	ND	ND	Fall River
418	8	3	20	SENW	ND	ND	ND	Fall River
419	8	2	23	NWNW	ND	ND	ND	Other Inyan Kara
420	8	3	8	NWSE	ND	ND	ND	Other Inyan Kara
421	8	2	8	NWNW	ND	ND	ND	Lakota
422	8	2	6	SWSE	ND	ND	ND	Lakota
423	8	2	3	SESW	ND	ND	ND	Sundance/Unkpapa
424	8	3	6	NWSE	ND	ND	ND	Sundance/Unkpapa
425	7	1	14	SENW	ND	ND	ND	Lakota
427	7	2	2	NWNW	ND	ND	ND	Sundance/Unkpapa
429	6	1	20	SENE	ND	ND	ND	Lakota
431	6	1	20	SENE	ND	ND	ND	Lakota
432	6	1	20	SENE	ND	ND	ND	Lakota
433	6	1	20	SENE	ND	ND	ND	Lakota
436	6	1	20	NWNE	990001.6275	454436.5461	3737	Fall River
440	7	2	3	SWNE	ND	ND	ND	Sundance/Unkpapa
502	6	1	27	NWSE	ND	ND	ND	Alluvial
503	7	1	23	SESE	ND	ND	ND	Sundance/Unkpapa
504	7	1	25	SESE	ND	ND	ND	Fall River
505	7	1	26	NESW	ND	ND	ND	Lakota
506	7	2	8	SWNW	ND	ND	ND	Sundance/Unkpapa
507	7	2	19	NENW	ND	ND	ND	Lakota
508	7	2	19	SWSE	ND	ND	ND	Lakota
510	7	1	12	SESE	1011331.943	428178.1651	3759	Lakota
601	8	2	23	NWNW	1033082.719	388749.7413	3615	Fall River
602	8	2	23	NWNW	1033064.956	388798.1063	3615	Lakota
603	8	2	23	NWNW	1032509.912	388763.8912	3619	Fall River
605	7	1	19	SWSE	1000213.323	428484.0565	3642	Other Inyan Kara
606	7	1	11	SWSW	1002111.841	428609.3226	3668	Lakota
607	7	1	30	SWNW	980219.4441	416377.6182	3611	Fall River
608	7	1	30	NWNW	980228.9136	416454.5538	3610	Lakota
609	6	1	29	NWNE	990133.3233	447808.3157	3702	Lakota
610	6	1	29	NWNE	989998.0402	447969.5677	3704	Fall River
611	6	1	20	NWNe	990235.5648	453958.8872	3731	Lakota
612	6	1	20	NWNE	990155.9068	454134.255	3732	Lakota
613	6	1	20	NWNE	990523.3586	453775.7939	3738	Fall River
614	6	1	20	NWNE	990583.8178	453770.1565	3739	Fuson
615	6	1	20	NWNE	990570.9895	453708.8761	3738	Lakota
616	6	1	20	SWNE	990534.0726	453142.1358	3745	Lakota

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
617	6	1	20	NENW	989427.4846	453586.6258	3723	Lakota
618	7	1	2	SENE	1006472.742	435906.7583	3759	unknown
619	7	1	2	NWNW	1003265.119	436729.3703	3701	Lakota
620	6	1	35	NWNW	1002350.318	443210.0993	3731	Lakota
621	6	1	27	NWSE	1000329.315	446398.1082	3717	Alluvial
622	6	1	20	NENE	991174.522	454033.7715	3747	Fall River
623	6	1	20	NENE	991068.0984	454300.3846	3750	Lakota
625	41	60	9	SESE	978764.4747	462270.3858	3816	Fall River
626	41	60	9	SWSE	978610.2151	462329.8362	3826	Lakota
627	6	1	18	SWNW	983044.3999	458921.5345	3713	unknown
628	6	1	20	SESE	991052.9337	449402.6524	3737	Other Inyan Kara
631	6	1	23	SWSW	1002733.997	448993.2386	3744	Fall River
632	6	1	23	SWNW	1002886.897	453010.3544	3747	unknown
633	6	1	14	SESW	1004801.912	455118.8232	3764	unknown
634	6	1	34	NESE	1000900.563	440168.275	3689	unknown
635	7	1	14	NENW	1004084.632	427130.8303	3643	Sundance/Unkpapa
636	7	1	11	NESW	1003173.25	429982.3145	3698	unknown
637	7	1	11	NESE	1006473.976	430320.5883	3743	unknown
638	7	1	2	NENE	1006668.16	437976.7587	3791	Fall River
639	7	2	7	SENW	1014103.328	430722.0265	3771	unknown
640	7	1	12	SESE	1011409.499	427965.0894	3754	unknown
642	7	1	12	SESE	1011325.121	428042.0134	3757	unknown
643	7	2	30	SESE	1015635.469	412200.2634	3575	Lakota
644	7	2	30	SESE	1015632.054	412253.3734	3575	Fall River
645	7	1	16	NENE	996079.9657	427998.3964	3609	unknown
646	7	1	15	SWNE	999646.4859	426408.9229	3611	Fall River
650	7	1	1	SESE	1012338.763	433014.833	3820	Lakota
651	7	1	14	NWSE	1004407.769	424246.1432	3600	Lakota
652	7	1	2	NWSE	1004758.754	434742.6477	3748	Other Inyan Kara
653	7	1	22	NWNE	999078.2979	422487.0492	3569	unknown
654	6	1	34	NWNE	1000770.962	443410.2383	3687	Other Inyan Kara
655	6	1	34	NENE	1001852.878	443307.3946	3719	Other Inyan Kara
656	6	1	31	SENW	982628.247	442000.9299	3622	unknown
657	6	1	20	NWNE	ND	ND	ND	Lakota
658	7	1	15	SWNE	ND	ND	ND	Lakota
659	7	1	10	SWNE	ND	ND	ND	Fall River
660	7	1	10	SWNE	ND	ND	ND	Lakota
661	7	1	12	NENW	ND	ND	ND	Lakota
662	7	1	11	SESW	ND	ND	ND	unknown
663	7	1	10	SWSE	ND	ND	ND	Lakota
664	7	1	10	SWSE	ND	ND	ND	Fall River
665	7	1	10	SESE	ND	ND	ND	Fall River
666	7	1	10	SESE	ND	ND	ND	Lakota
668	7	1	15	NWNE	999428.155	427450.3155	3622	Other Inyan Kara

Well ID	Legal Location				SD State Plane 1983		Elevation, ft	Aquifer
	T.	R.	Sec.	Qrt Qrt	East (ft)	North (ft)		
669	7	1	15	NWNE	ND	ND	ND	Lakota
670	7	1	15	NWNE	ND	ND	ND	Fuson
671	7	1	15	NWNE	ND	ND	ND	Fall River
672	7	1	15	NWNE	ND	ND	ND	Fall River
673	7	1	15	NWNE	ND	ND	ND	Fuson
674	7	1	15	NWNE	ND	ND	ND	Lakota
675	7	2	31	SESE	1015340.264	406352.2188	3492	Alluvial
676	6	1	34	SESW	999245.0312	439891.6372	3662	Alluvial
677	7	1	4	SWSW	991925.5409	434077.2303	3562	Alluvial
678	7	1	9	SWNE	994921.194	431925.7016	3595	Alluvial
679	6	1	27	NWSE	1000693.36	446245.4324	3715	Alluvial
680	7	1	11	NESW	1003476.59	429969.0789	3688	Lakota
681	6	1	32	NWNE	988728.3431	443725.3264	3624	Fall River
682	7	1	11	SENW	1003535.474	431259.5932	3720	Lakota
683	6	1	29	NESW	988607.893	446108.0187	3669	Fall River
684	7	1	11	NESW	1003586.926	429745.8227	3691	Lakota
685	6	1	32	NWNE	989085.4868	443415.4025	3626	Fall River
686	7	1	11	NESW	1003365.421	429751.8227	3694	Lakota
687	6	1	32	NENW	988476.4049	443730.5899	3626	Fall River
688	7	1	11	NESW	1003425.818	429974.4313	3687	Fall River
689	6	1	32	NENW	988715.0026	443789.1861	3626	Lakota
690	7	1	11	NESW	1003512.176	429971.0682	3700	Sundance/Unkpapa
691	6	1	32	NENW	988764.8084	443706.8807	3626	Fall River
692	7	1	11	NESW	1003466.908	429999.5069	3701	Lakota
693	6	1	32	NENW	988727.3316	443667.2062	3626	Sundance/Unkpapa
694	7	1	15	NWNW	997116.0514	426836.0704	3600	Fall River
695	6	1	32	SESE	990783.4225	439312.5055	3594	Fall River
696	7	1	15	NWNW	997086.1856	426946.4439	3602	Lakota
697	6	1	32	SESE	990748.4216	439347.3562	3594	Lakota
698	7	1	2	SENW	1004307.778	435651.0652	3739	Fall River
703	7	1	1	SWSE	1010020.507	434334.3457	3877	Sundance/Unkpapa
704	7	1	5	SWNE	989364.5045	436647.6682	3599	Sundance/Unkpapa
2020	7	1	17	NWSW	986286.6643	424857.9008	3565	unknown
3002	7	2	31	SESE	ND	ND	ND	unknown
3026	7	1	1	SESE	1012037.43	432833.2349	3822	Lakota
4002	6	1	30	NWSW	981812.8541	446932.2402	3621	Other Inyan Kara
5002	41	60	28	SWSW	ND	ND	ND	Other Inyan Kara
7002	7	1	23	NWNW	1001731.47	421930.808	3571	Lakota
8002	7	1	23	SWSE	1004651.515	418556.4148	3550	Lakota
8003	7	1	23	SWSE	1004520.892	418530.8085	3543	Other Inyan Kara
8802	7	1	35	SESE	1005923.05	407436.6955	3554	Fall River
8803	7	1	35	SESE	1005445.181	407730.2169	3552	unknown

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All Abandoned Wells near the Dewey-Burdock Uranium ISR Project

Well ID	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Aquifer	Located in Field	Data Origin
5	850	UNK	UNK	5	leaky	UNK	2	yes	TVA EIS Report
6	UNK	UNK	UNK	12	little rust	UNK	7	yes	GPS
GPS5	495	UNK	UNK	4	not good	UNK	2	yes	TVA EIS Report
41	UNK	UNK	UNK	6	UNK	UNK	4	yes	TVA EIS Report
43	350	UNK	UNK	4	cant see under tent	UNK	2	yes	TVA EIS Report
44	130	UNK	UNK	UNK	UNK	UNK	1	no	TVA Data
88	320	UNK	UNK	UNK	UNK	UNK	1	yes	TVA EIS Report
113	UNK	UNK	UNK	UNK	windmill	UNK	7	yes	GPS
502	46	UNK	UNK	UNK	UNK	UNK	4	no	TVA EIS Report
606	UNK	UNK	UNK	UNK	not good	UNK	2	yes	TVA EIS Report
621	500	UNK	UNK	UNK	unknown	UNK	4	yes	TVA EIS Report
632	UNK	UNK	UNK	UNK	unknown	UNK	7	yes	GPS
634	UNK	UNK	UNK	UNK	no	UNK	7	yes	GPS
636	UNK	UNK	UNK	7	slightly rusty	UNK	7	yes	GPS
638	180	UNK	UNK	2	little rusty	UNK	1	yes	TVA EIS Report
639	UNK	UNK	UNK	UNK	none visible	UNK	7	yes	GPS
640	UNK	UNK	UNK	1	good	UNK	7	yes	GPS
642	UNK	UNK	UNK	5	open bad	UNK	7	yes	GPS
645	UNK	UNK	UNK	UNK	hand pump	UNK	7	yes	GPS
651	UNK	UNK	UNK	2	moderate	UNK	2	yes	TVA EIS Report
652	280	UNK	UNK	UNK	UNK	UNK	3	yes	GPS
653	UNK	UNK	UNK	UNK	UNK	UNK	7	yes	GPS
654	UNK	UNK	UNK	8	UNK	UNK	3	yes	GPS
655	UNK	UNK	UNK	12	UNK	UNK	3	yes	GPS
659	UNK	UNK	UNK	UNK	UNK	UNK	1	no	TVA Data
660	UNK	UNK	UNK	UNK	UNK	UNK	2	no	TVA Data

Powertech (USA) Inc.

Known Alluvial Wells at the Dewey-Burdock Uranium ISR Project

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Water Quality Sampling Frequency	Data Origin
675	Alluvial on Cheyenne River at Marietta		14.4	4	14	2	new pvc		monitor	Quarterly	Well Completion Report
676	Alluvial on Pass Creek at old Spencer Ranch		22.5	12	22	2	new pvc		monitor	Quarterly	Well Completion Report
677	Alluvial on Beaver Creek near Putnam		14.5	4	14	2	new pvc		monitor	Quarterly	Well Completion Report
678	Alluvial on Pass Creek downstream of Dewey Rd		14.5	4	14	2	new pvc		monitor	Quarterly	Well Completion Report
679	Alluvial on Pass Creek at Doran Ranch		39	29	39	2	new pvc		monitor	Quarterly	Well Completion Report

POWERTECH (USA) INC.

Known Fall River Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
4	D-19		2264	UNK	UNK	3	rusty leaky	UNK	stock	yes	once	TVA EIS Report
7	D-27		200	UNK	UNK	6	UNK	UNK	domestic	UNK	quarterly	TVA EIS Report
8	D-29		240	UNK	UNK	6	UNK	UNK	domestic	yes	quarterly	TVA Data
17	D-13		156	UNK	UNK	3	little rusty	UNK	stock	no	none	Well Completion Report
18	D-10		527	UNK	UNK	4	UNK	UNK	domestic	yes	quarterly	TVA EIS Report
20	D-21		530	UNK	UNK	UNK	UNK	UNK	domestic	UNK	none	TVA EIS Report
21	D-23		910	UNK	UNK	UNK	UNK	UNK	stock	UNK	none	TVA EIS Report
23	D-40		600	UNK	UNK	UNK	UNK	UNK	stock	no	none	TVA EIS Report
24	D-39		600	UNK	UNK	UNK	UNK	UNK	stock	yes	none	TVA EIS Report
26	D-42		350	UNK	UNK	UNK	UNK	UNK	other	no	none	TVA EIS Report
49			600	UNK	UNK	4	good	UNK	stock	yes	water level	TVA Data
436	DPZ-3 FR, 6S 1E20AB2		590	UNK	UNK	UNK	UNK	UNK	monitor	no	none	USGS
601	BPZ 14 FR		UNK	UNK	UNK	1	okay	UNK	monitor	UNK	none	Well Completion Report
603	8S 2E23BBA		UNK	UNK	UNK	6	UNK	UNK	UNK	UNK	none	USGS
607	BPZ 18 FR		UNK	UNK	UNK	1	okay	UNK	monitor	no	water level	TVA Data
610	BPZ 20 FR		680	630	672	1	good cond capped	UNK	monitor	no	water level	Well Completion Report
613	DPZ 1 FR, 6S1E20AD6		580	504	580	4	okay	UNK	monitor	no	water level	Well Completion Report
622	DPZ 4 FR, 6S 1E20AA		520	503	580	4	okay	UNK	monitor	no	monthly	Well Completion Report
625	BPZ 22 FR		630	UNK	UNK	1	okay	UNK	monitor	no	none	TVA Data
631			80	30	80	5	steel	UNK	stock	no	quarterly	Well Completion Report
644	BPZ 16 FR		UNK	UNK	UNK	1	okay	UNK	monitor	no	none	Well Completion Report
646	BPZ-9 FR		UNK	UNK	UNK	UNK	UNK	UNK	monitor	yes	none	GPS
681	DB07-32-3C		600	585	600	6	new PVC	UNK	pump test well	yes	monthly	Well Completion Report
683	DB07-29-7		650	635	650	4	new	UNK	monitor	no	once	Well Completion Report
685	DB07-32-4C		595	580	595	4	new PVC	UNK	monitor	yes	once	Well Completion Report
687	DB07-32-5		608	590	605	4	new PVC	UNK	monitor	yes	once	Well Completion Report

POWERTECH (USA) INC.

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
688	DB08-11-17		255	245	255	6	UNK	UNK	monitor	no	monthly	Well Completion Report
691	DB07-32-9C		505	490	505	6	new pvc	UNK	monitor	yes	once	Well Completion Report
694	DB08-15-02		392	377	392	6	new pvc	UNK	monitor	yes	monthly	Well Completion Report
695	DB08-32-13		508	493	508	6	new pvc	UNK	monitor	yes	monthly	Well Completion Report
698	DB08-02-01		205	180	205	6	new pvc	UNK	monitor	no	monthly	Well Completion Report
8802	D-44, 88B		320	UNK	UNK	UNK	UNK	UNK	stock past	UNK	none	TVA EIS Report

Known Fuson Wells at the Dewey-Burdock Uranium ISR Project

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
614	DPZ 1 FU, 6S1E20AD2		620	609	620	4	okay	UNK	6	no	2	Well Completion Report

POWERTECH (USA) INC.

Known Lakota Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
1	D-11		600	UNK	UNK	4	really rusty		stock	yes	none	TVA EIS Report
2	D-20		650	566	650	5	UNK		domestic	yes	quarterly	Well Completion Report
12	D-7		805	UNK	UNK	5	okay ltl rusty		stock	yes	water level	TVA EIS Report
13	D-6		625	580	625	5	UNK		domestic	no	quarterly	Well Completion Report
14	D-5		470	UNK	UNK	4	fairly rusty		none	no	none	TVA EIS Report
16	D-1		330	UNK	UNK	5	UNK		domestic	no	quarterly	TVA EIS Report
38	B-4		494	UNK	UNK	4	slightly rusty		stock	yes	water level	Well Completion Report
42	D-8		600	UNK	UNK	5	UNK		domestic	yes	quarterly	TVA EIS Report
51	D-9		550	UNK	UNK	10	UNK		other	yes	none	TVA EIS Report
61	D-12		525	UNK	UNK	5	UNK		stock	no	none	TVA EIS Report
96			560	UNK	UNK	5	UNK		domestic	yes	none	TVA Data
115			UNK	UNK	UNK	UNK	okay		domestic	yes	none	Well Completion Report
135			360	UNK	UNK	UNK	UNK		domestic	no	none	TVA Data
139			620	UNK	UNK	UNK	UNK		stock	yes	none	TVA Data
147	DPZ -8 LAK, 6S 1E17CAC		750	UNK	UNK	1	okay		monitor	no	none	USGS
510	D-14, 7S 1E12DD		540	300	520	5	PVC		stock	yes	none	Well Completion Report
602	BPZ 14 LAK		UNK	UNK	UNK	1	okay		monitor	UNK	none	Well Completion Report
608	BPZ 18 LAK		UNK	UNK	UNK	1	okay		monitor	UNK	water level	TVA Data
609	BPZ 20 LAK, 6S 1E29ABDC		1000	903	966	4	good capped		monitor	no	water level	Well Completion Report
611	Dewey TVA Pump Well		815	695	800	UNK	UNK		pump test well	no	none	Well Completion Report
612	DPZ 2 LK, 6S 1E20AB		UNK	UNK	UNK	4	okay		monitor	no	none	USGS
615	DPZ 1 LK		800	712	800	4	okay		monitor	no	monthly	Well Completion Report
616	DPZ 5 LK		795	735	835	4	okay		monitor	no	none	Well Completion Report
617	DPZ 6 LK, 6S 1E20AC		810	715	810	4	okay		monitor	no	none	Well Completion Report
619	D-4, Daniels West 1, MET		280	UNK	UNK	4	ok ltl rust		stock	no	quarterly	TVA EIS Report
620	Spencer Mine Well		UNK	UNK	UNK	UNK	good		stock	no	none	GPS

POWERTECH (USA) INC.

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
623	DPZ 4 L, 6S 1E20AA(2)		765	714	780	4	okay		monitor	no	none	Well Completion Report
626	BPZ 22 LAK		640	UNK	UNK	4	UNK		UNK	no	none	TVA Data
643	BPZ 16 LAK		UNK	UNK	UNK	1	okay		monitor	UNK	none	Well Completion Report
650	Daniels Bennet Canyon		UNK	UNK	UNK	4	rusty		stock	no	quarterly	GPS
680	DB07-11-11C		436	426	436	6	new PVC		pump test well	no	monthly	Well Completion Report
682	DB07-11-2		460	450	460	4	new PVC		monitor	no	once	Well Completion Report
684	DB07-11-14C		423	413	423	4	new pvc		monitor	no	once	Well Completion Report
686	DB07-11-15		428	418	428	4	new PVC		monitor	no	once	Well Completion Report
689	DB07-32-10,		730	715	730	6	UNK		monitor	yes	monthly	Well Completion Report
692	DB08-11-19		327	325	335	6	new pvc		monitor	no	once	Well Completion Report
696	DB08-15-03		587	572	587	6	new pvc		monitor	yes	monthly	Well Completion Report
697	DB08-32-12		682	667	682	6	new pvc		monitor	yes	monthly	Well Completion Report
3026	DB08-01-06		196	166	196	6	new		monitor	no	monthly	Well Completion Report
7002	D-26, 7S		500	UNK	UNK	6	poor		stock	yes	quarterly	TVA EIS Report
8002	D-28, 8S		500	UNK	UNK	6	poor		stock	yes	water level	TVA EIS Report

POWERTECH (USA) INC.

Known Sundance or Unkpapa Aquifer Wells at the Dewey-Burdock Uranium ISR Project

Well ID	Name Other	Date Drilled	Depth, ft	Depth to Top Screen, ft	Depth to Bottom Screen, ft	Casing Diameter, in	Casing Condition (Surface Observation)	Cement Condition	Use Type	Flowing Artesian	Water Quality Sampling Frequency	Data Origin
635	7S 1E14BAAC		880	666	780	6	leaky	UNK	stock	yes	quarterly	well completion report
114	E-2		365	UNK	UNK	UNK	UNK	UNK	stock	no	none	TVA EIS Report
690	DB08-11-18		623	621	631	6	new pvc		monitor	yes	once	well completion report
704	DB08-05-01		955	915	955	6	new		other	yes	none	well completion report
693	DB07-32-11		910	910	930	6	new pvc		monitor	yes	once	well completion report
703	DB08-01-07		525	475	525	6	new		other	no	none	well completion report

POWERTECH (USA) INC.

Groundwater Quality

Additional Water Quality Data and Statistics by Well

Well #2				
Analyte	9/26/2007 12:46	11/12/2007 9:25	2/12/2008 10:21	5/30/2008 15:21
A/C Balance (± 5) (%)	-2.46	0.663	-2.6	3.25
Alkalinity-Total as CaCO3 (mg/L)	214	208	88	212
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.4	0.8	0.3
Anions (meq/L)	16.7	16.5	53.3	16.6
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			<0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	261	254	107	258
Boron-Dissolved (mg/L)	<0.1	<0.1	0.7	0.1
Boron-Total (mg/L)			0.6	<0.1
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	48.5	51.7	241	57.8
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	15.9	16.7	50.6	17.7
Chloride (mg/L)	10	11	26	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1570	1500	4400	1670
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.2	0.2	0.4	0.3
Gross Alpha-Dissolved (pCi/L)	1.4	8.7	3.5	8.2
Gross Beta-Dissolved (pCi/L)	9.3	12.4	14.4	10.3
Gross Gamma-Dissolved (pCi/L)	<20	260	<20	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			1.32	1.54
Lead 210-Dissolved (pCi/L)	<1	<1	<1	3.1
Lead 210-Suspended (pCi/L)	<1	<1	<1	1.4
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	15.8	16.6	87	19
Manganese-Dissolved (mg/L)	0.08	0.08	0.07	0.08
Manganese-Total (mg/L)			0.06	0.09
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001

Well #2				
Analyte	9/26/2007 12:46	11/12/2007 9:25	2/12/2008 10:21	5/30/2008 15:21
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.02	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		140	120	190
pH	7.91	7.85	7.94	7.92
Polonium 210-Dissolved (pCi/L)	<1	2	2.7	0.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	11.5	11.4	7.8	11
Radium 226-Dissolved (pCi/L)	<0.2	1.3	1.1	2.1
Radium 226-Suspended (pCi/L)	2.2	<0.2	0.7	0.2
Radium 226-Total (pCi/L)	2.2			
Radon 222-Total (pCi/L)		674	908	727
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	0.001	<0.001
Selenium-Total (mg/L)			0.002	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	0.001	<0.001
Silica-Dissolved (mg/L)	8	8.1	10.2	4.3
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		8.8	10	8.7
Sodium-Dissolved (mg/L)	273	286	716	297
Solids-Total Dissolved Calculated (mg/L)	1070	1090	3600	1110
Solids-Total Dissolved TDS @ 180 C (mg/L)	1100	1100	3700	1100
Strontium-Total (mg.L)			5.7	1.8
Sulfate (mg/L)	583	577	2440	579
TDS Balance (0.80 - 1.20) (dec.%)	1	0.97	1.02	0.96
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	0.0004	<0.0003
Uranium-Suspended (mg/L)	0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0004		<0.0005	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

Powertech (USA) Inc.

Well #2								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-0.28675	2.797902	-2.565	-0.8985	2.60325	-2.6	3.25	4
Alkalinity-Total as CaCO3 (mg/L)	180.5	61.7171	118	210	213.5	88	214	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.3875	0.311916	0.1125	0.35	0.7	0.05	0.8	4
Anions (meq/L)	25.775	18.35018	16.525	16.65	44.15	16.5	53.3	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.00225	0.002475		0.00225		0.0005	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	220	75.38789	143.75	256	260.25	107	261	4
Boron-Dissolved (mg/L)	0.225	0.317543	0.05	0.075	0.55	0.05	0.7	4
Boron-Total (mg/L)	0.325	0.388909		0.325		0.05	0.6	2
Cadmium-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	99.75	94.24565	49.3	54.75	195.2	48.5	241	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	25.225	16.93269	16.1	17.2	42.375	15.9	50.6	4
Chloride (mg/L)	14	8.041559	9.25	10.5	22.25	9	26	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2285	1411.725	1517.5	1620	3717.5	1500	4400	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.275	0.095743	0.2	0.25	0.375	0.2	0.4	4
Gross Alpha-Dissolved (pCi/L)	5.45	3.574446	1.925	5.85	8.575	1.4	8.7	4
Gross Beta-Dissolved (pCi/L)	11.6	2.270095	9.55	11.35	13.9	9.3	14.4	4
Gross Gamma-Dissolved (pCi/L)	70	126.7544	2.5	10	197.5		260	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	1.43	0.155563		1.43		1.32	1.54	2
Lead-Dissolved (mg/L)	0.006625	0.01225	0.0005	0.0005	0.018875	0.0005	0.025	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.15	1.3	0.5	0.5	2.45	0.5	3.1	4
Lead 210-Suspended (pCi/L)	0.725	0.45	0.5	0.5	1.175	0.5	1.4	4

Powertech (USA) Inc.

Well #2								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	34.6	34.95979	16	17.8	70	15.8	87	4
Manganese-Dissolved (mg/L)	0.0775	0.005	0.0725	0.08	0.08	0.07	0.08	4
Manganese-Total (mg/L)	0.075	0.021213		0.075		0.06	0.09	2
Mercury-Dissolved (mg/L)	0.0004	0.0002	0.0002	0.0005	0.0005	0.0001	0.0005	4
Mercury-Total (mg/L)	0.000388	0.000225	0.000163	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.035	0.021213		0.035		0.02	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	150	36.05551	120	140	190	120	190	3
pH	7.905	0.03873	7.865	7.915	7.935	7.85	7.94	4
Polonium 210-Dissolved (pCi/L)	1.325	1.228481	0.2	1.25	2.525	0.1	2.7	4
Polonium 210-Suspended (pCi/L)	0.375	0.25	0.125	0.5	0.5		0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	10.425	1.763283	8.6	11.2	11.475	7.8	11.5	4
Radium 226-Dissolved (pCi/L)	1.15	0.822598	0.35	1.2	1.9	0.1	2.1	4
Radium 226-Suspended (pCi/L)	0.8	0.969536	0.125	0.45	1.825	0.1	2.2	4
Radium 226-Total (pCi/L)	2.2			2.2		2.2	2.2	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	769.6667	122.6961	674	727	908	674	908	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Selenium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Selenium-VI-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Silica-Dissolved (mg/L)	7.65	2.452889	5.225	8.05	9.675	4.3	10.2	4
Silver-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	393	215.5566	276.25	291.5	611.25	273	716	4
Sodium Adsorption Ratio (SAR) (meq/L)	9.166667	0.723418	8.7	8.8	10	8.7	10	3
Solids-Total Dissolved Calculated (mg/L)	1717.5	1255.106	1075	1100	2977.5	1070	3600	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1750	1300	1100	1100	3050	1100	3700	4
Strontium-Total (mg.L)	3.75	2.757716		3.75		1.8	5.7	2
Sulfate (mg/L)	1044.75	930.17	577.5	581	1975.75	577	2440	4

Well #2								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
TDS Balance (0.80 - 1.20) (dec.%)	0.9875	0.027538	0.9625	0.985	1.015	0.96	1.02	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.002	0.001	0.001	0.0025	0.0025	0.0005	0.0025	4
Uranium-Dissolved (mg/L)	0.000213	0.000125	0.00015	0.00015	0.000338	0.00015	0.0004	4
Uranium-Suspended (mg/L)	0.000188	0.000075	0.00015	0.00015	0.000263	0.00015	0.0003	4
Uranium-Total (mg/L)	0.000267	0.000126	0.00015	0.00025	0.0004	0.00015	0.0004	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45	5/29/2008 11:10
			Well #7		
A/C Balance (± 5) (%)		-3.73	1.13	-2.5	8.11
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	170	176	170	170	170
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	0.4	0.3	0.4	0.3	0.3
Anions (meq/L)		14.1	15.6	15.9	14.4
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001	0.003
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	210	215	207	207	207
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	300				
Bismuth precision (±) (pCi/L)	18				
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	37	30	36	32.9	42.1
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		13	15.9	15.1	17
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	13	12	12	11	11
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1530	1490	1440	1600	1650
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.37	0.3	0.4	0.3	0.4
Gross Alpha precision (±) (pCi/L)	0.8				
Gross Alpha-Dissolved (pCi/L)	17	4.4	7.2	15.5	3.3
Gross Beta precision (±) (pCi/L)	1.6				
Gross Beta-Dissolved (pCi/L)	16	5	14.9	10.1	9.6
Gross Gamma-Dissolved (pCi/L)	<20	1200	130	77	
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.41	0.41
Lead 210-Dissolved (pCi/L)		<1	<1	24	0.5
Lead 210-Suspended (pCi/L)		<1	<1	<1	-7.4

POWERTECH (USA) INC.

Well #7					
Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45	5/29/2008 11:10
Lead 210-Total (pCi/L)		<1			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214 precision (±) (pCi/L)	30				
Lead 214-Dissolved (pCi/L)	350				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	16	11.5	15.3	14	18.2
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.03	0.03	0.03	0.03	0.03
Manganese-Total (mg/L)				0.03	0.03
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			210	180	210
pH	8.08	8.13	8.05	8.14	8.17
Polonium 210-Dissolved (pCi/L)		<1	2.1	<1	
Polonium 210-Suspended (pCi/L)		<1	<1	<1	-0.1
Polonium 210-Total (pCi/L)		<1			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	10	11	11.1	10.8	11
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	0.6				
Radium 226-Dissolved (pCi/L)	2.6	0.6	1.1	0.7	0.9
Radium 226-Suspended (pCi/L)		<0.2	<0.2	<0.9	-0.3
Radium 226-Total (pCi/L)		<0.2			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222-Total (pCi/L)			206	242	451
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.5	7.8	7.5	4.1
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			10	10	9.7
Sodium-Dissolved (mg/L)	270	237	289	276	300
Solids-Total Dissolved Calculated (mg/L)		896	1040	1050	1010
Solids-Total Dissolved TDS @ 180 C	1000	1000	1000	990	960

POWERTECH (USA) INC.

Well #7					
Analyte	10/3/2006 11:12	9/28/2007 17:28	11/12/2007 8:20	2/20/2008 8:45	5/29/2008 11:10
(mg/L)					
Strontium-Total (mg.L)				1	1.1
Sulfate (mg/L)	546	586	567	583	514
TDS Balance (0.80 - 1.20) (dec.%)		1.16	0.98	0.94	0.95
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.2	0.2
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	<0.001	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	48				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)				<0.01	<0.01

POWERTECH (USA) INC.

Well #7								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.7525	5.321243	-3.4225	-0.685	6.365	-3.73	8.11	4
Alkalinity-Total as CaCO3 (mg/L)	171.5	3	170	170	174.5	170	176	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.325	0.05	0.3	0.3	0.375	0.3	0.4	4
Anions (meq/L)	15	0.883176	14.175	15	15.825	14.1	15.9	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	209	4	207	207	213	207	215	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	35.25	5.182342	30.725	34.45	40.575	30	42.1	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	15.25	1.690168	13.525	15.5	16.725	13	17	4
Chloride (mg/L)	11.5	0.57735	11	11.5	12	11	12	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1545	96.78154	1452.5	1545	1637.5	1440	1650	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	7.6	5.516641	3.575	5.8	13.425	3.3	15.5	4
Gross Beta-Dissolved (pCi/L)	9.9	4.047221	6.15	9.85	13.7	5	14.9	4
Gross Gamma-Dissolved (pCi/L)	351.75	568.0131	19.25	103.5	932.5		1200	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.41			0.41		0.41	0.41	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	6.375	11.75	0.5	0.5	18.125	0.5	24	4
Lead 210-Suspended (pCi/L)	-1.475	3.95	-5.425	0.5	0.5	-7.4	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	14.75	2.788668	12.125	14.65	17.475	11.5	18.2	4
Manganese-Dissolved (mg/L)	0.03		0.03	0.03	0.03	0.03	0.03	4
Manganese-Total (mg/L)	0.03			0.03		0.03	0.03	2

Well #7								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	200	17.32051	180	210	210	180	210	3
pH	8.1225	0.051235	8.07	8.135	8.1625	8.05	8.17	4
Polonium 210-Dissolved (pCi/L)	0.775	0.914239	0.125	0.5	1.7		2.1	4
Polonium 210-Suspended (pCi/L)	0.35	0.3	0.05	0.5	0.5	-0.1	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	10.975	0.125831	10.85	11	11.075	10.8	11.1	4
Radium 226-Dissolved (pCi/L)	0.825	0.221736	0.625	0.8	1.05	0.6	1.1	4
Radium 226-Suspended (pCi/L)	0.0875	0.306526	-0.2	0.1	0.3625	-0.3	0.45	4
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	299.6667	132.2888	206	242	451	206	451	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.725	1.755705	4.95	7.5	7.725	4.1	7.8	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	275.5	27.47726	246.75	282.5	297.25	237	300	4
Sodium Adsorption Ratio (SAR) (meq/L)	9.9	0.173205	9.7	10	10	9.7	10	3
Solids-Total Dissolved Calculated (mg/L)	999	70.73896	924.5	1025	1047.5	896	1050	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	987.5	18.92969	967.5	995	1000	960	1000	4
Strontium-Total (mg.L)	1.05	0.070711		1.05		1	1.1	2
Sulfate (mg/L)	562.5	33.39162	527.25	575	585.25	514	586	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0075	0.103078	0.9425	0.965	1.115	0.94	1.16	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.15	0.057735	0.1	0.15	0.2	0.1	0.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4

Well #7								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015			0.00015		0.00015	0.00015	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Well #8					
Analyte	9/26/2007 14:33	11/27/2007 16:30	11/27/2007 16:40	2/5/2008 10:20	5/29/2008 11:41
A/C Balance (± 5) (%)	-2.44	-3.23	-4.83	5.03	5.33
Alkalinity-Total as CaCO3 (mg/L)	168	178	156	166	164
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.2	0.3	0.3	0.2
Anions (meq/L)	15	14.8	15.4	13.1	14.3
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)				<0.001	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	205	217	190	202	200
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	48.5	56.4	55.1	52.6	58.9
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	14.3	13.9	13.9	14.5	15.9
Chloride (mg/L)	13	12	12	12	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1420	1420	1420	1430	1560
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4	0.5	0.4
Gross Alpha-Dissolved (pCi/L)	5	8.7	9	5.4	3.2
Gross Beta-Dissolved (pCi/L)	15.9	25	29.1	21	16.2
Gross Gamma-Dissolved (pCi/L)	650	970	1200	<20	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.21	0.23
Lead 210-Dissolved (pCi/L)	<1	4	<1	3	0.8
Lead 210-Suspended (pCi/L)	<1	<1	<1	1.9	4.9
Lead 210-Total (pCi/L)	<1				
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	21.2	24.6	24.5	22.6	26.3
Manganese-Dissolved (mg/L)	0.08	0.11	0.11	0.08	0.09
Manganese-Total (mg/L)				0.08	0.09
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05

POWERTECH (USA) INC.

Well #8					
Analyte	9/26/2007 14:33	11/27/2007 16:30	11/27/2007 16:40	2/5/2008 10:20	5/29/2008 11:41
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		150	150	220	210
pH	7.93	7.95	7.94	7.94	7.97
Polonium 210-Dissolved (pCi/L)	<1	<1	<1	1.6	-0.2
Polonium 210-Suspended (pCi/L)	<1	<1	<1	<1	-0.1
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	14.2	15.7	15.2	14.7	13.7
Radium 226-Dissolved (pCi/L)	<0.2	2.7	1.9	1.5	1.2
Radium 226-Suspended (pCi/L)	3.5	<0.2	<0.2	2.8	-0.4
Radium 226-Total (pCi/L)	3.5				
Radon 222-Total (pCi/L)		123	197	329	514
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	0.002	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	0.001	<0.001
Silica-Dissolved (mg/L)	6.9	6.7	6.6	7.3	3.5
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		5.6	5.7	6.4	6.5
Sodium-Dissolved (mg/L)	224	199	201	222	240
Solids-Total Dissolved Calculated (mg/L)	962	939	973	879	973
Solids-Total Dissolved TDS @ 180 C (mg/L)	960	1000	1100	1000	940
Strontium-Total (mg.L)				1.6	1.6
Sulfate (mg/L)	540	594	570	455	514
TDS Balance (0.80 - 1.20) (dec.%)	1	1.12	1.09	1.15	0.97
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	<0.2	
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003			<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	0.01	0.02	<0.01
Zinc-Total (mg/L)				<0.01	<0.01

Well #8								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-0.028	4.832734	-4.03	-2.44	5.18	-4.83	5.33	5
Alkalinity-Total as CaCO3 (mg/L)	166.4	7.924645	160	166	173	156	178	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.21	0.10247	0.125	0.2	0.3	0.05	0.3	5
Anions (meq/L)	14.52	0.88713	13.7	14.8	15.2	13.1	15.4	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0007	0.000274	0.0005	0.0005	0.001	0.0005	0.001	5
Arsenic-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	202.8	9.731393	195	202	211	190	217	5
Boron-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	54.3	3.960429	50.55	55.1	57.65	48.5	58.9	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	14.5	0.824621	13.9	14.3	15.2	13.9	15.9	5
Chloride (mg/L)	12	0.707107	11.5	12	12.5	11	13	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1450	61.64414	1420	1420	1495	1420	1560	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.42	0.044721	0.4	0.4	0.45	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	6.26	2.507588	4.1	5.4	8.85	3.2	9	5
Gross Beta-Dissolved (pCi/L)	21.44	5.69412	16.05	21	27.05	15.9	29.1	5
Gross Gamma-Dissolved (pCi/L)	566	548.115	5	650	1085		1200	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	0.22	0.014142		0.22		0.21	0.23	2
Lead-Dissolved (mg/L)	0.0054	0.010957	0.0005	0.0005	0.01275	0.0005	0.025	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.76	1.63187	0.5	0.8	3.5	0.5	4	5
Lead 210-Suspended (pCi/L)	1.66	1.909974	0.5	0.5	3.4	0.5	4.9	5
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	23.84	1.973069	21.9	24.5	25.45	21.2	26.3	5

Well #8								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Manganese-Dissolved (mg/L)	0.094	0.015166	0.08	0.09	0.11	0.08	0.11	5
Manganese-Total (mg/L)	0.085	0.007071		0.085		0.08	0.09	2
Mercury-Dissolved (mg/L)	0.00042	0.000179	0.0003	0.0005	0.0005	0.0001	0.0005	5
Mercury-Total (mg/L)	0.00035	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	182.5	37.74917	150	180	217.5	150	220	4
pH	7.946	0.015166	7.935	7.94	7.96	7.93	7.97	5
Polonium 210-Dissolved (pCi/L)	0.58	0.645755	0.15	0.5	1.05	-0.2	1.6	5
Polonium 210-Suspended (pCi/L)	0.38	0.268328	0.2	0.5	0.5	-0.1	0.5	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	14.7	0.790569	13.95	14.7	15.45	13.7	15.7	5
Radium 226-Dissolved (pCi/L)	1.48	0.954987	0.65	1.5	2.3	0.1	2.7	5
Radium 226-Suspended (pCi/L)	1.22	1.79081	-0.15	0.1	3.15	-0.4	3.5	5
Radium 226-Total (pCi/L)	3.5			3.5		3.5	3.5	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	290.75	171.4961	141.5	263	467.75	123	514	4
Selenium-Dissolved (mg/L)	0.0008	0.000671	0.0005	0.0005	0.00125	0.0005	0.002	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Silica-Dissolved (mg/L)	6.2	1.532971	5.05	6.7	7.1	3.5	7.3	5
Silver-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	217.2	17.19593	200	222	232	199	240	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.05	0.465475	5.625	6.05	6.475	5.6	6.5	4
Solids-Total Dissolved Calculated (mg/L)	945.2	39.52468	909	962	973	879	973	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	1000	61.64414	950	1000	1050	940	1100	5
Strontium-Total (mg.L)	1.6			1.6		1.6	1.6	2
Sulfate (mg/L)	534.6	53.78476	484.5	540	582	455	594	5
TDS Balance (0.80 - 1.20) (dec.%)	1.066	0.077653	0.985	1.09	1.135	0.97	1.15	5
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5

Well #8								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Thorium 230-Suspended (pCi/L)	0.08	0.044721	0.05	0.1	0.1		0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Uranium-Dissolved (mg/L)	0.00018	6.71E-05	0.00015	0.00015	0.000225	0.00015	0.0003	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	3
Vanadium-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Zinc-Dissolved (mg/L)	0.012	0.007583	0.005	0.01	0.02	0.005	0.02	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

Powertech (USA) Inc.

Well #13					
Analyte	**10/3/2006 11:36**	**9/27/2007 15:45**	**11/12/2007 12:15**	**2/20/2008 14:41**	**5/19/2008 12:20**
A/C Balance (± 5) (%)		-1.26	-3.53	-4.96	6.97
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	170	168	142	160	156
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	0.2	0.6	0.1	<0.1	<0.1
Anions (meq/L)		12.3	14	13.9	12.6
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001	0.001
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	205	173	195	190
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	<20				
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.001
Calcium-Dissolved (mg/L)	61	57.4	61.3	58	72.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		12	13.1	12.6	14.5
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	11	11	11	10	10
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1290	1280	1140	1330	1420
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.43	0.4	0.4	0.5	0.5
Gross Alpha precision (±) (pCi/L)	0.7				
Gross Alpha-Dissolved (pCi/L)	12	8.9	7.5	19.5	4.2
Gross Beta precision (±) (pCi/L)	1.7				
Gross Beta-Dissolved (pCi/L)	17	9.6	11.7	11.4	10.3
Gross Gamma-Dissolved (pCi/L)	<20	<20	4300	<20	
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				3.11	4.56
Lead 210-Dissolved (pCi/L)		<1	<1	4.7	4.1
Lead 210-Suspended (pCi/L)		<1	<1	<1	-0.2
Lead 210-Total (pCi/L)		<1			

POWERTECH (USA) INC.

Well #13					
Analyte	**10/3/2006 11:36**	**9/27/2007 15:45**	**11/12/2007 12:15**	**2/20/2008 14:41**	**5/19/2008 12:20**
Lead 212-Dissolved (pCi/L)	<20				
Lead 214-Dissolved (pCi/L)	<20				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	22	21	25.1	22.4	29.5
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.11	0.1	0.2	0.16	0.2
Manganese-Total (mg/L)				0.16	0.2
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.01
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			230	200	260
pH	7.93	7.83	7.75	8.05	7.96
Polonium 210-Dissolved (pCi/L)		<1	2.6	1.1	-0.6
Polonium 210-Suspended (pCi/L)		5.2	<1	<1	
Polonium 210-Total (pCi/L)		5.2			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	9	11.3	11.7	11.8	11.5
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	0.5				
Radium 226-Dissolved (pCi/L)	2.1	1.8	1.6	1.1	1.6
Radium 226-Suspended (pCi/L)		<0.2	<0.2	1.6	0.01
Radium 226-Total (pCi/L)		1.1			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	63.2				
Radon 222-Total (pCi/L)	335		305	258	412
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.005
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.7	6.2	6.5	3.6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			4.7	4.9	4.7
Sodium-Dissolved (mg/L)	180	163	175	173	188
Solids-Total Dissolved Calculated (mg/L)		781	898	888	857
Solids-Total Dissolved TDS @ 180 C (mg/L)	880	890	890	850	880

Well #13					
Analyte	**10/3/2006 11:36**	**9/27/2007 15:45**	**11/12/2007 12:15**	**2/20/2008 14:41**	**5/19/2008 12:20**
Strontium-Total (mg.L)				1.5	1.7
Sulfate (mg/L)	460	488	520	499	442
TDS Balance (0.80 - 1.20) (dec.%)		1.14	0.99	0.96	1.02
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		0.4	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.4	0.2
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	<0.001	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	51				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	<0.01	<0.01	0.04	<0.01	0.01
Zinc-Total (mg/L)				0.07	0.04

POWERTECH (USA) INC.

Well #13								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.695	5.332257	-4.6025	-2.395	4.9125	-4.96	6.97	4
Alkalinity-Total as CaCO3 (mg/L)	156.5	10.87811	145.5	158	166	142	168	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.2	0.267706	0.05	0.075	0.475	0.05	0.6	4
Anions (meq/L)	13.2	0.875595	12.375	13.25	13.975	12.3	14	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	190.75	13.37597	177.25	192.5	202.5	173	205	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	62.275	6.964374	57.55	59.65	69.625	57.4	72.4	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	13.05	1.066146	12.15	12.85	14.15	12	14.5	4
Chloride (mg/L)	10.5	0.57735	10	10.5	11	10	11	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1292.5	117.0114	1175	1305	1397.5	1140	1420	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	10.025	6.616835	5.025	8.2	16.85	4.2	19.5	4
Gross Beta-Dissolved (pCi/L)	10.75	0.974679	9.775	10.85	11.625	9.6	11.7	4
Gross Gamma-Dissolved (pCi/L)	1080	2146.672	2.5	10	3227.5		4300	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	3.835	1.025305		3.835		3.11	4.56	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	2.45	2.26495	0.5	2.3	4.55	0.5	4.7	4
Lead 210-Suspended (pCi/L)	0.325	0.35	-0.025	0.5	0.5	-0.2	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	24.5	3.742548	21.35	23.75	28.4	21	29.5	4

POWERTECH (USA) INC.

Well #13								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Manganese-Dissolved (mg/L)	0.165	0.047258	0.115	0.18	0.2	0.1	0.2	4
Manganese-Total (mg/L)	0.18	0.028284		0.18		0.16	0.2	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000288	0.000246	6.25E-05	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	230	30	200	230	260	200	260	3
pH	7.8975	0.13351	7.77	7.895	8.0275	7.75	8.05	4
Polonium 210-Dissolved (pCi/L)	0.9	1.334166	-0.325	0.8	2.225	-0.6	2.6	4
Polonium 210-Suspended (pCi/L)	1.55	2.444722	0.125	0.5	4.025		5.2	4
Polonium 210-Total (pCi/L)	5.2			5.2		5.2	5.2	1
Potassium-Dissolved (mg/L)	11.575	0.221736	11.35	11.6	11.775	11.3	11.8	4
Radium 226-Dissolved (pCi/L)	1.525	0.298608	1.225	1.6	1.75	1.1	1.8	4
Radium 226-Suspended (pCi/L)	0.4525	0.766176	0.0325	0.1	1.225	0.01	1.6	4
Radium 226-Total (pCi/L)	1.1			1.1		1.1	1.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	325	78.92401	258	305	412	258	412	3
Selenium-Dissolved (mg/L)	0.001	0.001	0.0005	0.0005	0.002	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6	1.726268	4.25	6.35	7.4	3.6	7.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	174.75	10.27538	165.5	174	184.75	163	188	4
Sodium Adsorption Ratio (SAR) (meq/L)	4.766667	0.11547	4.7	4.7	4.9	4.7	4.9	3
Solids-Total Dissolved Calculated (mg/L)	856	52.9591	800	872.5	895.5	781	898	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	877.5	18.92969	857.5	885	890	850	890	4
Strontium-Total (mg.L)	1.6	0.141421		1.6		1.5	1.7	2
Sulfate (mg/L)	487.25	32.95831	453.5	493.5	514.75	442	520	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0275	0.078899	0.9675	1.005	1.11	0.96	1.14	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.173205	0.025	0.1	0.325		0.4	4
Thorium 230-Suspended (pCi/L)	0.2	0.141421	0.1	0.15	0.35	0.1	0.4	4

POWERTECH (USA) INC.

Well #13								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015			0.00015		0.00015	0.00015	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.015	0.016833	0.005	0.0075	0.0325	0.005	0.04	4
Zinc-Total (mg/L)	0.055	0.021213		0.055		0.04	0.07	2

Powertech (USA) Inc.

Well #16					
Analyte	10/3/2006 12:00	9/27/2007 19:18	11/12/2007 16:05	3/30/2008 15:19	6/30/2008 13:45
A/C Balance (± 5) (%)		-2.85	-1.55	-2	4.63
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	160	158	148	148	150
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	<0.1	0.4	<0.1	<0.1	<0.1
Anions (meq/L)		11.8	11	12.5	11.5
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)				0.004	<0.002
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	193	180	180	183
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	770				
Bismuth precision (±) (pCi/L)	35				
Boron-Dissolved (mg/L)	0.12	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	140	108	103	113	125
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		11.1	10.7	12	12.6
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	6.2	5	5	5	4
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1260	1080	925	1050	1000
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.37	0.4	0.4	0.4	0.5
Gross Alpha precision (±) (pCi/L)	1.5				
Gross Alpha-Dissolved (pCi/L)	110	62.7	12.2	85.7	28.3
Gross Beta precision (±) (pCi/L)	2				
Gross Beta-Dissolved (pCi/L)	50	33.1	24	47.2	19.3
Gross Gamma precision(±) (pCi/L)	70				
Gross Gamma-Dissolved (pCi/L)	1600	<20	2300	600	760
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.25	0.26
Lead 210-Dissolved (pCi/L)		<1	2.2	-27	2

Well #16					
Analyte	**10/3/2006 12:00**	**9/27/2007 19:18**	**11/12/2007 16:05**	**3/30/2008 15:19**	**6/30/2008 13:45**
Lead 210-Suspended (pCi/L)		<1	1.2		-0.4
Lead 210-Total (pCi/L)		<1			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214 precision (±) (pCi/L)	35				
Lead 214-Dissolved (pCi/L)	810				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.003
Magnesium-Dissolved (mg/L)	55	40.7	39.4	46.8	47
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.19	0.16	<0.01	0.13	0.14
Manganese-Total (mg/L)				0.14	0.13
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.2	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			240	200	230
pH	7.44	7.43	7.48	7.57	7.38
Polonium 210-Dissolved (pCi/L)		<1	<1	0.2	
Polonium 210-Suspended (pCi/L)		<1	<1	0.8	
Polonium 210-Total (pCi/L)		<1			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	16	16.6	16	15.1	16.7
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	2.5				
Radium 226-Dissolved (pCi/L)	33.6	26.2	8.1	15.3	6.4
Radium 226-Suspended (pCi/L)		<0.2	<0.2	1.4	-0.3
Radium 226-Total (pCi/L)		17.4			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	252				
Radon 222-Total (pCi/L)	39000		1090	28200	3150
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	0.002
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.3	6.5	7	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			0.94	0.96	0.93
Sodium-Dissolved (mg/L)	53	44	44.1	48	48

Well #16					
Analyte	**10/3/2006 12:00**	**9/27/2007 19:18**	**11/12/2007 16:05**	**3/30/2008 15:19**	**6/30/2008 13:45**
Solids-Total Dissolved Calculated (mg/L)		715	686	786	743
Solids-Total Dissolved TDS @ 180 C (mg/L)	940	810	760	780	780
Strontium-Total (mg.L)				2.7	2.7
Sulfate (mg/L)	522	448	428	449	401
TDS Balance (0.80 - 1.20) (dec.%)		1.14	1.11	0.99	1.04
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		0.3	<0.2	0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	0.1	
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	0.002	0.0021	0.0007	0.0007	<0.0003
Uranium-Suspended (mg/L)		<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				0.0007	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	52				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	0.04	0.04	0.06	0.01	0.02
Zinc-Total (mg/L)				0.02	<0.03

POWERTECH (USA) INC.

Well #16								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-0.4425	3.424358	-2.6375	-1.775	3.085	-2.85	4.63	4
Alkalinity-Total as CaCO3 (mg/L)	151	4.760952	148	149	156	148	158	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.1375	0.175	0.05	0.05	0.3125	0.05	0.4	4
Anions (meq/L)	11.7	0.627163	11.125	11.65	12.325	11	12.5	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	184	6.164414	180	181.5	190.5	180	193	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	112.25	9.429563	104.25	110.5	122	103	125	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	11.6	0.860233	10.8	11.55	12.45	10.7	12.6	4
Chloride (mg/L)	4.75	0.5	4.25	5	5	4	5	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1013.75	67.74646	943.75	1025	1072.5	925	1080	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.425	0.05	0.4	0.4	0.475	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	47.225	33.1899	16.225	45.5	79.95	12.2	85.7	4
Gross Beta-Dissolved (pCi/L)	30.9	12.28414	20.475	28.55	43.675	19.3	47.2	4
Gross Gamma-Dissolved (pCi/L)	917.5	976.469	157.5	680	1915	10	2300	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.255	0.007071		0.255		0.25	0.26	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.001	0.000707		0.001		0.0005	0.0015	2
Lead 210-Dissolved (pCi/L)	-5.575	14.30347	-20.125	1.25	2.15	-27	2.2	4
Lead 210-Suspended (pCi/L)	0.325	0.689807	-0.3	0.25	1.025	-0.4	1.2	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	43.475	3.991136	39.725	43.75	46.95	39.4	47	4
Manganese-Dissolved (mg/L)	0.10875	0.070282	0.03625	0.135	0.155	0.005	0.16	4
Manganese-Total (mg/L)	0.135	0.007071		0.135		0.13	0.14	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.0003	0.000231	0.0001	0.0003	0.0005	0.0001	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05			0.05		0.05	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

POWERTECH (USA) INC.

Well #16								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	223.3333	20.81666	200	230	240	200	240	3
pH	7.465	0.081035	7.3925	7.455	7.5475	7.38	7.57	4
Polonium 210-Dissolved (pCi/L)	0.3	0.244949	0.05	0.35	0.5		0.5	4
Polonium 210-Suspended (pCi/L)	0.45	0.331662	0.125	0.5	0.725		0.8	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	16.1	0.734847	15.325	16.3	16.675	15.1	16.7	4
Radium 226-Dissolved (pCi/L)	14	9.001852	6.825	11.7	23.475	6.4	26.2	4
Radium 226-Suspended (pCi/L)	0.325	0.741058	-0.2	0.1	1.075	-0.3	1.4	4
Radium 226-Total (pCi/L)	17.4			17.4		17.4	17.4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	10813.33	15092.48	1090	3150	28200	1090	28200	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.175	1.552149	4.55	6.75	7.225	3.9	7.3	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	46.025	2.280899	44.025	46.05	48	44	48	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.943333	0.015275	0.93	0.94	0.96	0.93	0.96	3
Solids-Total Dissolved Calculated (mg/L)	732.5	42.58717	693.25	729	775.25	686	786	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	782.5	20.61553	765	780	802.5	760	810	4
Strontium-Total (mg.L)	2.7			2.7		2.7	2.7	2
Sulfate (mg/L)	431.5	22.51666	407.75	438	448.75	401	449	4
TDS Balance (0.80 - 1.20) (dec.%)	1.07	0.067823	1.0025	1.075	1.1325	0.99	1.14	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.129099	0.025	0.15	0.275		0.3	4
Thorium 230-Suspended (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.000913	0.000833	0.000288	0.0007	0.00175	0.00015	0.0021	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.000425	0.000389		0.000425		0.00015	0.0007	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.0325	0.022174	0.0125	0.03	0.055	0.01	0.06	4
Zinc-Total (mg/L)	0.0175	0.003536		0.0175		0.015	0.02	2

POWERTECH (USA) INC.

Well #18						
Analyte	**10/3/2006 10:07**	**9/26/2007 10:39**	**11/12/2007 10:15**	**11/12/2007 10:20**	**2/12/2008 11:08**	**5/30/2008 11:12**
A/C Balance (± 5) (%)		0.211	-0.239	-0.843	-1.77	5.45
Actinium 228-Dissolved (pCi/L)	<20					
Alkalinity-Total as $CaCO_3$ (mg/L)	180	184	176	172	180	180
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20					
Ammonia (mg/L)	0.2	0.2	0.2	0.2	0.2	0.1
Anions (meq/L)		14.7	15	15	15.2	14.2
Antimony-Total (mg/L)					<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	0.002	0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)					0.002	0.003
Barium 133-Dissolved (pCi/L)	<20					
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)					<0.1	<0.1
Beryllium-Total (mg/L)					<0.001	<0.001
Bicarbonate as HCO_3 (mg/L)	220	224	215	210	219	219
Bismuth 212-Dissolved (pCi/L)	<20					
Bismuth 214-Dissolved (pCi/L)	<20					
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)					<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.01	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)					<0.005	<0.005
Calcium-Dissolved (mg/L)	34	31.8	33	32.5	34	38
Carbonate as CO_3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)		14.8	15	14.7	14.7	15.8
Cesium 134-Dissolved (pCi/L)	<20					
Cesium 137-Dissolved (pCi/L)	<20					
Chloride (mg/L)	14	13	13	13	14	12
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)					<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20					
Conductivity @ 25 C (umhos/cm)	1430	1430	1360	1330	1450	1470
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)					<0.01	<0.01
Fluoride (mg/L)	0.38	0.4	0.4	0.4	0.5	0.4
Gross Alpha precision (±) (pCi/L)	1					
Gross Alpha-Dissolved (pCi/L)	37	15.7	18.9	20	31.7	27.5
Gross Beta precision (±) (pCi/L)	1.6					
Gross Beta-Dissolved (pCi/L)	14	6.7	12.1	13	13	4.8
Gross Gamma-Dissolved (pCi/L)	<20	510	370	330	190	
Iodine 125-Dissolved (pCi/L)	<20					
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)					1.04	1.11
Lead 210-Dissolved (pCi/L)		<1	4.6	<1	<1	-1

Well #18						
Analyte	**10/3/2006 10:07**	**9/26/2007 10:39**	**11/12/2007 10:15**	**11/12/2007 10:20**	**2/12/2008 11:08**	**5/30/2008 11:12**
Lead 210-Suspended (pCi/L)		<1	<1	<1	<1	29.6
Lead 210-Total (pCi/L)		<1				
Lead 212-Dissolved (pCi/L)	<20					
Lead 214-Dissolved (pCi/L)	<20					
Lead-Dissolved (mg/L)	<0.01	<0.05	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)					<0.001	<0.001
Magnesium-Dissolved (mg/L)	12	11.3	11.6	11.4	12.2	13.4
Manganese 54-Dissolved (pCi/L)	<20					
Manganese-Dissolved (mg/L)	0.06	0.06	0.06	0.06	0.07	0.06
Manganese-Total (mg/L)					0.06	0.06
Mercury-Dissolved (mg/L)		<0.0002	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001		<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)					<0.01	<0.1
Nickel-Dissolved (mg/L)	0.03	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)					<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5					
Oxidation-Reduction Potential (mV)			80	85	130	200
pH	8.11	8.09	8.02	8.06	8.11	8.1
Polonium 210-Dissolved (pCi/L)		<1	<1	<1	2.2	
Polonium 210-Suspended (pCi/L)		6	<1	<1	<1	1.7
Polonium 210-Total (pCi/L)		6				
Potassium 40-Dissolved (pCi/L)	<20					
Potassium-Dissolved (mg/L)	7	7.2	7	7	7.3	6.9
Radium 223-Dissolved (pCi/L)	<20					
Radium 224-Dissolved (pCi/L)	<20					
Radium 226 precision (±) (pCi/L)	1.2					
Radium 226-Dissolved (pCi/L)	5.8	<0.2	3.2	3.6	3.2	2.6
Radium 226-Suspended (pCi/L)		4	<0.2	<0.2	1.1	1.1
Radium 226-Total (pCi/L)		4				
Radium 228 precision (±) (pCi/L)	1.2					
Radium 228-Dissolved (pCi/L)	2.3					
Radon 222 precision (±) (pCi/L)	69.3					
Radon 222-Total (pCi/L)	762		945	944	1220	1210
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)					<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7	7.5	7.3	7.3	7.8	4.2
Silver-Dissolved (mg/L)	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)					<0.005	<0.005

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Well #18						
Analyte	**10/3/2006 10:07**	**9/26/2007 10:39**	**11/12/2007 10:15**	**11/12/2007 10:20**	**2/12/2008 11:08**	**5/30/2008 11:12**
Sodium Adsorption Ratio (SAR) (meq/L)			11	11	10	10
Sodium-Dissolved (mg/L)	260	278	280	276	270	291
Solids-Total Dissolved Calculated (mg/L)		965	994	988	1000	973
Solids-Total Dissolved TDS @ 180 C (mg/L)	950	990	960	950	960	940
Strontium-Total (mg.L)					0.6	0.7
Sulfate (mg/L)	481	513	534	536	537	492
TDS Balance (0.80 - 1.20) (dec.%)		1.03	0.97	0.97	0.96	0.96
Thallium 208-Dissolved (pCi/L)	<20					
Thallium-Total (mg/L)					<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20					
Thorium 230-Dissolved (pCi/L)		<0.2	<0.2	<0.2	0.2	
Thorium 230-Suspended (pCi/L)		<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)		<0.2				
Thorium 232-Dissolved (pCi/L)		<0.001	<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20					
Uranium 238-Dissolved (pCi/L)	<20					
Uranium-Dissolved (mg/L)	0.007	0.0061	0.0066	0.0065	0.0066	0.0059
Uranium-Suspended (mg/L)		0.0017	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)					0.0062	0.0062
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	52					
Zinc 65-Dissolved (pCi/L)	<20					
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)					<0.01	<0.01

Well #18								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.5618	2.831501	-1.3065	-0.239	2.8305	-1.77	5.45	5
Alkalinity-Total as CaCO3 (mg/L)	178.4	4.560702	174	180	182	172	184	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.18	0.044721	0.15	0.2	0.2	0.1	0.2	5
Anions (meq/L)	14.82	0.389872	14.45	15	15.1	14.2	15.2	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0012	0.000447	0.001	0.001	0.0015	0.001	0.002	5
Arsenic-Total (mg/L)	0.0025	0.000707		0.0025		0.002	0.003	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	217.4	5.22494	212.5	219	221.5	210	224	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	33.86	2.449081	32.15	33	36	31.8	38	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	15	0.463681	14.7	14.8	15.4	14.7	15.8	5
Chloride (mg/L)	13	0.707107	12.5	13	13.5	12	14	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1408	60.16644	1345	1430	1460	1330	1470	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.42	0.044721	0.4	0.4	0.45	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	22.76	6.60969	17.3	20	29.6	15.7	31.7	5
Gross Beta-Dissolved (pCi/L)	9.92	3.882911	5.75	12.1	13	4.8	13	5
Gross Gamma-Dissolved (pCi/L)	280	193.6492	95	330	440		510	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	1.075	0.049497		1.075		1.04	1.11	2
Lead-Dissolved (mg/L)	0.0054	0.010957	0.0005	0.0005	0.01275	0.0005	0.025	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.02	2.104044	-0.25	0.5	2.55	-1	4.6	5
Lead 210-Suspended (pCi/L)	6.32	13.01392	0.5	0.5	15.05	0.5	29.6	5

Well #18								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	11.98	0.867179	11.35	11.6	12.8	11.3	13.4	5
Manganese-Dissolved (mg/L)	0.062	0.004472	0.06	0.06	0.065	0.06	0.07	5
Manganese-Total (mg/L)	0.06			0.06		0.06	0.06	2
Mercury-Dissolved (mg/L)	0.00042	0.000179	0.0003	0.0005	0.0005	0.0001	0.0005	5
Mercury-Total (mg/L)	0.000388	0.000225	0.000163	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	123.75	55.58402	81.25	107.5	182.5	80	200	4
pH	8.076	0.036469	8.04	8.09	8.105	8.02	8.11	5
Polonium 210-Dissolved (pCi/L)	0.74	0.844393	0.25	0.5	1.35		2.2	5
Polonium 210-Suspended (pCi/L)	1.84	2.382855	0.5	0.5	3.85	0.5	6	5
Polonium 210-Total (pCi/L)	6			6		6	6	1
Potassium-Dissolved (mg/L)	7.08	0.164317	6.95	7	7.25	6.9	7.3	5
Radium 226-Dissolved (pCi/L)	2.54	1.409965	1.35	3.2	3.4	0.1	3.6	5
Radium 226-Suspended (pCi/L)	1.28	1.600625	0.1	1.1	2.55	0.1	4	5
Radium 226-Total (pCi/L)	4			4		4	4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1079.75	156.2271	944.25	1077.5	1217.5	944	1220	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	6.82	1.478851	5.75	7.3	7.65	4.2	7.8	5
Silver-Dissolved (mg/L)	0.003	0.001118	0.0025	0.0025	0.00375	0.0025	0.005	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	279	7.681146	273	278	285.5	270	291	5
Sodium Adsorption Ratio (SAR) (meq/L)	10.5	0.57735	10	10.5	11	10	11	4
Solids-Total Dissolved Calculated (mg/L)	984	14.61164	969	988	997	965	1000	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	960	18.70829	945	960	975	940	990	5
Strontium-Total (mg.L)	0.65	0.070711		0.65		0.6	0.7	2
Sulfate (mg/L)	522.4	19.65452	502.5	534	536.5	492	537	5
TDS Balance (0.80 - 1.20) (dec.%)	0.978	0.0294	0.96	0.97	1	0.96	1.03	5

Well #18								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
		96						
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1	0.070711	0.05	0.1	0.15		0.2	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Uranium-Dissolved (mg/L)	0.00634	0.000321	0.006	0.0065	0.0066	0.0059	0.0066	5
Uranium-Suspended (mg/L)	0.00046	0.000693	0.00015	0.00015	0.000925	0.00015	0.0017	5
Uranium-Total (mg/L)	0.0062			0.0062		0.0062	0.0062	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Well #42					
Analyte	**10/3/2006 10:18**	**9/28/2007 11:34**	**11/12/2007 11:20**	**2/5/2008 14:10**	**5/30/2008 11:55**
A/C Balance (± 5) (%)		-1.32	-0.342	3.65	6.08
Actinium 228-Dissolved (pCi/L)	<20				
Alkalinity-Total as CaCO3 (mg/L)	180	180	174	180	176
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Americium 241-Dissolved (pCi/L)	<20				
Ammonia (mg/L)	0.2	0.1	0.1	0.1	0.1
Anions (meq/L)		13.3	14.7	14.5	13.6
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.01	<0.001	<0.001	0.001	<0.001
Arsenic-Total (mg/L)				0.002	0.004
Barium 133-Dissolved (pCi/L)	<20				
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	220	219	212	219	215
Bismuth 212-Dissolved (pCi/L)	<20				
Bismuth 214-Dissolved (pCi/L)	1600				
Bismuth precision (±) (pCi/L)	64				
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.001	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.005
Calcium-Dissolved (mg/L)	35	30	34	35.3	39.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)		13	14.6	15.6	15.3
Cesium 134-Dissolved (pCi/L)	<20				
Cesium 137-Dissolved (pCi/L)	<20				
Chloride (mg/L)	14	12	13	12	11
Chromium-Dissolved (mg/L)	<0.01	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Cobalt 60-Dissolved (pCi/L)	<20				
Conductivity @ 25 C (umhos/cm)	1410	1390	1310	1420	1510
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.39	0.4	0.4	0.4	0.4
Gross Alpha precision (±) (pCi/L)	3.2				
Gross Alpha-Dissolved (pCi/L)	560	371	375	526	558
Gross Beta precision (±) (pCi/L)	2.7				
Gross Beta-Dissolved (pCi/L)	110	122	173	93.5	159
Gross Gamma precision(±) (pCi/L)	130				
Gross Gamma-Dissolved (pCi/L)	3400	1300	70000	2800	150
Iodine 125-Dissolved (pCi/L)	<20				
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				0.15	0.16
Lead 210-Dissolved (pCi/L)		<1	21	15	17.8

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Well #42					
Analyte	**10/3/2006 10:18**	**9/28/2007 11:34**	**11/12/2007 11:20**	**2/5/2008 14:10**	**5/30/2008 11:55**
Lead 210-Suspended (pCi/L)		57	<1	17	14
Lead 210-Total (pCi/L)		57			
Lead 212-Dissolved (pCi/L)	<20				
Lead 214 precision (±) (pCi/L)	70				
Lead 214-Dissolved (pCi/L)	1800				
Lead-Dissolved (mg/L)	<0.01	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)				<0.001	<0.001
Magnesium-Dissolved (mg/L)	12	9.4	11.8	12.3	13.5
Manganese 54-Dissolved (pCi/L)	<20				
Manganese-Dissolved (mg/L)	0.08	0.06	0.08	0.09	0.08
Manganese-Total (mg/L)				0.08	0.08
Mercury-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.005	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)				<0.01	<0.1
Nickel-Dissolved (mg/L)	0.02	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)				<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)		<0.1	0.2	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Non-polar organic materials (SGT-HEM) (mg/l)	<5				
Oxidation-Reduction Potential (mV)			240	170	200
pH	8.01	8.02	7.95	8.08	8.05
Polonium 210-Dissolved (pCi/L)		<1	<1	5.5	1.6
Polonium 210-Suspended (pCi/L)		13	1.1	2	0.3
Polonium 210-Total (pCi/L)		13			
Potassium 40-Dissolved (pCi/L)	<20				
Potassium-Dissolved (mg/L)	7	7.1	7.2	7.8	6.8
Radium 223-Dissolved (pCi/L)	<20				
Radium 224-Dissolved (pCi/L)	<20				
Radium 226 precision (±) (pCi/L)	3.1				
Radium 226-Dissolved (pCi/L)	87.6	96.5	102	100	100
Radium 226-Suspended (pCi/L)		<0.2	<0.2	5.1	-0.3
Radium 226-Total (pCi/L)		79.7			
Radium 228-Dissolved (pCi/L)	<1				
Radon 222 precision (±) (pCi/L)	581				
Radon 222-Total (pCi/L)	197000		132000	175000	219000
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	0.001	<0.001
Selenium-IV-Dissolved (mg/L)			<0.001	<0.001	<0.001
Selenium-Total (mg/L)				<0.001	<0.001
Selenium-VI-Dissolved (mg/L)			<0.001	0.001	<0.001
Silica-Dissolved (mg/L)	7	7.1	7.2	7.4	4.1
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)				<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)			10	11	9.7
Sodium-Dissolved (mg/L)	250	242	270	289	277

POWERTECH (USA) INC.

Well #42					
Analyte	**10/3/2006 10:18**	**9/28/2007 11:34**	**11/12/2007 11:20**	**2/5/2008 14:10**	**5/30/2008 11:55**
Solids-Total Dissolved Calculated (mg/L)		858	969	971	932
Solids-Total Dissolved TDS @ 180 C (mg/L)	940	960	940	980	930
Strontium-Total (mg.L)				0.7	0.7
Sulfate (mg/L)	473	505	519	505	466
TDS Balance (0.80 - 1.20) (dec.%)		1.12	0.97	1.01	1
Thallium 208-Dissolved (pCi/L)	<20				
Thallium-Total (mg/L)				<0.001	<0.001
Thorium 228-Dissolved (pCi/L)	<20				
Thorium 230-Dissolved (pCi/L)		<0.2	0.5	<0.2	0.1
Thorium 230-Suspended (pCi/L)		<0.2	0.2	<0.2	
Thorium 230-Total (pCi/L)		<0.2			
Thorium 232-Dissolved (pCi/L)		<0.005	<0.005	<0.005	<0.005
Thorium 234-Dissolved (pCi/L)	<20				
Uranium 238-Dissolved (pCi/L)	<20				
Uranium-Dissolved (mg/L)	0.04	0.015	0.0324	0.0194	0.0142
Uranium-Suspended (mg/L)		0.0029	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)				0.0198	0.0149
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Water Temperature (lab, deg F)	53				
Zinc 65-Dissolved (pCi/L)	<20				
Zinc-Dissolved (mg/L)	<0.01	0.01	0.03	0.02	0.02
Zinc-Total (mg/L)				0.03	0.02

POWERTECH (USA) INC.

Well #42								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	2.017	3.458088	-1.0755	1.654	5.4725	-1.32	6.08	4
Alkalinity-Total as CaCO3 (mg/L)	177.5	3	174.5	178	180	174	180	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Anions (meq/L)	14.025	0.680074	13.375	14.05	14.65	13.3	14.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.003	0.001414		0.003		0.002	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	216.25	3.40343	212.75	217	219	212	219	4
Boron-Dissolved (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	34.675	3.874167	31	34.65	38.375	30	39.4	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	14.625	1.161536	13.4	14.95	15.525	13	15.6	4
Chloride (mg/L)	12	0.816497	11.25	12	12.75	11	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1407.5	82.61356	1330	1405	1487.5	1310	1510	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Gross Alpha-Dissolved (pCi/L)	457.5	98.45642	372	450.5	550	371	558	4
Gross Beta-Dissolved (pCi/L)	136.875	36.04251	100.625	140.5	169.5	93.5	173	4
Gross Gamma-Dissolved (pCi/L)	18562.5	34308.83	437.5	2050	53200	150	70000	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.155	0.007071		0.155		0.15	0.16	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	13.575	9.054787	4.125	16.4	20.2	0.5	21	4
Lead 210-Suspended (pCi/L)	22.125	24.33233	3.875	15.5	47	0.5	57	4
Lead 210-Total (pCi/L)	57			57		57	57	1
Magnesium-Dissolved (mg/L)	11.75	1.721434	10	12.05	13.2	9.4	13.5	4

POWERTECH (USA) INC.

Well #42								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Manganese-Dissolved (mg/L)	0.0775	0.012583	0.065	0.08	0.0875	0.06	0.09	4
Manganese-Total (mg/L)	0.08			0.08		0.08	0.08	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000288	0.000246	6.25E-05	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	203.3333	35.11885	170	200	240	170	240	3
pH	8.025	0.055678	7.9675	8.035	8.0725	7.95	8.08	4
Polonium 210-Dissolved (pCi/L)	2.025	2.373991	0.5	1.05	4.525	0.5	5.5	4
Polonium 210-Suspended (pCi/L)	4.1	5.973832	0.5	1.55	10.25	0.3	13	4
Polonium 210-Total (pCi/L)	13			13		13	13	1
Potassium-Dissolved (mg/L)	7.225	0.419325	6.875	7.15	7.65	6.8	7.8	4
Radium 226-Dissolved (pCi/L)	99.625	2.286737	97.375	100	101.5	96.5	102	4
Radium 226-Suspended (pCi/L)	1.25	2.573584	-0.2	0.1	3.85	-0.3	5.1	4
Radium 226-Total (pCi/L)	79.7			79.7		79.7	79.7	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	175333.3	43500.96	132000	175000	219000	132000	219000	3
Selenium-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Silica-Dissolved (mg/L)	6.45	1.571623	4.85	7.15	7.35	4.1	7.4	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	269.5	19.94158	249	273.5	286	242	289	4
Sodium Adsorption Ratio (SAR) (meq/L)	10.23333	0.680686	9.7	10	11	9.7	11	3
Solids-Total Dissolved Calculated (mg/L)	932.5	52.80467	876.5	950.5	970.5	858	971	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	952.5	22.17356	932.5	950	975	930	980	4
Strontium-Total (mg.L)	0.7			0.7		0.7	0.7	2
Sulfate (mg/L)	498.75	22.80899	475.75	505	515.5	466	519	4
TDS Balance (0.80 - 1.20) (dec.%)	1.025	0.065574	0.9775	1.005	1.0925	0.97	1.12	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.2	0.2	0.1	0.1	0.4	0.1	0.5	4

Well #42								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Thorium 230-Suspended (pCi/L)	0.1	0.08165	0.025	0.1	0.175		0.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.02025	0.008416	0.0144	0.0172	0.02915	0.0142	0.0324	4
Uranium-Suspended (mg/L)	0.000838	0.001375	0.00015	0.00015	0.002213	0.00015	0.0029	4
Uranium-Total (mg/L)	0.01735	0.003465		0.01735		0.0149	0.0198	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.02	0.008165	0.0125	0.02	0.0275	0.01	0.03	4
Zinc-Total (mg/L)	0.025	0.007071		0.025		0.02	0.03	2

POWERTECH (USA) INC.

Well# 615					
Analyte	**4/1/2008 14:34**	**4/1/2008 14:42**	**4/21/2008 16:16**	**5/28/2008 19:20**	**6/25/2008 13:55**
A/C Balance (± 5) (%)	1.45	2.22	4.26	3	2.39
Alkalinity-Total as CaCO3 (mg/L)	136	138	136	138	138
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	10.8	10.7	10.6	11.2	10.6
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.02	0.019	0.02	0.013	0.016
Arsenic-Total (mg/L)	0.024	0.025	0.024	0.024	0.024
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	166	168	166	168	168
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	70.9	71.1	73	79.2	71.8
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	11.1	11.2	11.5	11.9	11.1
Chloride (mg/L)	6	6	4	5	5
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1050	1050	1040	1050	1110
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.5	0.4	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	18.2	17.7	15.1	15.3	38.3
Gross Beta-Dissolved (pCi/L)	11.6	5.8	12.1	3.7	12.6
Gross Gamma-Dissolved (pCi/L)				170	
Iron-Dissolved (mg/L)	0.7	0.66	0.79	0.1	0.42
Iron-Total (mg/L)	1.35	1.4	1.35	1.4	1.5
Lead 210-Dissolved (pCi/L)	-2.5	-13.8		3.8	1.1
Lead 210-Suspended (pCi/L)	27.1	12.8	-3.2	1.5	3.5
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0.002	0.002	<0.001	<0.001	0.013
Magnesium-Dissolved (mg/L)	21.7	21.9	22.9	23.2	21.6
Manganese-Dissolved (mg/L)	0.08	0.08	0.07	0.07	0.07
Manganese-Total (mg/L)	0.08	0.08	0.07	0.07	0.07
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05

Powertech (USA) Inc.

Well# 615					
Analyte	**4/1/2008 14:34**	**4/1/2008 14:42**	**4/21/2008 16:16**	**5/28/2008 19:20**	**6/25/2008 13:55**
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	0.06	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	210	210	300	200	140
pH	7.36	7.34	7.43	7.16	7.48
Polonium 210-Dissolved (pCi/L)	0.6	0.8	0.9	-0.1	0.5
Polonium 210-Suspended (pCi/L)	0.4	0.9	0.4		
Potassium-Dissolved (mg/L)	8.7	8.6	8.7	9	8.7
Radium 226-Dissolved (pCi/L)	1.8	2.3	2	2	7.2
Radium 226-Suspended (pCi/L)	0.3		-0.2	0.2	-0.4
Radon 222-Total (pCi/L)	1490	1250	1180	1070	1830
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.6	7.6	7.8	4.4	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.4	3.4	3.5	3.4	3.4
Sodium-Dissolved (mg/L)	127	128	132	134	127
Solids-Total Dissolved Calculated (mg/L)	715	710	715	745	696
Solids-Total Dissolved TDS @ 180 C (mg/L)	670	680	750	710	680
Strontium-Total (mg.L)	1.3	1.3	1.4	1.4	1.4
Sulfate (mg/L)	378	370	371	399	369
TDS Balance (0.80 - 1.20) (dec.%)	0.94	0.95	1.05	0.95	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2				
Thorium 230-Suspended (pCi/L)	0.9	0.2	0.1	0.1	0.1
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0026	0.0026	0.0025	0.0024	0.0024
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0026	0.0025	0.0025	0.0025	0.0023
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	0.02	0.02	<0.01	<0.01	<0.01

Powertech (USA) Inc.

Well #619				
Analyte	**9/27/2007 17:45**	**11/12/2007 14:25**	**3/24/2008 15:40**	**6/17/2008 18:10**
A/C Balance (± 5) (%)	-1.34	-2.56	3.41	9.08
Alkalinity-Total as CaCO3 (mg/L)	140	98	116	116
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.3	0.2	0.2
Anions (meq/L)	28.7	26.8	29.9	28.3
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	0.001
Arsenic-Total (mg/L)			0.002	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	171	119	141	141
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)			<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.005
Calcium-Dissolved (mg/L)	304	263	343	375
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	27.9	25.5	32	34
Chloride (mg/L)	9	10	12	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2270	1860	2180	2390
Copper-Dissolved (mg/L)	0.08	<0.01	<0.01	0.01
Copper-Total (mg/L)			<0.01	0.01
Fluoride (mg/L)	0.2	0.2	0.3	0.3
Gross Alpha-Dissolved (pCi/L)	367	341	438	398
Gross Beta-Dissolved (pCi/L)	117	170	175	144
Gross Gamma-Dissolved (pCi/L)	120	4200	25	270
Iron-Dissolved (mg/L)	1.95	4.39	3.22	3.03
Iron-Total (mg/L)			11.9	13
Lead 210-Dissolved (pCi/L)	<1	<1	19	-1.1
Lead 210-Suspended (pCi/L)	<1	<1	11	2
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	0.008	<0.001	<0.001	0.002
Lead-Total (mg/L)			0.005	0.002
Magnesium-Dissolved (mg/L)	106	96.4	125	129
Manganese-Dissolved (mg/L)	1.51	1.15	1.62	1.74
Manganese-Total (mg/L)			1.82	1.65
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1

Powertech (USA) Inc.

Well #619				
Analyte	9/27/2007 17:45	11/12/2007 14:25	3/24/2008 15:40	6/17/2008 18:10
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		25	-80.2	150
pH	7.03	7.03	7.25	7.82
Polonium 210-Dissolved (pCi/L)	<1	<1	1.9	-0.1
Polonium 210-Suspended (pCi/L)	<1	<1	0.1	0.4
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	16.9	16.2	16.5	17.6
Radium 226-Dissolved (pCi/L)	120	100	99.7	110
Radium 226-Suspended (pCi/L)	<0.2	3.5	11.4	8.8
Radium 226-Total (pCi/L)	120			
Radon 222-Total (pCi/L)		2990	5580	5770
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.5	6	8	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.2	1.1	1
Sodium-Dissolved (mg/L)	80	86.1	90.3	90
Solids-Total Dissolved Calculated (mg/L)	1830	1720	1980	1940
Solids-Total Dissolved TDS @ 180 C (mg/L)	2100	1900	2100	2000
Strontium-Total (mg.L)			5.2	5.4
Sulfate (mg/L)	1440	1180	1310	1230
TDS Balance (0.80 - 1.20) (dec.%)	1.14	1.09	1.05	1.02
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.5	<0.2		
Thorium 230-Suspended (pCi/L)	<0.2	0.2	0.2	
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.002	0.0015	0.0015	0.0016
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0018	0.0018
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.11	0.07	0.03	0.03
Zinc-Total (mg/L)			0.18	0.08

POWERTECH (USA) INC.

Well #622				
Analyte	**4/1/2008 14:56**	**4/21/2008 15:28**	**5/28/2008 18:26**	**6/25/2008 12:05**
A/C Balance (± 5) (%)	-18.5	3.01	5.53	3.53
Alkalinity-Total as CaCO3 (mg/L)	164	180	178	178
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	13.4	14	14.1	13.9
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.001	0.006	0.006	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	0.2	0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	200	219	217	217
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	11.2	87.6	97.5	89.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	9.23	14.9	15.8	14.9
Chloride (mg/L)	12	10	10	10
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1260	1330	1220	1410
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	15	22.6	32.6	36.4
Gross Beta-Dissolved (pCi/L)	9.2	16.2	11.9	22.5
Gross Gamma-Dissolved (pCi/L)			150	
Iron-Dissolved (mg/L)	<0.03	0.03	<0.03	<0.03
Iron-Total (mg/L)	0.96	7.34	10.7	5.17
Lead 210-Dissolved (pCi/L)	-3.5	-4.1	1.2	-2
Lead 210-Suspended (pCi/L)			-0.9	3.5
Lead-Dissolved (mg/L)	<0.001	0.001	0.001	<0.001
Lead-Total (mg/L)	0.004	0.026	0.023	0.03
Magnesium-Dissolved (mg/L)	7.1	32	32.7	31.2
Manganese-Dissolved (mg/L)	0.02	0.18	0.2	0.19
Manganese-Total (mg/L)	0.02	0.23	0.25	0.22
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05

POWERTECH (USA) INC.

Well #622				
Analyte	**4/1/2008 14:56**	**4/21/2008 15:28**	**5/28/2008 18:26**	**6/25/2008 12:05**
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	0.08	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	200	340	200	240
pH	8.15	7.85	7.52	7.95
Polonium 210-Dissolved (pCi/L)	0.8	1.1	-0.3	0.2
Polonium 210-Suspended (pCi/L)		2.8	2.5	1
Potassium-Dissolved (mg/L)	11.3	10.3	10.6	10.2
Radium 226-Dissolved (pCi/L)	2.3	2.7	3.2	4.1
Radium 226-Suspended (pCi/L)	0.7	0.9	1	-0.2
Radon 222-Total (pCi/L)	501	1090	804	1950
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	1.2	7.5	4	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	11	4.1	4.1	4
Sodium-Dissolved (mg/L)	179	175	182	174
Solids-Total Dissolved Calculated (mg/L)	793	931	944	914
Solids-Total Dissolved TDS @ 180 C (mg/L)	800	940	890	900
Strontium-Total (mg.L)	<0.1	1.6	1.6	1.6
Sulfate (mg/L)	470	487	493	481
TDS Balance (0.80 - 1.20) (dec.%)	1.01	1.01	0.95	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.1			
Thorium 230-Suspended (pCi/L)	0.2	0.1	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.0054	0.0056	0.0051
Uranium-Suspended (mg/L)	<0.0003	0.0008	0.0005	<0.0003
Uranium-Total (mg/L)	<0.0003	0.0065	0.0068	0.0059
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	0.01
Zinc-Total (mg/L)	0.03	0.22	0.25	0.13

Powertech (USA) Inc.

Well #622								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.6075	11.31394	-13.1225	3.27	5.03	-18.5	5.53	4
Alkalinity-Total as CaCO3 (mg/L)	175	7.393691	167.5	178	179.5	164	180	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	13.85	0.310913	13.525	13.95	14.075	13.4	14.1	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.00425	0.002363	0.00175	0.005	0.006	0.001	0.006	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	213.25	8.883505	204.25	217	218.5	200	219	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	71.475	40.41001	30.3	88.6	95.525	11.2	97.5	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	13.7075	3.015	10.6475	14.9	15.575	9.23	15.8	4
Chloride (mg/L)	10.5	1	10	10	11.5	10	12	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1305	83.46656	1230	1295	1390	1220	1410	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.375	0.05	0.325	0.4	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	26.65	9.705497	16.9	27.6	35.45	15	36.4	4
Gross Beta-Dissolved (pCi/L)	14.95	5.800287	9.875	14.05	20.925	9.2	22.5	4
Gross Gamma-Dissolved (pCi/L)	37.5	75			112.5		150	4
Iron-Dissolved (mg/L)	0.01875	0.0075	0.015	0.015	0.02625	0.015	0.03	4
Iron-Total (mg/L)	6.0425	4.081212	2.0125	6.255	9.86	0.96	10.7	4
Lead-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Lead-Total (mg/L)	0.02075	0.011529	0.00875	0.0245	0.029	0.004	0.03	4
Lead 210-Dissolved (pCi/L)	-2.1	2.370654	-3.95	-2.75	0.4	-4.1	1.2	4
Lead 210-Suspended (pCi/L)	0.65	1.946792	-0.675		2.625	-0.9	3.5	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	25.75	12.44843	13.125	31.6	32.525	7.1	32.7	4
Manganese-Dissolved (mg/L)	0.1475	0.085391	0.06	0.185	0.1975	0.02	0.2	4
Manganese-Total (mg/L)	0.18	0.107393	0.07	0.225	0.245	0.02	0.25	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

Powertech (USA) Inc.

Well #622								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.0575	0.015	0.05	0.05	0.0725	0.05	0.08	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	245	66.08076	200	220	315	200	340	4
pH	7.8675	0.263106	7.6025	7.9	8.1	7.52	8.15	4
Polonium 210-Dissolved (pCi/L)	0.45	0.6245	-0.175	0.5	1.025	-0.3	1.1	4
Polonium 210-Suspended (pCi/L)	1.575	1.31244	0.25	1.75	2.725		2.8	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	10.6	0.496655	10.225	10.45	11.125	10.2	11.3	4
Radium 226-Dissolved (pCi/L)	3.075	0.776209	2.4	2.95	3.875	2.3	4.1	4
Radium 226-Suspended (pCi/L)	0.6	0.547723	0.025	0.8	0.975	-0.2	1	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1086.25	624.0355	576.75	947	1735	501	1950	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	4.15	2.582634	1.875	3.95	6.625	1.2	7.5	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	177.5	3.696846	174.25	177	181.25	174	182	4
Sodium Adsorption Ratio (SAR) (meq/L)	5.8	3.466987	4.025	4.1	9.275	4	11	4
Solids-Total Dissolved Calculated (mg/L)	895.5	69.42862	823.25	922.5	940.75	793	944	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	882.5	59.09033	822.5	895	930	800	940	4
Strontium-Total (mg.L)	1.2125	0.775	0.4375	1.6	1.6	0.05	1.6	4
Sulfate (mg/L)	482.75	9.810708	472.75	484	491.5	470	493	4
TDS Balance (0.80 - 1.20) (dec.%)	0.99	0.028284	0.96	1	1.01	0.95	1.01	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.025	0.05			0.075		0.1	4
Thorium 230-Suspended (pCi/L)	0.1	0.08165	0.025	0.1	0.175		0.2	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.004063	0.002616	0.001388	0.00525	0.00555	0.00015	0.0056	4
Uranium-Suspended (mg/L)	0.0004	0.000314	0.00015	0.000325	0.000725	0.00015	0.0008	4
Uranium-Total (mg/L)	0.004838	0.003147	0.001588	0.0062	0.006725	0.00015	0.0068	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.1575	0.099121	0.055	0.175	0.2425	0.03	0.25	4

POWERTECH (USA) INC.

Well #628				
Analyte	9/28/2007 9:23	11/14/2007 10:59	2/20/2008 18:30	5/29/2008 15:02
A/C Balance (± 5) (%)	-4.9	-1.74	0.362	5.86
Alkalinity-Total as CaCO3 (mg/L)	134	160	162	160
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.6	0.2	0.2	0.2
Anions (meq/L)	23.5	14.4	17.6	15.2
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.001
Arsenic-Total (mg/L)			0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	154	195	193	195
Boron-Dissolved (mg/L)	0.4	<0.1	0.2	0.2
Boron-Total (mg/L)			<0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	24	43.2	50	40.1
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	21.3	13.9	17.8	17
Chloride (mg/L)	82	35	29	42
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2490	1800	1510	1640
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.5	0.4	0.4	0.5
Gross Alpha-Dissolved (pCi/L)	29.9	83.9	64.5	39
Gross Beta-Dissolved (pCi/L)	14	47.1	19	11.4
Gross Gamma-Dissolved (pCi/L)	<20	1100	440	260
Iron-Dissolved (mg/L)	0.11	<0.03	<0.03	<0.03
Iron-Total (mg/L)			0.7	0.66
Lead 210-Dissolved (pCi/L)	<1	<1	14	0.1
Lead 210-Suspended (pCi/L)	<1	<1	1.2	0.5
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	11.4	16.9	20.6	17.5
Manganese-Dissolved (mg/L)	0.06	0.15	0.09	0.08
Manganese-Total (mg/L)			0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05

Powertech (USA) Inc.

Well #628				
Analyte	9/28/2007 9:23	11/14/2007 10:59	2/20/2008 18:30	5/29/2008 15:02
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		96	110	180
pH	8.66	7.77	8.32	8.21
Polonium 210-Dissolved (pCi/L)	<1	2.7	1.3	-0.5
Polonium 210-Suspended (pCi/L)	6.4	<1	<1	0.1
Polonium 210-Total (pCi/L)	6.4			
Potassium-Dissolved (mg/L)	8.8	8.5	9.3	8.2
Radium 226-Dissolved (pCi/L)	7.4	20.7	9	6.1
Radium 226-Suspended (pCi/L)	<0.2		1.7	-0.3
Radium 226-Total (pCi/L)	6.8			
Radon 222-Total (pCi/L)		2740	4360	5040
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	4.5	7.2	5	4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		7.6	9.2	10
Sodium-Dissolved (mg/L)	435	233	306	307
Solids-Total Dissolved Calculated (mg/L)	1530	923	1180	1040
Solids-Total Dissolved TDS @ 180 C (mg/L)	1800	1300	920	980
Strontium-Total (mg.L)			0.9	0.9
Sulfate (mg/L)	1030	635	651	515
TDS Balance (0.80 - 1.20) (dec.%)	1.15	1.44	0.78	0.95
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	<0.2	0.3	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0017	0.0034	0.003	0.0027
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0031	0.0029
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

POWERTECH (USA) INC.

Well #628								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-0.1045	4.526388	-4.11	-0.689	4.4855	-4.9	5.86	4
Alkalinity-Total as CaCO3 (mg/L)	154	13.36663	140.5	160	161.5	134	162	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.3	0.2	0.2	0.2	0.5	0.2	0.6	4
Anions (meq/L)	17.675	4.114507	14.6	16.4	22.025	14.4	23.5	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	184.25	20.18869	163.75	194	195	154	195	4
Boron-Dissolved (mg/L)	0.2125	0.143614	0.0875	0.2	0.35	0.05	0.4	4
Boron-Total (mg/L)	0.075	0.035355		0.075		0.05	0.1	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	39.325	11.02161	28.025	41.65	48.3	24	50	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	17.5	3.040833	14.675	17.4	20.425	13.9	21.3	4
Chloride (mg/L)	47	23.93045	30.5	38.5	72	29	82	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1860	436.4249	1542.5	1720	2317.5	1510	2490	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Gross Alpha-Dissolved (pCi/L)	54.325	24.56045	32.175	51.75	79.05	29.9	83.9	4
Gross Beta-Dissolved (pCi/L)	22.875	16.45507	12.05	16.5	40.075	11.4	47.1	4
Gross Gamma-Dissolved (pCi/L)	452.5	466.2885	72.5	350	935	10	1100	4
Iron-Dissolved (mg/L)	0.03875	0.0475	0.015	0.015	0.08625	0.015	0.11	4
Iron-Total (mg/L)	0.68	0.028284		0.68		0.66	0.7	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	3.775	6.819274	0.2	0.5	10.625	0.1	14	4
Lead 210-Suspended (pCi/L)	0.675	0.35	0.5	0.5	1.025	0.5	1.2	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	16.6	3.827096	12.775	17.2	19.825	11.4	20.6	4
Manganese-Dissolved (mg/L)	0.095	0.03873	0.065	0.085	0.135	0.06	0.15	4
Manganese-Total (mg/L)	0.085	0.007071		0.085		0.08	0.09	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

Well #628								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	128.6667	45.0037	96	110	180	96	180	3
pH	8.24	0.367242	7.88	8.265	8.575	7.77	8.66	4
Polonium 210-Dissolved (pCi/L)	1	1.351542	-0.25	0.9	2.35	-0.5	2.7	4
Polonium 210-Suspended (pCi/L)	1.875	3.022554	0.2	0.5	4.925	0.1	6.4	4
Polonium 210-Total (pCi/L)	6.4			6.4		6.4	6.4	1
Potassium-Dissolved (mg/L)	8.7	0.469042	8.275	8.65	9.175	8.2	9.3	4
Radium 226-Dissolved (pCi/L)	10.8	6.705719	6.425	8.2	17.775	6.1	20.7	4
Radium 226-Suspended (pCi/L)	0.5	1.058301	-0.3	0.1	1.7	-0.3	1.7	3
Radium 226-Total (pCi/L)	6.8			6.8		6.8	6.8	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	4046.667	1181.581	2740	4360	5040	2740	5040	3
Selenium-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	5.175	1.410378	4.125	4.75	6.65	4	7.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	320.25	83.98164	251.25	306.5	403	233	435	4
Sodium Adsorption Ratio (SAR) (meq/L)	8.933333	1.22202	7.6	9.2	10	7.6	10	3
Solids-Total Dissolved Calculated (mg/L)	1168.25	263.0569	952.25	1110	1442.5	923	1530	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1250	402.8234	935	1140	1675	920	1800	4
Strontium-Total (mg.L)	0.9			0.9		0.9	0.9	2
Sulfate (mg/L)	707.75	223.2418	545	643	935.25	515	1030	4
TDS Balance (0.80 - 1.20) (dec.%)	1.08	0.283666	0.8225	1.05	1.3675	0.78	1.44	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.15	0.1	0.1	0.1	0.25	0.1	0.3	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0027	0.000726	0.00195	0.00285	0.0033	0.0017	0.0034	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.003	0.000141		0.003		0.0029	0.0031	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

Powertech (USA) Inc.

Well #631				
Analyte	9/26/2007 16:40	11/14/2007 15:20	2/20/2008 13:55	5/19/2008 11:06
A/C Balance (± 5) (%)	-4.28	-3.03	-4.87	5.08
Alkalinity-Total as CaCO3 (mg/L)	168	160	158	164
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	26.9	28.9	29.5	29.7
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			<0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	205	195	193	200
Boron-Dissolved (mg/L)	0.2	<0.1	0.1	0.2
Boron-Total (mg/L)			0.1	0.2
Cadmium-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.001
Calcium-Dissolved (mg/L)	268	307	324	375
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	24.7	27.2	26.8	32.8
Chloride (mg/L)	10	10	8	10
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2180	2170	2420	2530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.2	0.5
Gross Alpha-Dissolved (pCi/L)	51	46.5	162	60.7
Gross Beta-Dissolved (pCi/L)	20.9	29.4	52.1	26.2
Gross Gamma-Dissolved (pCi/L)	520	1900	510	130
Iron-Dissolved (mg/L)	<0.03	0.84	0.57	0.39
Iron-Total (mg/L)			1.06	0.98
Lead 210-Dissolved (pCi/L)	<1	<1	6.1	0.5
Lead 210-Suspended (pCi/L)	<1	<1	7.5	-1.4
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.05	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	82.9	89.3	82.6	110
Manganese-Dissolved (mg/L)	0.28	0.29	0.3	0.33
Manganese-Total (mg/L)			0.28	0.32
Mercury-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.01
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05

POWERTECH (USA) INC.

Well #631				
Analyte	**9/26/2007 16:40**	**11/14/2007 15:20**	**2/20/2008 13:55**	**5/19/2008 11:06**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		<0	180	230
pH	7.76	7.23	7.6	7.54
Polonium 210-Dissolved (pCi/L)	<1	3.5	<1	0.2
Polonium 210-Suspended (pCi/L)	<1	<1	<1	0.1
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	15.9	15.7	15.7	16.3
Radium 226-Dissolved (pCi/L)	12.9	9.5	19.4	22.1
Radium 226-Suspended (pCi/L)	2.3		<0.9	-0.3
Radium 226-Total (pCi/L)	15.2			
Radon 222-Total (pCi/L)		4220	3920	4430
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.005
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.002	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.2	7.8	6.9	3.5
Silver-Dissolved (mg/L)	<0.01	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.2	0.99	1.2
Sodium-Dissolved (mg/L)	92.4	92.9	77.1	107
Solids-Total Dissolved Calculated (mg/L)	1690	1830	1880	1980
Solids-Total Dissolved TDS @ 180 C (mg/L)	1900	2000	2000	2000
Strontium-Total (mg.L)			5.6	6.8
Sulfate (mg/L)	1240	1220	1250	1250
TDS Balance (0.80 - 1.20) (dec.%)	1.11	1.09	1.05	1.02
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	0.6	
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.001	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0027	0.0029	0.0027	0.0026
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.003		0.0026	0.0028
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	0.01

POWERTECH (USA) INC.

Well #631								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.775	4.633936	-4.7225	-3.655	3.0525	-4.87	5.08	4
Alkalinity-Total as CaCO3 (mg/L)	162.5	4.434712	158.5	162	167	158	168	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	28.75	1.279323	27.4	29.2	29.65	26.9	29.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Arsenic-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	198.25	5.377422	193.5	197.5	203.75	193	205	4
Boron-Dissolved (mg/L)	0.1375	0.075	0.0625	0.15	0.2	0.05	0.2	4
Boron-Total (mg/L)	0.15	0.070711		0.15		0.1	0.2	2
Cadmium-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	318.5	44.3659	277.75	315.5	362.25	268	375	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	27.875	3.461575	25.225	27	31.4	24.7	32.8	4
Chloride (mg/L)	9.5	1	8.5	10	10	8	10	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2325	178.9786	2172.5	2300	2502.5	2170	2530	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.325	0.125831	0.225	0.3	0.45	0.2	0.5	4
Gross Alpha-Dissolved (pCi/L)	80.05	54.95371	47.625	55.85	136.675	46.5	162	4
Gross Beta-Dissolved (pCi/L)	32.15	13.75415	22.225	27.8	46.425	20.9	52.1	4
Gross Gamma-Dissolved (pCi/L)	765	778.1388	225	515	1555	130	1900	4
Iron-Dissolved (mg/L)	0.45375	0.346058	0.10875	0.48	0.7725	0.015	0.84	4
Iron-Total (mg/L)	1.02	0.056569		1.02		0.98	1.06	2
Lead-Dissolved (mg/L)	0.006625	0.01225	0.0005	0.0005	0.018875	0.0005	0.025	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.9	2.8	0.5	0.5	4.7	0.5	6.1	4
Lead 210-Suspended (pCi/L)	1.775	3.920353	-0.925	0.5	5.75	-1.4	7.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	91.2	12.90865	82.675	86.1	104.825	82.6	110	4
Manganese-Dissolved (mg/L)	0.3	0.021602	0.2825	0.295	0.3225	0.28	0.33	4
Manganese-Total (mg/L)	0.3	0.028284		0.3		0.28	0.32	2
Mercury-Dissolved (mg/L)	0.0004	0.0002	0.0002	0.0005	0.0005	0.0001	0.0005	4
Mercury-Total (mg/L)	0.000388	0.000225	0.000163	0.0005	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

Well #631								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	136.6667	120.9683		180	230		230	3
pH	7.5325	0.222017	7.3075	7.57	7.72	7.23	7.76	4
Polonium 210-Dissolved (pCi/L)	1.175	1.556438	0.275	0.5	2.75	0.2	3.5	4
Polonium 210-Suspended (pCi/L)	0.4	0.2	0.2	0.5	0.5	0.1	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	15.9	0.282843	15.7	15.8	16.2	15.7	16.3	4
Radium 226-Dissolved (pCi/L)	15.975	5.791589	10.35	16.15	21.425	9.5	22.1	4
Radium 226-Suspended (pCi/L)	0.816667	1.33822	-0.3	0.45	2.3	-0.3	2.3	3
Radium 226-Total (pCi/L)	15.2			15.2		15.2	15.2	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	4190	256.3201	3920	4220	4430	3920	4430	3
Selenium-Dissolved (mg/L)	0.001375	0.001031	0.0005	0.00125	0.002375	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.35	1.936492	4.35	7.05	7.65	3.5	7.8	4
Silver-Dissolved (mg/L)	0.003125	0.00125	0.0025	0.0025	0.004375	0.0025	0.005	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	92.35	12.21324	80.925	92.65	103.475	77.1	107	4
Sodium Adsorption Ratio (SAR) (meq/L)	1.13	0.121244	0.99	1.2	1.2	0.99	1.2	3
Solids-Total Dissolved Calculated (mg/L)	1845	120.6924	1725	1855	1955	1690	1980	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1975	50	1925	2000	2000	1900	2000	4
Strontium-Total (mg.L)	6.2	0.848528		6.2		5.6	6.8	2
Sulfate (mg/L)	1240	14.14214	1225	1245	1250	1220	1250	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0675	0.040311	1.0275	1.07	1.105	1.02	1.11	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Suspended (pCi/L)	0.2	0.270801	0.025	0.1	0.475		0.6	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.002	0.001	0.001	0.0025	0.0025	0.0005	0.0025	4
Uranium-Dissolved (mg/L)	0.002725	0.000126	0.002625	0.0027	0.00285	0.0026	0.0029	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.0028	0.0002	0.0026	0.0028	0.003	0.0026	0.003	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.0075	0.003536		0.0075		0.005	0.01	2

POWERTECH (USA) INC.

Well #635				
Analyte	9/26/2007 18:08	11/27/2007 8:25	2/10/2008 14:55	4/29/2008 19:00
A/C Balance (± 5) (%)	-1.14	-0.831	-0.25	3.52
Alkalinity-Total as CaCO3 (mg/L)	124	118	120	118
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.4	0.5	0.5
Anions (meq/L)	30.4	31.6	33.7	32.8
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			<0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	151	144	146	144
Boron-Dissolved (mg/L)	0.4	0.4	0.5	0.4
Boron-Total (mg/L)			0.5	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	110	120	132	136
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	29.8	31.1	33.5	35.2
Chloride (mg/L)	24	23	26	20
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2890	2830	2950	2810
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	2.5	4.4	14.8	13.2
Gross Beta-Dissolved (pCi/L)	4.3	6.3	10	-8
Gross Gamma-Dissolved (pCi/L)	960	1000	91	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			1.11	1.08
Lead 210-Dissolved (pCi/L)	<1	1.7	<1	
Lead 210-Suspended (pCi/L)	<1	5.1	<1	-9.6
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	0.003	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001
Magnesium-Dissolved (mg/L)	44.3	49	52.3	54.1
Manganese-Dissolved (mg/L)	0.06	0.07	0.06	0.06
Manganese-Total (mg/L)			0.06	0.05
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05

POWERTECH (USA) INC.

Well #635				
Analyte	**9/26/2007 18:08**	**11/27/2007 8:25**	**2/10/2008 14:55**	**4/29/2008 19:00**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)		270	129.4	180
pH	7.72	7.64	7.91	8.2
Polonium 210-Dissolved (pCi/L)	<1	1.9	<1	1.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	7.8	8.3	8.2	7.3
Radium 226-Dissolved (pCi/L)	1.6	0.8	1.3	
Radium 226-Suspended (pCi/L)	0.8	<0.2	0.6	0.3
Radium 226-Total (pCi/L)	2.4			
Radon 222-Total (pCi/L)		902	806	1070
Selenium-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.6	9	10	4.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		9.3	9.6	10
Sodium-Dissolved (mg/L)	470	480	515	545
Solids-Total Dissolved Calculated (mg/L)	2040	2120	2270	2280
Solids-Total Dissolved TDS @ 180 C (mg/L)	2200	2300	2300	2200
Strontium-Total (mg.L)			4.2	4.6
Sulfate (mg/L)	1500	1370	1470	1430
TDS Balance (0.80 - 1.20) (dec.%)	1.09	1.08	1.03	0.98
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0.2
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.002	0.002	0.0021	0.0017
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.002		0.0021	0.0017
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01

Powertech (USA) Inc.

Well #635								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	0.32475	2.161883	-1.06275	-0.5405	2.5775	-1.14	3.52	4
Alkalinity-Total as CaCO3 (mg/L)	120	2.828427	118	119	123	118	124	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.375	0.189297	0.175	0.45	0.5	0.1	0.5	4
Anions (meq/L)	32.125	1.436141	30.7	32.2	33.475	30.4	33.7	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	146.25	3.304038	144	145	149.75	144	151	4
Boron-Dissolved (mg/L)	0.425	0.05	0.4	0.4	0.475	0.4	0.5	4
Boron-Total (mg/L)	0.45	0.070711		0.45		0.4	0.5	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	124.5	11.81807	112.5	126	135	110	136	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	32.4	2.415229	30.125	32.3	34.775	29.8	35.2	4
Chloride (mg/L)	23.25	2.5	20.75	23.5	25.5	20	26	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2870	63.24555	2815	2860	2935	2810	2950	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	8.725	6.174882	2.975	8.8	14.4	2.5	14.8	4
Gross Beta-Dissolved (pCi/L)	3.15	7.799359	-4.925	5.3	9.075	-8	10	4
Gross Gamma-Dissolved (pCi/L)	512.75	541.0578	22.75	525.5	990		1000	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	1.095	0.021213		1.095		1.08	1.11	2
Lead-Dissolved (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	0.675	0.722842	0.125	0.5	1.4		1.7	4
Lead 210-Suspended (pCi/L)	-0.875	6.207724	-7.075	0.5	3.95	-9.6	5.1	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	49.925	4.303777	45.475	50.65	53.65	44.3	54.1	4
Manganese-Dissolved (mg/L)	0.0625	0.005	0.06	0.06	0.0675	0.06	0.07	4
Manganese-Total (mg/L)	0.055	0.007071		0.055		0.05	0.06	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.03	0.028284		0.03		0.01	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

POWERTECH (USA) INC.

Well #635								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	193.1333	71.21414	129.4	180	270	129.4	270	3
pH	7.8675	0.248914	7.66	7.815	8.1275	7.64	8.2	4
Polonium 210-Dissolved (pCi/L)	1	0.663325	0.5	0.8	1.7	0.5	1.9	4
Polonium 210-Suspended (pCi/L)	0.375	0.25	0.125	0.5	0.5		0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	7.9	0.454606	7.425	8	8.275	7.3	8.3	4
Radium 226-Dissolved (pCi/L)	1.233333	0.404145	0.8	1.3	1.6	0.8	1.6	3
Radium 226-Suspended (pCi/L)	0.45	0.310913	0.15	0.45	0.75	0.1	0.8	4
Radium 226-Total (pCi/L)	2.4			2.4		2.4	2.4	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	926	133.6263	806	902	1070	806	1070	3
Selenium-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Selenium-Total (mg/L)	0.00075	0.000354		0.00075		0.0005	0.001	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	8.125	2.229163	5.825	8.8	9.75	4.9	10	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	502.5	34.27827	472.5	497.5	537.5	470	545	4
Sodium Adsorption Ratio (SAR) (meq/L)	9.633333	0.351188	9.3	9.6	10	9.3	10	3
Solids-Total Dissolved Calculated (mg/L)	2177.5	117.2959	2060	2195	2277.5	2040	2280	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	2250	57.73503	2200	2250	2300	2200	2300	4
Strontium-Total (mg.L)	4.4	0.282843		4.4		4.2	4.6	2
Sulfate (mg/L)	1442.5	56.19905	1385	1450	1492.5	1370	1500	4
TDS Balance (0.80 - 1.20) (dec.%)	1.045	0.050662	0.9925	1.055	1.0875	0.98	1.09	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.125	0.05	0.1	0.1	0.175	0.1	0.2	4
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00195	0.000173	0.001775	0.002	0.002075	0.0017	0.0021	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.001933	0.000208	0.0017	0.002	0.0021	0.0017	0.0021	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00875	0.0075	0.005	0.005	0.01625	0.005	0.02	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Well #650				
Analyte	9/28/2007 19:00	11/12/2007 15:30	3/24/2008 9:00	5/30/2008 16:30
A/C Balance (± 5) (%)	-3.87	4.96	-5.85	-1.4
Alkalinity-Total as CaCO3 (mg/L)	116	108	30	30
Aluminum-Dissolved (mg/L)	0.6	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.6	0.6	0.4	0.4
Anions (meq/L)	25.9	23.5	17.8	18.2
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	141	132	37	37
Boron-Dissolved (mg/L)	<0.1	<0.1	0.1	0.1
Boron-Total (mg/L)			0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.005
Calcium-Dissolved (mg/L)	219	221	101	125
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	23.9	26	15.9	17.7
Chloride (mg/L)	17	16	19	16
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2260	1770	1540	1700
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			0.08	<0.01
Fluoride (mg/L)	<0.1	<0.1	0.1	0.1
Gross Alpha-Dissolved (pCi/L)	13.1	5.6	2.9	2.1
Gross Beta-Dissolved (pCi/L)	20.9	20.1	12.5	10.8
Gross Gamma-Dissolved (pCi/L)	1100	2200	<20	
Iron-Dissolved (mg/L)	13.2	0.68	0.06	0.1
Iron-Total (mg/L)			7.59	8.99
Lead 210-Dissolved (pCi/L)	<1	1.4	24	1.5
Lead 210-Suspended (pCi/L)	<1	<1	12	6.2
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			0.05	0.002
Magnesium-Dissolved (mg/L)	85.2	100	62.3	70.6
Manganese-Dissolved (mg/L)	2.44	1.39	0.43	0.94
Manganese-Total (mg/L)			0.56	0.66
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05

Well #650				
Analyte	9/28/2007 19:00	11/12/2007 15:30	3/24/2008 9:00	5/30/2008 16:30
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		190	120	200
pH	7.04	7.22	7.4	7.3
Polonium 210-Dissolved (pCi/L)	<1	<1	0.4	-0.2
Polonium 210-Suspended (pCi/L)	<1	<1	1.2	0.2
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	17.6	18.1	14.5	15.6
Radium 226-Dissolved (pCi/L)	2.7	2.4	1.4	1.2
Radium 226-Suspended (pCi/L)	0.6	<0.2	0.7	-0.02
Radium 226-Total (pCi/L)	3.2			
Radon 222-Total (pCi/L)		134	202	254
Selenium-Dissolved (mg/L)	0.002	<0.001	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			<0.001	<0.001
Selenium-VI-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	2.7	1.1	0.9	<0.5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		1.9	2.3	2.1
Sodium-Dissolved (mg/L)	110	139	121	119
Solids-Total Dissolved Calculated (mg/L)	1630	1560	1140	1190
Solids-Total Dissolved TDS @ 180 C (mg/L)	2000	1600	1300	1400
Strontium-Total (mg.L)			2.1	2.6
Sulfate (mg/L)	1320	1000	801	825
TDS Balance (0.80 - 1.20) (dec.%)	1.21	1.01	1.11	1.13
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	0.4	
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	0.8	0.2
Thorium 230-Total (pCi/L)	<0.2			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0019	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	0.0014	<0.0003	0.0033	<0.0003
Uranium-Total (mg/L)			0.0004	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			0.07	0.02

POWERTECH (USA) INC.

Well #650								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-1.54	4.700163	-5.355	-2.635	3.37	-5.85	4.96	4
Alkalinity-Total as CaCO3 (mg/L)	71	47.45524	30	69	114	30	116	4
Aluminum-Dissolved (mg/L)	0.1875	0.275	0.05	0.05	0.4625	0.05	0.6	4
Ammonia (mg/L)	0.5	0.11547	0.4	0.5	0.6	0.4	0.6	4
Anions (meq/L)	21.35	3.993745	17.9	20.85	25.3	17.8	25.9	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Arsenic-Total (mg/L)	0.0015	0.000707		0.0015		0.001	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	86.75	57.56373	37	84.5	138.75	37	141	4
Boron-Dissolved (mg/L)	0.075	0.028868	0.05	0.075	0.1	0.05	0.1	4
Boron-Total (mg/L)	0.1			0.1		0.1	0.1	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	166.5	62.55398	107	172	220.5	101	221	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	20.875	4.838991	16.35	20.8	25.475	15.9	26	4
Chloride (mg/L)	17	1.414214	16	16.5	18.5	16	19	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1817.5	310.309	1580	1735	2137.5	1540	2260	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.0425	0.053033		0.0425		0.005	0.08	2
Fluoride (mg/L)	0.075	0.028868	0.05	0.075	0.1	0.05	0.1	4
Gross Alpha-Dissolved (pCi/L)	5.925	5.012235	2.3	4.25	11.225	2.1	13.1	4
Gross Beta-Dissolved (pCi/L)	16.075	5.166801	11.225	16.3	20.7	10.8	20.9	4
Gross Gamma-Dissolved (pCi/L)	827.5	1050.567	2.5	555	1925		2200	4
Iron-Dissolved (mg/L)	3.51	6.46621	0.07	0.39	10.07	0.06	13.2	4
Iron-Total (mg/L)	8.29	0.989949		8.29		7.59	8.99	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.026	0.033941		0.026		0.002	0.05	2
Lead 210-Dissolved (pCi/L)	6.85	11.44217	0.725	1.45	18.375	0.5	24	4
Lead 210-Suspended (pCi/L)	4.8	5.500909	0.5	3.35	10.55	0.5	12	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	79.525	16.61112	64.375	77.9	96.3	62.3	100	4
Manganese-Dissolved (mg/L)	1.3	0.855219	0.5575	1.165	2.1775	0.43	2.44	4
Manganese-Total (mg/L)	0.61	0.070711		0.61		0.56	0.66	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000175	0.000218	0.00005	0.000075	0.0004	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

POWERTECH (USA) INC.

Well #650								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	170	43.58899	120	190	200	120	200	3
pH	7.24	0.152315	7.085	7.26	7.375	7.04	7.4	4
Polonium 210-Dissolved (pCi/L)	0.3	0.33665	-0.05	0.45	0.5	-0.2	0.5	4
Polonium 210-Suspended (pCi/L)	0.6	0.424264	0.275	0.5	1.025	0.2	1.2	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	16.45	1.690168	14.775	16.6	17.975	14.5	18.1	4
Radium 226-Dissolved (pCi/L)	1.925	0.736546	1.25	1.9	2.625	1.2	2.7	4
Radium 226-Suspended (pCi/L)	0.345	0.357911	0.01	0.35	0.675	-0.02	0.7	4
Radium 226-Total (pCi/L)	3.2			3.2		3.2	3.2	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	196.6667	60.17752	134	202	254	134	254	3
Selenium-Dissolved (mg/L)	0.001375	0.001031	0.0005	0.00125	0.002375	0.0005	0.0025	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	1.2375	1.040332	0.4125	1	2.3	0.25	2.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	122.25	12.14839	112.25	120	134.5	110	139	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.1	0.2	1.9	2.1	2.3	1.9	2.3	3
Solids-Total Dissolved Calculated (mg/L)	1380	250.7323	1152.5	1375	1612.5	1140	1630	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1575	309.5696	1325	1500	1900	1300	2000	4
Strontium-Total (mg.L)	2.35	0.353553		2.35		2.1	2.6	2
Sulfate (mg/L)	986.5	239.3721	807	912.5	1240	801	1320	4
TDS Balance (0.80 - 1.20) (dec.%)	1.115	0.08226	1.035	1.12	1.19	1.01	1.21	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.15	0.173205	0.025	0.1	0.325		0.4	4
Thorium 230-Suspended (pCi/L)	0.3	0.33665	0.1	0.15	0.65	0.1	0.8	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.000588	0.000875	0.00015	0.00015	0.001463	0.00015	0.0019	4
Uranium-Suspended (mg/L)	0.00125	0.001488	0.00015	0.000775	0.002825	0.00015	0.0033	4
Uranium-Total (mg/L)	0.000275	0.000177		0.000275		0.00015	0.0004	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.00875	0.0075	0.005	0.005	0.01625	0.005	0.02	4
Zinc-Total (mg/L)	0.045	0.035355		0.045		0.02	0.07	2

Well #675					
Analyte	**9/28/2007 10:49**	**11/27/2007 17:34**	**2/5/2008 12:05**	**4/29/2008 17:47**	**4/29/2008 17:50**
A/C Balance (± 5) (%)	-4.99	1.35	5.71	1.42	0.84
Alkalinity-Total as CaCO3 (mg/L)	378	352	388	422	428
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	0.5	0.3	0.2	0.2
Anions (meq/L)	84.2	80	77.8	89.5	90.4
Antimony-Total (mg/L)			<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)			0.002	0.002	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	461	429	473	514	522
Boron-Dissolved (mg/L)	0.4	0.3	0.4	0.3	0.3
Boron-Total (mg/L)			<0.1	0.3	0.3
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	400	410	439	450	452
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	76.2	82.2	87.2	92.1	91.9
Chloride (mg/L)	64	60	75	64	64
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	6090	5830	6340	6560	6530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01	<0.01
Fluoride (mg/L)	0.1	0.4	0.6	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	18.8	18.3	29.3	55.2	51.1
Gross Beta-Dissolved (pCi/L)	18.5	<2	25.3	8	-0.4
Gross Gamma-Dissolved (pCi/L)	<20	1100	<20		
Iron-Dissolved (mg/L)	0.13	0.05	0.15	1.88	2.32
Iron-Total (mg/L)			3.48	5.03	5.12
Lead 210-Dissolved (pCi/L)	<1	6	<1		
Lead 210-Suspended (pCi/L)	14	<1	<1	-19.2	-5.2
Lead 210-Total (pCi/L)	14				
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	339	362	376	408	416
Manganese-Dissolved (mg/L)	2.89	3.14	3.39	3.02	2.66
Manganese-Total (mg/L)			3.4	3.02	2.75
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			<0.01	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05	<0.05

POWERTECH (USA) INC.

Well #675					
Analyte	**9/28/2007 10:49**	**11/27/2007 17:34**	**2/5/2008 12:05**	**4/29/2008 17:47**	**4/29/2008 17:50**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.1	0.07	0.07
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05	<0.05
Oxidation-Reduction Potential (mV)		220	180	240	240
pH	7.25	7.32	7.29	7.53	7.79
Polonium 210-Dissolved (pCi/L)	<1	<1	2.1	0.6	1.2
Polonium 210-Suspended (pCi/L)	<1	2	<1	0.3	-0.1
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	28	25.2	24.5	21.7	21.4
Radium 226-Dissolved (pCi/L)	<0.2	0.5	<0.2		
Radium 226-Suspended (pCi/L)	2.3	1.7	<0.2	0.7	0.7
Radium 226-Total (pCi/L)	2.3				
Radon 222-Total (pCi/L)		712	783	960	960
Selenium-Dissolved (mg/L)	0.003	<0.001	0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.004	0.002	0.002
Selenium-VI-Dissolved (mg/L)		<0.001	0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	16	14.9	14.4	7.3	7.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		6.2	6.5	6.6	6.4
Sodium-Dissolved (mg/L)	630	713	769	809	789
Solids-Total Dissolved Calculated (mg/L)	5280	5200	5180	5830	5860
Solids-Total Dissolved TDS @ 180 C (mg/L)	5900	6100	6100	5700	4800
Strontium-Total (mg.L)			8.3	8.8	8.6
Sulfate (mg/L)	3600	3420	3260	3810	3840
TDS Balance (0.80 - 1.20) (dec.%)	1.11	1.17	1.18	0.97	0.82
Thallium-Total (mg/L)			<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2		
Thorium 230-Suspended (pCi/L)	<0.2	1.3	<0.2		0.1
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0372	0.0307	0.0387	0.0493	0.0485
Uranium-Suspended (mg/L)	0.0013	0.003	0.0005	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0387	0.0502	0.0516
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	0.02	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01	0.01

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	0.866	3.817686	-2.075	1.35	3.565	-4.99	5.71	5
Alkalinity-Total as CaCO3 (mg/L)	393.6	31.6038	365	388	425	352	428	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.3	0.122474	0.2	0.3	0.4	0.2	0.5	5
Anions (meq/L)	84.38	5.589454	78.9	84.2	89.95	77.8	90.4	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.0009	0.000224	0.00075	0.001	0.001	0.0005	0.001	5
Arsenic-Total (mg/L)	0.002		0.002	0.002	0.002	0.002	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Bicarbonate as HCO3 (mg/L)	479.8	38.50584	445	473	518	429	522	5
Boron-Dissolved (mg/L)	0.34	0.054772	0.3	0.3	0.4	0.3	0.4	5
Boron-Total (mg/L)	0.216667	0.144338	0.05	0.3	0.3	0.05	0.3	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	430.2	23.79496	405	439	451	400	452	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	85.92	6.780634	79.2	87.2	92	76.2	92.1	5
Chloride (mg/L)	65.4	5.639149	62	64	69.5	60	75	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	6270	309.2733	5960	6340	6545	5830	6560	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.42	0.192354	0.25	0.5	0.55	0.1	0.6	5
Gross Alpha-Dissolved (pCi/L)	34.54	17.6069	18.55	29.3	53.15	18.3	55.2	5
Gross Beta-Dissolved (pCi/L)	10.48	11.16185	0.3	8	21.9	-0.4	25.3	5
Gross Gamma-Dissolved (pCi/L)	224	489.7244		10	555		1100	5
Iron-Dissolved (mg/L)	0.906	1.101649	0.09	0.15	2.1	0.05	2.32	5
Iron-Total (mg/L)	4.543333	0.921973	3.48	5.03	5.12	3.48	5.12	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	1.4	2.583602		0.5	3.25		6	5
Lead 210-Suspended (pCi/L)	-1.88	11.98445	-12.2	0.5	7.25	-19.2	14	5
Lead 210-Total (pCi/L)	14			14		14	14	1
Magnesium-Dissolved (mg/L)	380.2	32.01874	350.5	376	412	339	416	5
Manganese-Dissolved (mg/L)	3.02	0.272855	2.775	3.02	3.265	2.66	3.39	5
Manganese-Total (mg/L)	3.056667	0.326548	2.75	3.02	3.4	2.75	3.4	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.035	0.025981	0.005	0.05	0.05	0.005	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3

Well #675								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.058	0.010954	0.05	0.05	0.07	0.05	0.07	5
Nitrogen, Nitrite as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5
Oxidation-Reduction Potential (mV)	220	28.28427	190	230	240	180	240	4
pH	7.436	0.225566	7.27	7.32	7.66	7.25	7.79	5
Polonium 210-Dissolved (pCi/L)	0.98	0.690652	0.5	0.6	1.65	0.5	2.1	5
Polonium 210-Suspended (pCi/L)	0.64	0.798749	0.1	0.5	1.25	-0.1	2	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	24.16	2.720845	21.55	24.5	26.6	21.4	28	5
Radium 226-Dissolved (pCi/L)	0.233333	0.23094	0.1	0.1	0.5	0.1	0.5	3
Radium 226-Suspended (pCi/L)	1.1	0.883176	0.4	0.7	2	0.1	2.3	5
Radium 226-Total (pCi/L)	2.3			2.3		2.3	2.3	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	853.75	126.0645	729.75	871.5	960	712	960	4
Selenium-Dissolved (mg/L)	0.0011	0.001084	0.0005	0.0005	0.002	0.0005	0.003	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.002667	0.001155	0.002	0.002	0.004	0.002	0.004	3
Selenium-VI-Dissolved (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Silica-Dissolved (mg/L)	12	4.284274	7.35	14.4	15.45	7.3	16	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	742	72.13182	671.5	769	799	630	809	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.425	0.170783	6.25	6.45	6.575	6.2	6.6	4
Solids-Total Dissolved Calculated (mg/L)	5470	344.5287	5190	5280	5845	5180	5860	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	5720	540.3702	5250	5900	6100	4800	6100	5
Strontium-Total (mg.L)	8.566667	0.251661	8.3	8.6	8.8	8.3	8.8	3
Sulfate (mg/L)	3586	249.3592	3340	3600	3825	3260	3840	5
TDS Balance (0.80 - 1.20) (dec.%)	1.05	0.15346	0.895	1.11	1.175	0.82	1.18	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)	0.06	0.054772		0.1	0.1		0.1	5
Thorium 230-Suspended (pCi/L)	0.32	0.549545	0.05	0.1	0.7		1.3	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.04088	0.00792	0.03395	0.0387	0.0489	0.0307	0.0493	5
Uranium-Suspended (mg/L)	0.00102	0.001202	0.00015	0.0005	0.00215	0.00015	0.003	5
Uranium-Total (mg/L)	0.046833	0.007078	0.0387	0.0502	0.0516	0.0387	0.0516	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.011	0.008216	0.005	0.005	0.02	0.005	0.02	5
Zinc-Total (mg/L)	0.006667	0.002887	0.005	0.005	0.01	0.005	0.01	3

POWERTECH (USA) INC.

Well #676				
Analyte	9/28/2007 13:46	11/27/2007 12:20	2/5/2008 16:57	4/29/2008 12:27
A/C Balance (± 5) (%)	-3.7	-2.19	0.0941	1.76
Alkalinity-Total as CaCO3 (mg/L)	240	228	208	220
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	38.2	40.9	39.5	41.4
Antimony-Total (mg/L)	0	0	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0	0	0.021	<0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	0	0	0.5	<0.1
Beryllium-Total (mg/L)	0	0	0.003	<0.001
Bicarbonate as HCO3 (mg/L)	293	278	254	268
Boron-Dissolved (mg/L)	0.4	0.4	0.5	0.5
Boron-Total (mg/L)	0	0	0.5	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	0	0	<0.005	<0.005
Calcium-Dissolved (mg/L)	465	514	518	561
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	35.5	39.1	39.5	430
Chloride (mg/L)	15	16	14	13
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	0	0	0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2880	2860	3010	3100
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	0	0	0.12	<0.01
Fluoride (mg/L)	0.2	0.2	0.4	0.3
Gross Alpha-Dissolved (pCi/L)	37.1	31.9	95.5	51.6
Gross Beta-Dissolved (pCi/L)	11.1	21.6	22.1	9.2
Gross Gamma-Dissolved (pCi/L)	1100	1000	<20	0
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0	0	66	0.57
Lead 210-Dissolved (pCi/L)	<1	<1	4.1	-0.9
Lead 210-Suspended (pCi/L)	<1	<1	3.8	-6.7
Lead 210-Total (pCi/L)	<1	0	0	0
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0	0	0.06	<0.001
Magnesium-Dissolved (mg/L)	104	113	114	129
Manganese-Dissolved (mg/L)	0.02	<0.01	0.02	<0.01
Manganese-Total (mg/L)	0	0	2.52	0.03
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0	0	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	0	0	0.1	<0.05

POWERTECH (USA) INC.

Well #676				
Analyte	**9/28/2007 13:46**	**11/27/2007 12:20**	**2/5/2008 16:57**	**4/29/2008 12:27**
Nitrogen, Nitrate as N (mg/L)	1	1	0.7	0.76
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)	0	250	230	280
pH	7.13	7.17	7.2	7.46
Polonium 210-Dissolved (pCi/L)	<1	1.2	2.9	1.1
Polonium 210-Suspended (pCi/L)	<1	<1	2.2	0.1
Polonium 210-Total (pCi/L)	<1	0	0	0
Potassium-Dissolved (mg/L)	11.6	12.3	12.7	10.9
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Radium 226-Suspended (pCi/L)	<0.2	<0.2	11.4	0
Radium 226-Total (pCi/L)	<0.2	0	0	0
Radon 222-Total (pCi/L)	0	453	686	755
Selenium-Dissolved (mg/L)	0.017	0.014	0.012	0.009
Selenium-IV-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0	0	0.013	0.012
Selenium-VI-Dissolved (mg/L)	0	0.014	0.012	0.009
Silica-Dissolved (mg/L)	13.7	14.4	14.3	6.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	0	0	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	0	0.92	0.96	0.93
Sodium-Dissolved (mg/L)	80	88.8	92.2	94
Solids-Total Dissolved Calculated (mg/L)	2410	2600	2550	2720
Solids-Total Dissolved TDS @ 180 C (mg/L)	3000	2900	2500	2600
Strontium-Total (mg.L)	0	0	9.2	8.6
Sulfate (mg/L)	1790	1720	1670	1760
TDS Balance (0.80 - 1.20) (dec.%)	1.24	1.12	0.98	0.95
Thallium-Total (mg/L)	0	0	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	4.2	0
Thorium 230-Total (pCi/L)	<0.2	0	0	0
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0494	0.0548	0.0586	0.0557
Uranium-Suspended (mg/L)	0.0096	0.0011	0.0702	<0.0003
Uranium-Total (mg/L)	0	0	0.0687	0.0591
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.03	<0.01	<0.01
Zinc-Total (mg/L)	0	0	0.28	0.03

Powertech (USA) Inc.

Well #676								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	-1.00898	2.416639	-3.3225	-1.04795	1.343525	-3.7	1.76	4
Alkalinity-Total as CaCO3 (mg/L)	224	13.46601	211	224	237	208	240	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	40	1.44453	38.525	40.2	41.275	38.2	41.4	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.01075	0.014496		0.01075		0.0005	0.021	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.275	0.318198		0.275		0.05	0.5	2
Beryllium-Total (mg/L)	0.00175	0.001768		0.00175		0.0005	0.003	2
Bicarbonate as HCO3 (mg/L)	273.25	16.43928	257.5	273	289.25	254	293	4
Boron-Dissolved (mg/L)	0.45	0.057735	0.4	0.45	0.5	0.4	0.5	4
Boron-Total (mg/L)	0.45	0.070711		0.45		0.4	0.5	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	514.5	39.26406	477.25	516	550.25	465	561	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	136.025	195.9916	36.4	39.3	332.375	35.5	430	4
Chloride (mg/L)	14.5	1.290994	13.25	14.5	15.75	13	16	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.0375	0.017678		0.0375		0.025	0.05	2
Conductivity @ 25 C (umhos/cm)	2962.5	113.2475	2865	2945	3077.5	2860	3100	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.0625	0.081317		0.0625		0.005	0.12	2
Fluoride (mg/L)	0.275	0.095743	0.2	0.25	0.375	0.2	0.4	4
Gross Alpha-Dissolved (pCi/L)	54.025	28.87922	33.2	44.35	84.525	31.9	95.5	4
Gross Beta-Dissolved (pCi/L)	16	6.802451	9.675	16.35	21.975	9.2	22.1	4
Gross Gamma-Dissolved (pCi/L)	527.5	604.7245	2.5	505	1075		1100	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	33.285	46.266		33.285		0.57	66	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.03025	0.042073		0.03025		0.0005	0.06	2
Lead 210-Dissolved (pCi/L)	1.05	2.137756	-0.55	0.5	3.2	-0.9	4.1	4
Lead 210-Suspended (pCi/L)	-0.475	4.431986	-4.9	0.5	2.975	-6.7	3.8	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	115	10.36018	106.25	113.5	125.25	104	129	4
Manganese-Dissolved (mg/L)	0.0125	0.00866	0.005	0.0125	0.02	0.005	0.02	4
Manganese-Total (mg/L)	1.275	1.760696		1.275		0.03	2.52	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.0625	0.053033		0.0625		0.025	0.1	2

Well #676								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.865	0.157797	0.715	0.88	1	0.7	1	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	253.3333	25.16611	230	250	280	230	280	3
pH	7.24	0.149443	7.14	7.185	7.395	7.13	7.46	4
Polonium 210-Dissolved (pCi/L)	1.425	1.030776	0.65	1.15	2.475	0.5	2.9	4
Polonium 210-Suspended (pCi/L)	0.825	0.93586	0.2	0.5	1.775	0.1	2.2	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.875	0.7932	11.075	11.95	12.6	10.9	12.7	4
Radium 226-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	3
Radium 226-Suspended (pCi/L)	3.866667	6.524058	0.1	0.1	11.4	0.1	11.4	3
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	631.3333	158.2477	453	686	755	453	755	3
Selenium-Dissolved (mg/L)	0.013	0.003367	0.00975	0.013	0.01625	0.009	0.017	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0125	0.000707		0.0125		0.012	0.013	2
Selenium-VI-Dissolved (mg/L)	0.011667	0.002517	0.009	0.012	0.014	0.009	0.014	3
Silica-Dissolved (mg/L)	12.2	3.879003	8.225	14	14.375	6.4	14.4	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	88.75	6.219057	82.2	90.5	93.55	80	94	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.936667	0.020817	0.92	0.93	0.96	0.92	0.96	3
Solids-Total Dissolved Calculated (mg/L)	2570	128.3225	2445	2575	2690	2410	2720	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	2750	238.0476	2525	2750	2975	2500	3000	4
Strontium-Total (mg.L)	8.9	0.424264		8.9		8.6	9.2	2
Sulfate (mg/L)	1735	51.96152	1682.5	1740	1782.5	1670	1790	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0725	0.134009	0.9575	1.05	1.21	0.95	1.24	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	1.1	2.067204	0.025	0.1	3.175		4.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.054625	0.003842	0.05075	0.05525	0.057875	0.0494	0.0586	4
Uranium-Suspended (mg/L)	0.020263	0.033562	0.000388	0.00535	0.05505	0.00015	0.0702	4
Uranium-Total (mg/L)	0.0639	0.006788		0.0639		0.0591	0.0687	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.01125	0.0125	0.005	0.005	0.02375	0.005	0.03	4
Zinc-Total (mg/L)	0.155	0.176777		0.155		0.03	0.28	2

POWERTECH (USA) INC.

Well #677				
Analyte	**9/28/2007 12:26**	**11/27/2007 15:20**	**2/5/2008 13:39**	**4/29/2008 15:14**
A/C Balance (± 5) (%)	-3.56	-3.76	3.88	2.3
Alkalinity-Total as CaCO3 (mg/L)	532	482	494	480
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	<0.1	<0.1	<0.1
Anions (meq/L)	140	148	136	150
Antimony-Total (mg/L)	0	0	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	0.001	0.001
Arsenic-Total (mg/L)	0	0	0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	0	0	<0.1	<0.1
Beryllium-Total (mg/L)	0	0	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	649	588	602	585
Boron-Dissolved (mg/L)	0.9	0.8	0.8	0.7
Boron-Total (mg/L)	0	0	0.7	0.7
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	0	0	<0.005	<0.005
Calcium-Dissolved (mg/L)	420	454	478	516
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	130	138	147	157
Chloride (mg/L)	1720	1780	1290	1710
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	0	0	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	11000	10800	11600	12100
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	0	0	<0.01	<0.01
Fluoride (mg/L)	<0.1	0.1	<0.1	0.7
Gross Alpha-Dissolved (pCi/L)	41	38.7	129	43.1
Gross Beta-Dissolved (pCi/L)	<2	<2	-2	-30
Gross Gamma-Dissolved (pCi/L)	1100	1000	<20	0
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0	0	0.12	0.04
Lead 210-Dissolved (pCi/L)	<1	1.1	2.1	0
Lead 210-Suspended (pCi/L)	<1	<1	<1	-2.3
Lead 210-Total (pCi/L)	<1	0	0	0
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	0	0	<0.001	<0.001
Magnesium-Dissolved (mg/L)	360	395	414	454
Manganese-Dissolved (mg/L)	2.89	2.55	2.59	1.62
Manganese-Total (mg/L)	0	0	2.65	1.71
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0	0	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	0	0	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	0.2	<0.1	0.11

Well #677				
Analyte	**9/28/2007 12:26**	**11/27/2007 15:20**	**2/5/2008 13:39**	**4/29/2008 15:14**
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)	0	200	170	210
pH	7.09	7.14	7.13	7.28
Polonium 210-Dissolved (pCi/L)	<1	<1	2.2	0.4
Polonium 210-Suspended (pCi/L)	<1	2.5	<1	-0.2
Polonium 210-Total (pCi/L)	<1	0	0	0
Potassium-Dissolved (mg/L)	13.2	11	11.3	9.8
Radium 226-Dissolved (pCi/L)	0.9	<0.2	<0.2	0
Radium 226-Suspended (pCi/L)	<0.2	2.7	<0.2	0.3
Radium 226-Total (pCi/L)	<0.2	0	0	0
Radon 222-Total (pCi/L)	0	892	808	1250
Selenium-Dissolved (mg/L)	0.003	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0	0	0.006	<0.001
Selenium-VI-Dissolved (mg/L)	0	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	10.2	10	9.4	4.2
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	0	0	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	0	16	16	17
Sodium-Dissolved (mg/L)	1810	1880	2030	2140
Solids-Total Dissolved Calculated (mg/L)	8510	9070	8830	9550
Solids-Total Dissolved TDS @ 180 C (mg/L)	8900	9700	9600	9100
Strontium-Total (mg.L)	0	0	10	11.6
Sulfate (mg/L)	4390	4590	4310	4410
TDS Balance (0.80 - 1.20) (dec.%)	1.04	1.07	1.09	0.95
Thallium-Total (mg/L)	0	0	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	0
Thorium 230-Suspended (pCi/L)	<0.2	2.2	0.3	0.1
Thorium 230-Total (pCi/L)	<0.2	0	0	0
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0218	0.0443	0.0402	0.045
Uranium-Suspended (mg/L)	0.027	0.0049	<0.0003	<0.0003
Uranium-Total (mg/L)	0	0	0.0414	0.0471
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.02	0.02	<0.01	<0.01
Zinc-Total (mg/L)	0	0	<0.01	0.01

POWERTECH (USA) INC.

Well #677								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.285	3.950979	-3.71	-0.63	3.485	-3.76	3.88	4
Alkalinity-Total as CaCO3 (mg/L)	497	24.13849	480.5	488	522.5	480	532	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.0875	0.075	0.05	0.05	0.1625	0.05	0.2	4
Anions (meq/L)	143.5	6.608076	137	144	149.5	136	150	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.001125	0.000629	0.000625	0.001	0.00175	0.0005	0.002	4
Arsenic-Total (mg/L)	0.001			0.001		0.001	0.001	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	606	29.60856	585.75	595	637.25	585	649	4
Boron-Dissolved (mg/L)	0.8	0.08165	0.725	0.8	0.875	0.7	0.9	4
Boron-Total (mg/L)	0.7			0.7		0.7	0.7	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	467	40.41452	428.5	466	506.5	420	516	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	143	11.63329	132	142.5	154.5	130	157	4
Chloride (mg/L)	1625	225.4625	1395	1715	1765	1290	1780	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	11375	590.9033	10850	11300	11975	10800	12100	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.225	0.317543	0.05	0.075	0.55	0.05	0.7	4
Gross Alpha-Dissolved (pCi/L)	62.95	44.06998	39.275	42.05	107.525	38.7	129	4
Gross Beta-Dissolved (pCi/L)	-7.5	15.06652	-23	-0.5	1	-30	1	4
Gross Gamma-Dissolved (pCi/L)	527.5	604.7245	2.5	505	1075		1100	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.08	0.056569		0.08		0.04	0.12	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	0.925	0.903235	0.125	0.8	1.85		2.1	4
Lead 210-Suspended (pCi/L)	-0.2	1.4	-1.6	0.5	0.5	-2.3	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	405.75	39.17801	368.75	404.5	444	360	454	4
Manganese-Dissolved (mg/L)	2.4125	0.549689	1.8525	2.57	2.815	1.62	2.89	4
Manganese-Total (mg/L)	2.18	0.66468		2.18		1.71	2.65	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

Well #677								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.1025	0.070887	0.05	0.08	0.1775	0.05	0.2	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	193.3333	20.81666	170	200	210	170	210	3
pH	7.16	0.082865	7.1	7.135	7.245	7.09	7.28	4
Polonium 210-Dissolved (pCi/L)	0.9	0.867948	0.425	0.5	1.775	0.4	2.2	4
Polonium 210-Suspended (pCi/L)	0.825	1.164403	-0.025	0.5	2	-0.2	2.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.325	1.408013	10.1	11.15	12.725	9.8	13.2	4
Radium 226-Dissolved (pCi/L)	0.366667	0.46188	0.1	0.1	0.9	0.1	0.9	3
Radium 226-Suspended (pCi/L)	0.8	1.270171	0.1	0.2	2.1	0.1	2.7	4
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	983.3333	234.7282	808	892	1250	808	1250	3
Selenium-Dissolved (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.00325	0.003889		0.00325		0.0005	0.006	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	8.45	2.853653	5.5	9.7	10.15	4.2	10.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	1965	148.4363	1827.5	1955	2112.5	1810	2140	4
Sodium Adsorption Ratio (SAR) (meq/L)	16.33333	0.57735	16	16	17	16	17	3
Solids-Total Dissolved Calculated (mg/L)	8990	438.178	8590	8950	9430	8510	9550	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	9325	386.221	8950	9350	9675	8900	9700	4
Strontium-Total (mg.L)	10.8	1.131371		10.8		10	11.6	2
Sulfate (mg/L)	4425	118.1807	4330	4400	4545	4310	4590	4
TDS Balance (0.80 - 1.20) (dec.%)	1.0375	0.061847	0.9725	1.055	1.085	0.95	1.09	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.675	1.021029	0.1	0.2	1.725	0.1	2.2	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.037825	0.010891	0.0264	0.04225	0.044825	0.0218	0.045	4
Uranium-Suspended (mg/L)	0.00805	0.01283	0.00015	0.002525	0.021475	0.00015	0.027	4
Uranium-Total (mg/L)	0.04425	0.004031		0.04425		0.0414	0.0471	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.0125	0.00866	0.005	0.0125	0.02	0.005	0.02	4
Zinc-Total (mg/L)	0.0075	0.003536		0.0075		0.005	0.01	2

POWERTECH (USA) INC.

Well #678					
Analyte	**9/28/2007 16:22**	**11/27/2007 13:40**	**2/5/2008 15:39**	**2/5/2008 15:45**	**4/29/2008 13:41**
A/C Balance (± 5) (%)	-0.532	0.551	<0	<0	1.9
Alkalinity-Total as CaCO3 (mg/L)	490	480	468	472	478
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	78.6	83.1	85.9	87.6	89.1
Antimony-Total (mg/L)			<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)			0.002	0.001	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	597	585	570	575	583
Boron-Dissolved (mg/L)	1.3	1.4	1.6	1.6	1.4
Boron-Total (mg/L)			1.6	1.6	1.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	397	422	428	412	457
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	77.8	84	85.3	84.6	92.6
Chloride (mg/L)	64	61	96	94	54
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	5710	5780	6020	5990	6300
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01	<0.01
Fluoride (mg/L)	0.6	0.9	<0.1	0.9	1
Gross Alpha-Dissolved (pCi/L)	23.2	18.9	41.5	30.2	54.7
Gross Beta-Dissolved (pCi/L)	8.1	35.3	16	<2	12.8
Gross Gamma-Dissolved (pCi/L)	1100	1100	<20	100	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			0.04	0.04	<0.03
Lead 210-Dissolved (pCi/L)	<1	4	3.3	<1	-1.2
Lead 210-Suspended (pCi/L)	<1	<1	<1	<1	-1.5
Lead 210-Total (pCi/L)	<1				
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	398	434	434	438	500
Manganese-Dissolved (mg/L)	2.85	3.31	2.39	2.79	2.66
Manganese-Total (mg/L)			2.72	2.61	2.61
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05	<0.05

POWERTECH (USA) INC.

Well #678					
Analyte	**9/28/2007 16:22**	**11/27/2007 13:40**	**2/5/2008 15:39**	**2/5/2008 15:45**	**4/29/2008 13:41**
Nitrogen, Nitrate as N (mg/L)	0.2	0.2	0.1	0.1	0.09
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.05
Oxidation-Reduction Potential (mV)		210	200	200	260
pH	7.23	7.42	7.34	7.36	7.55
Polonium 210-Dissolved (pCi/L)	<1	<1	2.4	1	1.3
Polonium 210-Suspended (pCi/L)	<1	1.3	<1	<1	
Polonium 210-Total (pCi/L)	<1				
Potassium-Dissolved (mg/L)	18.9	20.1	20.2	20	17.4
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	<0.2	<0.2	
Radium 226-Suspended (pCi/L)	<0.2	0.7	<0.2	<0.2	0.7
Radium 226-Total (pCi/L)	<0.2				
Radon 222-Total (pCi/L)		391	487	418	687
Selenium-Dissolved (mg/L)	0.003	<0.001	0.002	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.005	0.004	0.003
Selenium-VI-Dissolved (mg/L)		<0.001	0.002	<0.001	<0.001
Silica-Dissolved (mg/L)	14.9	15.4	16.3	16.3	7.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		5	5.2	5.1	4.9
Sodium-Dissolved (mg/L)	564	609	634	628	643
Solids-Total Dissolved Calculated (mg/L)	4950	5280	5440	5500	5730
Solids-Total Dissolved TDS @ 180 C (mg/L)	6000	6100	6000	6000	5400
Strontium-Total (mg.L)			10.2	9.7	11
Sulfate (mg/L)	3220	3440	3540	3620	3740
TDS Balance (0.80 - 1.20) (dec.%)	1.21	1.16	1.1	1.1	0.95
Thallium-Total (mg/L)			<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	0.3	<0.2	0.2
Thorium 230-Suspended (pCi/L)	<0.2	<0.2	<0.2	<0.2	0.1
Thorium 230-Total (pCi/L)	<0.2				
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0352	0.0349	0.0368	0.0368	0.0355
Uranium-Suspended (mg/L)	0.0032	0.0008	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)			0.0379	0.0352	0.0387
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.2
Zinc-Dissolved (mg/L)	0.01	0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			<0.01	<0.01	<0.01

Powertech (USA) Inc.

Well #678								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	0.3838	0.930069	-0.266		1.2255	-0.532	1.9	5
Alkalinity-Total as CaCO3 (mg/L)	477.6	8.414274	470	478	485	468	490	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Anions (meq/L)	84.86	4.148855	80.85	85.9	88.35	78.6	89.1	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.0011	0.000548	0.00075	0.001	0.0015	0.0005	0.002	5
Arsenic-Total (mg/L)	0.001333	0.000577	0.001	0.001	0.002	0.001	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Bicarbonate as HCO3 (mg/L)	582	10.34408	572.5	583	591	570	597	5
Boron-Dissolved (mg/L)	1.46	0.134164	1.35	1.4	1.6	1.3	1.6	5
Boron-Total (mg/L)	1.533333	0.11547	1.4	1.6	1.6	1.4	1.6	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	423.2	22.24185	404.5	422	442.5	397	457	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	84.86	5.261939	80.9	84.6	88.95	77.8	92.6	5
Chloride (mg/L)	73.8	19.70279	57.5	64	95	54	96	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	5960	231.8405	5745	5990	6160	5710	6300	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.69	0.387943	0.325	0.9	0.95	0.05	1	5
Gross Alpha-Dissolved (pCi/L)	33.7	14.5205	21.05	30.2	48.1	18.9	54.7	5
Gross Beta-Dissolved (pCi/L)	14.64	12.85391	4.55	12.8	25.65	1	35.3	5
Gross Gamma-Dissolved (pCi/L)	462	583.7123	5	100	1100		1100	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	0.031667	0.014434	0.015	0.04	0.04	0.015	0.04	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	1.42	2.164948	-0.35	0.5	3.65	-1.2	4	5
Lead 210-Suspended (pCi/L)	0.1	0.894427	-0.5	0.5	0.5	-1.5	0.5	5
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	440.8	36.86733	416	434	469	398	500	5
Manganese-Dissolved (mg/L)	2.8	0.335559	2.525	2.79	3.08	2.39	3.31	5
Manganese-Total (mg/L)	2.646667	0.063509	2.61	2.61	2.72	2.61	2.72	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000367	0.000207	0.0001	0.0005	0.0005	0.0001	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.023333	0.023094	0.01	0.01	0.05	0.01	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3

POWERTECH (USA) INC.

Well #678								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.138	0.056745	0.095	0.1	0.2	0.09	0.2	5
Nitrogen, Nitrite as N (mg/L)	0.045	0.01118	0.0375	0.05	0.05	0.025	0.05	5
Oxidation-Reduction Potential (mV)	217.5	28.72281	200	205	247.5	200	260	4
pH	7.38	0.11726	7.285	7.36	7.485	7.23	7.55	5
Polonium 210-Dissolved (pCi/L)	1.14	0.782943	0.5	1	1.85	0.5	2.4	5
Polonium 210-Suspended (pCi/L)	0.56	0.466905	0.25	0.5	0.9		1.3	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	19.32	1.194571	18.15	20	20.15	17.4	20.2	5
Radium 226-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Radium 226-Suspended (pCi/L)	0.34	0.328634	0.1	0.1	0.7	0.1	0.7	5
Radium 226-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	495.75	133.7544	397.75	452.5	637	391	687	4
Selenium-Dissolved (mg/L)	0.0013	0.001151	0.0005	0.0005	0.0025	0.0005	0.003	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.004	0.001	0.003	0.004	0.005	0.003	0.005	3
Selenium-VI-Dissolved (mg/L)	0.000875	0.00075	0.0005	0.0005	0.001625	0.0005	0.002	4
Silica-Dissolved (mg/L)	14.16	3.550775	11.4	15.4	16.3	7.9	16.3	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	615.6	31.42133	586.5	628	638.5	564	643	5
Sodium Adsorption Ratio (SAR) (meq/L)	5.05	0.129099	4.925	5.05	5.175	4.9	5.2	4
Solids-Total Dissolved Calculated (mg/L)	5380	289.5686	5115	5440	5615	4950	5730	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	5900	282.8427	5700	6000	6050	5400	6100	5
Strontium-Total (mg.L)	10.3	0.655744	9.7	10.2	11	9.7	11	3
Sulfate (mg/L)	3512	196.774	3330	3540	3680	3220	3740	5
TDS Balance (0.80 - 1.20) (dec.%)	1.104	0.097622	1.025	1.1	1.185	0.95	1.21	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)	0.16	0.089443	0.1	0.1	0.25	0.1	0.3	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.03584	0.000902	0.03505	0.0355	0.0368	0.0349	0.0368	5
Uranium-Suspended (mg/L)	0.00089	0.001322	0.00015	0.00015	0.002	0.00015	0.0032	5
Uranium-Total (mg/L)	0.037267	0.001834	0.0352	0.0379	0.0387	0.0352	0.0387	3
Vanadium-Dissolved (mg/L)	0.08	0.067082	0.05	0.05	0.125	0.05	0.2	5
Zinc-Dissolved (mg/L)	0.007	0.002739	0.005	0.005	0.01	0.005	0.01	5
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3

POWERTECH (USA) INC.

Well #679				
Analyte	9/28/2007 15:04	11/14/2007 13:45	2/3/2008 16:25	5/18/2008 18:00
A/C Balance (± 5) (%)	-1.81	-1.35	1.37	6.81
Alkalinity-Total as CaCO3 (mg/L)	140	136	144	158
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	32.7	34.4	33	33.6
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)			0.007	0.011
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			0.2	0.3
Beryllium-Total (mg/L)			<0.001	0.002
Bicarbonate as HCO3 (mg/L)	171	166	176	193
Boron-Dissolved (mg/L)	0.4	0.4	0.4	0.4
Boron-Total (mg/L)			<0.1	0.4
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.001	<0.001
Calcium-Dissolved (mg/L)	414	447	440	515
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	31.5	33.5	33.9	38.5
Chloride (mg/L)	12	12	13	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2520	2470	1970	2880
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			0.02	0.03
Fluoride (mg/L)	0.3	0.2	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	19.9	13.3	18.4	22.4
Gross Beta-Dissolved (pCi/L)	10.7	16.3	7.2	10.8
Gross Gamma-Dissolved (pCi/L)	1200	1500	86	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)			14.9	26.4
Lead 210-Dissolved (pCi/L)	<1	9.1	<1	4.5
Lead 210-Suspended (pCi/L)	<1	<1	<1	-9.8
Lead 210-Total (pCi/L)	<1			
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)			0.015	0.022
Magnesium-Dissolved (mg/L)	89	92.5	100	109
Manganese-Dissolved (mg/L)	0.14	0.04	0.03	0.04
Manganese-Total (mg/L)			0.35	0.57
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.0002	<0.001		<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)			0.01	0.02
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)			<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	1.2	1.3	1.3	1.1

Well #679				
Analyte	**9/28/2007 15:04**	**11/14/2007 13:45**	**2/3/2008 16:25**	**5/18/2008 18:00**
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		230	200	240
pH	7.53	7.34	7.66	7.83
Polonium 210-Dissolved (pCi/L)	1.1	2.3	<1	-0.1
Polonium 210-Suspended (pCi/L)	<1	<1	<1	-0.3
Polonium 210-Total (pCi/L)	<1			
Potassium-Dissolved (mg/L)	12.5	11.4	11.8	11.1
Radium 226-Dissolved (pCi/L)	<0.2	<0.2	0.9	3.7
Radium 226-Suspended (pCi/L)	2.5		9	0.2
Radium 226-Total (pCi/L)	2.5			
Radon 222-Total (pCi/L)		819	2170	1250
Selenium-Dissolved (mg/L)	0.016	0.012	0.013	0.01
Selenium-IV-Dissolved (mg/L)		<0.001	<0.001	<0.001
Selenium-Total (mg/L)			0.014	0.013
Selenium-VI-Dissolved (mg/L)		0.012	0.012	0.01
Silica-Dissolved (mg/L)	10.4	12.6	12.7	6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)			<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)		0.84	0.87	0.86
Sodium-Dissolved (mg/L)	73	74.9	77.6	82
Solids-Total Dissolved Calculated (mg/L)	2110	2230	2160	2290
Solids-Total Dissolved TDS @ 180 C (mg/L)	2500	2600	2500	2500
Strontium-Total (mg.L)			7.3	7.8
Sulfate (mg/L)	1580	1500	1420	1440
TDS Balance (0.80 - 1.20) (dec.%)	1.19	1.15	1.18	1.09
Thallium-Total (mg/L)			<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	<0.2	<0.2	
Thorium 230-Suspended (pCi/L)	1.9	0.3	0.4	1.4
Thorium 230-Total (pCi/L)	1.9			
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0157	0.0144	0.0139	0.0112
Uranium-Suspended (mg/L)	0.011	0.0008	0.0007	0.0012
Uranium-Total (mg/L)			0.0154	0.0164
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)			0.06	0.09

Well #679								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.255	3.960282	-1.695	0.01	5.45	-1.81	6.81	4
Alkalinity-Total as CaCO3 (mg/L)	144.5	9.574271	137	142	154.5	136	158	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	33.425	0.75	32.775	33.3	34.2	32.7	34.4	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Arsenic-Total (mg/L)	0.009	0.002828		0.009		0.007	0.011	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.25	0.070711		0.25		0.2	0.3	2
Beryllium-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Bicarbonate as HCO3 (mg/L)	176.5	11.73314	167.25	173.5	188.75	166	193	4
Boron-Dissolved (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Boron-Total (mg/L)	0.225	0.247487		0.225		0.05	0.4	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Calcium-Dissolved (mg/L)	454	43.07358	420.5	443.5	498	414	515	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	34.35	2.959167	32	33.7	37.35	31.5	38.5	4
Chloride (mg/L)	12	0.816497	11.25	12	12.75	11	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2460	374.2548	2095	2495	2790	1970	2880	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.025	0.007071		0.025		0.02	0.03	2
Fluoride (mg/L)	0.325	0.095743	0.225	0.35	0.4	0.2	0.4	4
Gross Alpha-Dissolved (pCi/L)	18.5	3.839271	14.575	19.15	21.775	13.3	22.4	4
Gross Beta-Dissolved (pCi/L)	11.25	3.759876	8.075	10.75	14.925	7.2	16.3	4
Gross Gamma-Dissolved (pCi/L)	696.5	765.2771	21.5	643	1425		1500	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	20.65	8.131728		20.65		14.9	26.4	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0185	0.00495		0.0185		0.015	0.022	2
Lead 210-Dissolved (pCi/L)	3.65	4.093491	0.5	2.5	7.95	0.5	9.1	4
Lead 210-Suspended (pCi/L)	-2.075	5.15	-7.225	0.5	0.5	-9.8	0.5	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	97.625	8.863549	89.875	96.25	106.75	89	109	4
Manganese-Dissolved (mg/L)	0.0625	0.051881	0.0325	0.04	0.115	0.03	0.14	4
Manganese-Total (mg/L)	0.46	0.155563		0.46		0.35	0.57	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000217	0.000247	0.00005	0.0001	0.0005	0.00005	0.0005	3
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.015	0.007071		0.015		0.01	0.02	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

Well #679								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	1.225	0.095743	1.125	1.25	1.3	1.1	1.3	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	223.3333	20.81666	200	230	240	200	240	3
pH	7.59	0.207043	7.3875	7.595	7.7875	7.34	7.83	4
Polonium 210-Dissolved (pCi/L)	0.95	1.024695	0.05	0.8	2	-0.1	2.3	4
Polonium 210-Suspended (pCi/L)	0.3	0.4	-0.1	0.5	0.5	-0.3	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	11.7	0.60553	11.175	11.6	12.325	11.1	12.5	4
Radium 226-Dissolved (pCi/L)	1.2	1.708801	0.1	0.5	3	0.1	3.7	4
Radium 226-Suspended (pCi/L)	3.9	4.563989	0.2	2.5	9	0.2	9	3
Radium 226-Total (pCi/L)	2.5			2.5		2.5	2.5	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1413	690.092	819	1250	2170	819	2170	3
Selenium-Dissolved (mg/L)	0.01275	0.0025	0.0105	0.0125	0.01525	0.01	0.016	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0135	0.000707		0.0135		0.013	0.014	2
Selenium-VI-Dissolved (mg/L)	0.011333	0.001155	0.01	0.012	0.012	0.01	0.012	3
Silica-Dissolved (mg/L)	10.425	3.13515	7.1	11.5	12.675	6	12.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	76.875	3.903311	73.475	76.25	80.9	73	82	4
Sodium Adsorption Ratio (SAR) (meq/L)	0.856667	0.015275	0.84	0.86	0.87	0.84	0.87	3
Solids-Total Dissolved Calculated (mg/L)	2197.5	78.89867	2122.5	2195	2275	2110	2290	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	2525	50	2500	2500	2575	2500	2600	4
Strontium-Total (mg.L)	7.55	0.353553		7.55		7.3	7.8	2
Sulfate (mg/L)	1485	71.87953	1425	1470	1560	1420	1580	4
TDS Balance (0.80 - 1.20) (dec.%)	1.1525	0.045	1.105	1.165	1.1875	1.09	1.19	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	1	0.778888	0.325	0.9	1.775	0.3	1.9	4
Thorium 230-Total (pCi/L)	1.9			1.9		1.9	1.9	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0138	0.001892	0.011875	0.01415	0.015375	0.0112	0.0157	4
Uranium-Suspended (mg/L)	0.003425	0.005055	0.000725	0.001	0.00855	0.0007	0.011	4
Uranium-Total (mg/L)	0.0159	0.000707		0.0159		0.0154	0.0164	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.075	0.021213		0.075		0.06	0.09	2

POWERTECH (USA) INC.

Well #680						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
A/C Balance (± 5) (%)		0.26	0.77	10.2	5.04	6.54
Alkalinity-Total as CaCO3 (mg/L)	258	264	262	262	254	188
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	35.2	32.4	33.9	30.6	33.9	33.4
Antimony-Total (mg/L)		<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.026	0.008	0.007	0.004	0.004	0.002
Arsenic-Total (mg/L)		0.009	0.006	0.005	0.004	0.005
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)		<0.001	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	315	322	319	319	310	229
Boron-Dissolved (mg/L)	0.1	0.1	0.1	0.2	0.2	0.2
Boron-Total (mg/L)		0.1	0.1	0.1	0.1	0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)		<0.005	<0.005	<0.001	<0.005	<0.005
Calcium-Dissolved (mg/L)	343	353	368	421	406	415
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	33.5	32.5	34.5	37.6	37.5	38.1
Chloride (mg/L)	15	15	11	12	12	12
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2630	2560	2510	2580	2860	3060
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)		<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.3	0.3	0.5	0.3
Gross Alpha-Dissolved (pCi/L)	4090	6440	4270	6500	4500	4370
Gross Beta-Dissolved (pCi/L)	1330	2320	1390	2250	1530	1320
Gross Gamma-Dissolved (pCi/L)	4700	150	1000	940	21000	5700
Iron-Dissolved (mg/L)	0.43	0.27	0.25	0.19	0.21	0.06
Iron-Total (mg/L)		0.3	0.29	0.34	0.35	0.28
Lead 210-Dissolved (pCi/L)	17		32	37.7	61.8	15.7
Lead 210-Suspended (pCi/L)	<1	-2	-1	20.3	6.8	12
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	113	111	123	129	133	134
Manganese-Dissolved (mg/L)	0.43	0.4	0.42	0.47	0.48	0.49
Manganese-Total (mg/L)		0.43	0.44	0.5	0.52	0.48
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)		<0.1	<0.1	<0.01	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05

Well #680						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		180	280	270	160	130
pH	7.26	7.31	7.56	7.14	7.08	7.32
Polonium 210-Dissolved (pCi/L)	1.7	1.5	0.5	2	1.5	0.4
Polonium 210-Suspended (pCi/L)	<1	0.5	0.3	9.1	1.1	1.3
Potassium-Dissolved (mg/L)	20.7	19.1	19.2	19.5	19.5	19.3
Radium 226-Dissolved (pCi/L)	1180	1150	1230	1430	1240	1410
Radium 226-Suspended (pCi/L)	12.7	1.9	1.6	13.2	1	4.4
Radon 222-Total (pCi/L)	143000	71800	81000	151000	359000	91700
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.9	8.2	8.3	3.8	4.1	4.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)		<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	1.8	1.4	1.4	1.4	1.5	1.5
Sodium-Dissolved (mg/L)	148	120	125	126	132	134
Solids-Total Dissolved Calculated (mg/L)	2210	2080	2190	2080	2240	2250
Solids-Total Dissolved TDS @ 180 C (mg/L)	2400	2200	2300	2300	2300	2500
Strontium-Total (mg.L)		7.3	7.3	8.1	8.2	8.1
Sulfate (mg/L)	1420	1280	1360	1200	1370	1410
TDS Balance (0.80 - 1.20) (dec.%)	1.09	1.05	1.04	1.11	1.04	1.1
Thallium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	0.2	0.3	0.1	0.1	
Thorium 230-Suspended (pCi/L)	0.3	0.2	0.3	0.4		0.1
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.172	0.0569	0.0303	0.0213	0.026	0.0227
Uranium-Suspended (mg/L)	0.0008	<0.0003	<0.0003	0.0004	<0.0003	<0.0003
Uranium-Total (mg/L)		0.0541	0.0291	0.0238	0.0273	0.0244
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.02	<0.01	0.01	<0.01	0.01
Zinc-Total (mg/L)		0.02	0.02	0.02	0.01	0.01

POWERTECH (USA) INC.

Well #680								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.801667	4.151089	0.195	2.905	7.455		10.2	6
Alkalinity-Total as CaCO3 (mg/L)	248	29.61081	237.5	260	262.5	188	264	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.075	0.061237	0.05	0.05	0.0875	0.05	0.2	6
Anions (meq/L)	33.23333	1.575648	31.95	33.65	34.225	30.6	35.2	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0085	0.008849	0.0035	0.0055	0.0125	0.002	0.026	6
Arsenic-Total (mg/L)	0.0058	0.001924	0.0045	0.005	0.0075	0.004	0.009	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0007	0.000447	0.0005	0.0005	0.001	0.0005	0.0015	5
Bicarbonate as HCO3 (mg/L)	302.3333	36.16444	289.75	317	319.75	229	322	6
Boron-Dissolved (mg/L)	0.15	0.054772	0.1	0.15	0.2	0.1	0.2	6
Boron-Total (mg/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	384.3333	33.79744	350.5	387	416.5	343	421	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	35.61667	2.411984	33.25	36	37.725	32.5	38.1	6
Chloride (mg/L)	12.83333	1.722401	11.75	12	15	11	15	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	2700	214.5693	2547.5	2605	2910	2510	3060	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.333333	0.08165	0.3	0.3	0.35	0.3	0.5	6
Gross Alpha-Dissolved (pCi/L)	5028.333	1124.872	4225	4435	6455	4090	6500	6
Gross Beta-Dissolved (pCi/L)	1690	467.4612	1327.5	1460	2267.5	1320	2320	6
Gross Gamma-Dissolved (pCi/L)	5581.667	7881.067	742.5	2850	9525	150	21000	6
Iron-Dissolved (mg/L)	0.235	0.120623	0.1575	0.23	0.31	0.06	0.43	6
Iron-Total (mg/L)	0.312	0.031145	0.285	0.3	0.345	0.28	0.35	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	27.36667	21.47749	11.775	24.5	43.725		61.8	6
Lead 210-Suspended (pCi/L)	6.1	8.767212	-1.25	3.65	14.075	-2	20.3	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	123.8333	9.968283	112.5	126	133.25	111	134	6
Manganese-Dissolved (mg/L)	0.448333	0.03656	0.415	0.45	0.4825	0.4	0.49	6
Manganese-Total (mg/L)	0.474	0.038471	0.435	0.48	0.51	0.43	0.52	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000275	0.000241	0.00005	0.000275	0.0005	0.00005	0.0005	8
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.041	0.020125	0.0275	0.05	0.05	0.005	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5

POWERTECH (USA) INC.

Well #680								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.054167	0.02458	0.04375	0.05	0.0625	0.025	0.1	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Oxidation-Reduction Potential (mV)	170	102.7619	97.5	170	272.5		280	6
pH	7.278333	0.167859	7.125	7.285	7.38	7.08	7.56	6
Polonium 210-Dissolved (pCi/L)	1.266667	0.659293	0.475	1.5	1.775	0.4	2	6
Polonium 210-Suspended (pCi/L)	2.133333	3.434919	0.45	0.8	3.25	0.3	9.1	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	19.55	0.585662	19.175	19.4	19.8	19.1	20.7	6
Radium 226-Dissolved (pCi/L)	1273.333	118.4342	1172.5	1235	1415	1150	1430	6
Radium 226-Suspended (pCi/L)	5.8	5.660742	1.45	3.15	12.825	1	13.2	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	149583.3	107708	78700	117350	203000	71800	359000	6
Selenium-Dissolved (mg/L)	0.001167	0.001033	0.0005	0.0005	0.0025	0.0005	0.0025	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Silica-Dissolved (mg/L)	6.283333	2.411155	4.025	6.3	8.45	3.8	8.9	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	130.8333	9.80646	123.75	129	137.5	120	148	6
Sodium Adsorption Ratio (SAR) (meq/L)	1.5	0.154919	1.4	1.45	1.575	1.4	1.8	6
Solids-Total Dissolved Calculated (mg/L)	2175	76.61593	2080	2200	2242.5	2080	2250	6
Solids-Total Dissolved TDS @ 180 C (mg/L)	2333.333	103.2796	2275	2300	2425	2200	2500	6
Strontium-Total (mg.L)	7.8	0.458258	7.3	8.1	8.15	7.3	8.2	5
Sulfate (mg/L)	1340	84.61678	1260	1365	1412.5	1200	1420	6
TDS Balance (0.80 - 1.20) (dec.%)	1.071667	0.031885	1.04	1.07	1.1025	1.04	1.11	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.133333	0.10328	0.075	0.1	0.225		0.3	6
Thorium 230-Suspended (pCi/L)	0.216667	0.147196	0.075	0.25	0.325		0.4	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.054867	0.05886	0.02235	0.02815	0.085675	0.0213	0.172	6
Uranium-Suspended (mg/L)	0.0003	0.000265	0.00015	0.00015	0.0005	0.00015	0.0008	6
Uranium-Total (mg/L)	0.03174	0.012684	0.0241	0.0273	0.0416	0.0238	0.0541	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.009167	0.005845	0.005	0.0075	0.0125	0.005	0.02	6
Zinc-Total (mg/L)	0.016	0.005477	0.01	0.02	0.02	0.01	0.02	5

POWERTECH (USA) INC.

Well #681						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
A/C Balance (± 5) (%)		-0.5	2.67	5.47	5.53	4.51
Alkalinity-Total as CaCO3 (mg/L)	174	172	172	174	180	170
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	14.2	13.9	13.5	13.3	13.8	13.2
Antimony-Total (mg/L)		<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.003	0.002	0.002	0.002	0.002	0.002
Arsenic-Total (mg/L)		0.005	0.002	0.003	0.004	0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	212	210	210	212	219	207
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Boron-Total (mg/L)		<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)		<0.005	<0.005	<0.001	<0.001	<0.005
Calcium-Dissolved (mg/L)	60.3	59.9	62	65.5	68.4	62.3
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	13.5	13.8	14.3	14.8	15.4	14.5
Chloride (mg/L)	13	17	13	15	16	15
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1320	1320	1330	1390	1500	1390
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)		<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4	0.6	0.5	0.4
Gross Alpha-Dissolved (pCi/L)	656	2170	1400	2220	1220	1390
Gross Beta-Dissolved (pCi/L)	226	659	430	675	304	364
Gross Gamma-Dissolved (pCi/L)	13000	2300	3400	290	6600	210
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)		<0.03	<0.03	0.04	0.05	0.04
Lead 210-Dissolved (pCi/L)	46		49.9	40.5	38.2	42.2
Lead 210-Suspended (pCi/L)	1.7	16.8	16.7	20.8	20.2	6.2
Lead-Dissolved (mg/L)	0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	0.013
Magnesium-Dissolved (mg/L)	22.3	23.9	25	25.1	25.5	24
Manganese-Dissolved (mg/L)	0.09	0.08	0.09	0.1	0.1	0.08
Manganese-Total (mg/L)		0.08	0.09	0.1	0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)		<0.1	<0.1	<0.01	<0.01	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)		<0.05	<0.05	<0.05	<0.05	<0.05

POWERTECH (USA) INC.

Well #681						
Analyte	**1/30/2008 13:50**	**3/31/2008 15:15**	**4/21/2008 21:21**	**5/13/2008 16:06**	**5/21/2008 12:50**	**6/10/2008 10:50**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)		170	280	240	220	140
pH	7.98	7.8	8.02	7.91	8.15	7.99
Polonium 210-Dissolved (pCi/L)	2.6	0.6	3.5	1.6	1.2	0.7
Polonium 210-Suspended (pCi/L)	1.6	1.2		2.4	3.2	1.4
Potassium-Dissolved (mg/L)	10.3	9.2	10	9.6	9.6	9.7
Radium 226-Dissolved (pCi/L)	421	414	377	407	423	434
Radium 226-Suspended (pCi/L)	9.9	3.5	0.2	1.8	1.6	0.7
Radon 222-Total (pCi/L)	462000	254000	253000	246	462000	389000
Selenium-Dissolved (mg/L)	<0.005	<0.001	<0.001	<0.005	<0.005	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	7.2	7.2	4	4.3	3.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)		<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	5.4	5.4	5.5	5.6	5.8	5.7
Sodium-Dissolved (mg/L)	192	197	204	212	221	210
Solids-Total Dissolved Calculated (mg/L)	901	908	903	891	926	883
Solids-Total Dissolved TDS @ 180 C (mg/L)	930	910	940	900	890	880
Strontium-Total (mg.L)		1.2	1.2	1.3	1.3	1.1
Sulfate (mg/L)	498	478	466	449	465	449
TDS Balance (0.80 - 1.20) (dec.%)	1.03	1.01	1.04	1.01	0.97	0.99
Thallium-Total (mg/L)		<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	<0.2	0.3			0.1	
Thorium 230-Suspended (pCi/L)	<0.2	0.2	0.2	0.7	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0117	0.0092	0.0098	0.0095	0.0096	0.0097
Uranium-Suspended (mg/L)	0.001	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)		0.0099	0.0102	0.0104	0.0108	0.0102
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)		<0.01	<0.01	<0.01	0.01	<0.01

POWERTECH (USA) INC.

Well #681								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	2.946667	2.687889	-0.125	3.59	5.485	-0.5	5.53	6
Alkalinity-Total as CaCO3 (mg/L)	173.6667	3.444803	171.5	173	175.5	170	180	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Anions (meq/L)	13.65	0.383406	13.275	13.65	13.975	13.2	14.2	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.002167	0.000408	0.002	0.002	0.00225	0.002	0.003	6
Arsenic-Total (mg/L)	0.003	0.001581	0.0015	0.003	0.0045	0.001	0.005	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Bicarbonate as HCO3 (mg/L)	211.6667	4.033196	209.25	211	213.75	207	219	6
Boron-Dissolved (mg/L)	0.058333	0.020412	0.05	0.05	0.0625	0.05	0.1	6
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0017	0.001095	0.0005	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	63.06667	3.279431	60.2	62.15	66.225	59.9	68.4	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	14.38333	0.685322	13.725	14.4	14.95	13.5	15.4	6
Chloride (mg/L)	14.83333	1.602082	13	15	16.25	13	17	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1375	69.4982	1320	1360	1417.5	1320	1500	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.45	0.083666	0.4	0.4	0.525	0.4	0.6	6
Gross Alpha-Dissolved (pCi/L)	1509.333	596.5925	1079	1395	2182.5	656	2220	6
Gross Beta-Dissolved (pCi/L)	443	186.172	284.5	397	663	226	675	6
Gross Gamma-Dissolved (pCi/L)	4300	4870.281	270	2850	8200	210	13000	6
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	6
Iron-Total (mg/L)	0.032	0.016047	0.015	0.04	0.045	0.015	0.05	5
Lead-Dissolved (mg/L)	0.001083	0.001429	0.0005	0.0005	0.001375	0.0005	0.004	6
Lead-Total (mg/L)	0.003	0.00559	0.0005	0.0005	0.00675	0.0005	0.013	5
Lead 210-Dissolved (pCi/L)	36.13333	18.18039	28.65	41.35	46.975		49.9	6
Lead 210-Suspended (pCi/L)	13.73333	7.893204	5.075	16.75	20.35	1.7	20.8	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	24.3	1.167904	23.5	24.5	25.2	22.3	25.5	6
Manganese-Dissolved (mg/L)	0.09	0.008944	0.08	0.09	0.1	0.08	0.1	6
Manganese-Total (mg/L)	0.088	0.008367	0.08	0.09	0.095	0.08	0.1	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000957	0.001796	0.00005	0.0005	0.0005	0.00005	0.005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.032	0.024648	0.005	0.05	0.05	0.005	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5

POWERTECH (USA) INC.

Well #681								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Oxidation-Reduction Potential (mV)	175	99.14636	105	195	250		280	6
pH	7.975	0.116404	7.8825	7.985	8.0525	7.8	8.15	6
Polonium 210-Dissolved (pCi/L)	1.7	1.141928	0.675	1.4	2.825	0.6	3.5	6
Polonium 210-Suspended (pCi/L)	1.633333	1.091177	0.9	1.5	2.6		3.2	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	9.733333	0.377712	9.5	9.65	10.075	9.2	10.3	6
Radium 226-Dissolved (pCi/L)	412.6667	19.68417	399.5	417.5	425.75	377	434	6
Radium 226-Suspended (pCi/L)	2.95	3.588175	0.575	1.7	5.1	0.2	9.9	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	303374.3	175794.3	189811.5	321500	462000	246	462000	6
Selenium-Dissolved (mg/L)	0.0015	0.001095	0.0005	0.0015	0.0025	0.0005	0.0025	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.0008	0.000671	0.0005	0.0005	0.00125	0.0005	0.002	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Silica-Dissolved (mg/L)	5.783333	1.913548	3.975	5.75	7.425	3.9	8.1	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	206	10.56409	195.75	207	214.25	192	221	6
Sodium Adsorption Ratio (SAR) (meq/L)	5.566667	0.163299	5.4	5.55	5.725	5.4	5.8	6
Solids-Total Dissolved Calculated (mg/L)	902	14.8054	889	902	912.5	883	926	6
Solids-Total Dissolved TDS @ 180 C (mg/L)	908.3333	23.16607	887.5	905	932.5	880	940	6
Strontium-Total (mg.L)	1.22	0.083666	1.15	1.2	1.3	1.1	1.3	5
Sulfate (mg/L)	467.5	18.61988	449	465.5	483	449	498	6
TDS Balance (0.80 - 1.20) (dec.%)	1.008333	0.025626	0.985	1.01	1.0325	0.97	1.04	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.083333	0.116905		0.05	0.15		0.3	6
Thorium 230-Suspended (pCi/L)	0.216667	0.248328	0.075	0.15	0.325		0.7	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.009917	0.000898	0.009425	0.00965	0.010275	0.0092	0.0117	6
Uranium-Suspended (mg/L)	0.000292	0.000347	0.00015	0.00015	0.000363	0.00015	0.001	6
Uranium-Total (mg/L)	0.0103	0.000332	0.01005	0.0102	0.0106	0.0099	0.0108	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.005833	0.002041	0.005	0.005	0.00625	0.005	0.01	6
Zinc-Total (mg/L)	0.006	0.002236	0.005	0.005	0.0075	0.005	0.01	5

POWERTECH (USA) INC.

Well #688				
Analyte	**4/2/2008 18:07**	**4/22/2008 13:26**	**6/10/2008 16:37**	**6/30/2008 18:39**
A/C Balance (± 5) (%)	-0.06	12.1	5.73	3.05
Alkalinity-Total as CaCO3 (mg/L)	98	90	100	136
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.5	0.1	0.1	0.2
Anions (meq/L)	11.3	10.2	10.6	11.5
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.002	0.001	0.002
Arsenic-Total (mg/L)	0.002	0.002	<0.002	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	12	76	107	156
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	25.8	50.1	34.1	40.4
Carbonate as CO3 (mg/L)	53	17	7	<5
Cations (meq/L)	11.3	13.1	11.9	12.3
Chloride (mg/L)	13	10	11	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1180	1070	1260	1140
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.5	0.5	0.6
Gross Alpha-Dissolved (pCi/L)	2.9	10.1	17.3	13.2
Gross Beta-Dissolved (pCi/L)	8.8	16.9	17.1	16.5
Gross Gamma-Dissolved (pCi/L)				1000
Iron-Dissolved (mg/L)	<0.03	<0.03	0.04	<0.03
Iron-Total (mg/L)	0.07	0.05	0.15	0.08
Lead 210-Dissolved (pCi/L)		-2.7	-0.5	-0.1
Lead 210-Suspended (pCi/L)	-0.4	-0.1	4.8	-2.3
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.003
Magnesium-Dissolved (mg/L)	13.6	20.5	16.6	19.2
Manganese-Dissolved (mg/L)	<0.01	0.06	0.02	0.02
Manganese-Total (mg/L)	0.03	0.01	0.01	0.02
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
	<0.001	<0.001		
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.1	<0.1

POWERTECH (USA) INC.

Well #688				
Analyte	**4/2/2008 18:07**	**4/22/2008 13:26**	**6/10/2008 16:37**	**6/30/2008 18:39**
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	110	280	180	220
pH	10.3	9.15	8.82	8.6
Polonium 210-Dissolved (pCi/L)	1	1.9		
Polonium 210-Suspended (pCi/L)	1	0.4	0.2	0.3
Potassium-Dissolved (mg/L)	16.8	12.2	12.5	12.9
Radium 226-Dissolved (pCi/L)	0.3	1.2	2.5	0.6
Radium 226-Suspended (pCi/L)	0.9	0.02	-0.3	-0.3
Radon 222-Total (pCi/L)	608	307	749	426
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	0.003
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.9	3.7	3.7	3.8
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	7.6	5.9	6.9	6.2
Sodium-Dissolved (mg/L)	193	197	195	191
Solids-Total Dissolved Calculated (mg/L)	771	744	738	774
Solids-Total Dissolved TDS @ 180 C (mg/L)	690	690	740	770
Strontium-Total (mg.L)	1.2	1.2	1.1	1.1
Sulfate (mg/L)	428	390	398	407
TDS Balance (0.80 - 1.20) (dec.%)	0.89	0.92	1.01	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)				
Thorium 230-Suspended (pCi/L)	0.7	15.9	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0008	0.0147	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01

POWERTECH (USA) INC.

Well #688								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
A/C Balance (± 5) (%)	5.205	5.169813	0.7175	4.39	10.5075	-0.06	12.1	4
Alkalinity-Total as CaCO3 (mg/L)	106	20.46135	92	99	127	90	136	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.225	0.189297	0.1	0.15	0.425	0.1	0.5	4
Anions (meq/L)	10.9	0.60553	10.3	10.95	11.45	10.2	11.5	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.0015	0.000577	0.001	0.0015	0.002	0.001	0.002	4
Arsenic-Total (mg/L)	0.002	0.000816	0.00125	0.002	0.00275	0.001	0.003	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	87.75	60.29027	28	91.5	143.75	12	156	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	37.6	10.25638	27.875	37.25	47.675	25.8	50.1	4
Carbonate as CO3 (mg/L)	19.875	22.89969	3.625	12	44	2.5	53	4
Cation/Anion Balance (%)								
Cations (meq/L)	12.15	0.754983	11.45	12.1	12.9	11.3	13.1	4
Chloride (mg/L)	11.25	1.258306	10.25	11	12.5	10	13	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1162.5	79.32003	1087.5	1160	1240	1070	1260	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.5	0.08165	0.425	0.5	0.575	0.4	0.6	4
Gross Alpha-Dissolved (pCi/L)	10.875	6.079679	4.7	11.65	16.275	2.9	17.3	4
Gross Beta-Dissolved (pCi/L)	14.825	4.024405	10.725	16.7	17.05	8.8	17.1	4
Gross Gamma-Dissolved (pCi/L)	250	500			750		1000	4
Iron-Dissolved (mg/L)	0.02125	0.0125	0.015	0.015	0.03375	0.015	0.04	4
Iron-Total (mg/L)	0.0875	0.043493	0.055	0.075	0.1325	0.05	0.15	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.00075	0.0005	0.0005	0.0005	0.00125	0.0005	0.0015	4
Lead 210-Dissolved (pCi/L)	-0.825	1.268529	-2.15	-0.3	-0.025	-2.7		4
Lead 210-Suspended (pCi/L)	0.5	3.02765	-1.825	-0.25	3.575	-2.3	4.8	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	17.475	3.05	14.35	17.9	20.175	13.6	20.5	4
Manganese-Dissolved (mg/L)	0.02625	0.023585	0.00875	0.02	0.05	0.005	0.06	4
Manganese-Total (mg/L)	0.0175	0.009574	0.01	0.015	0.0275	0.01	0.03	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000358	0.00022	8.75E-05	0.0005	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

Well #688								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	197.5	71.35592	127.5	200	265	110	280	4
pH	9.2175	0.756235	8.655	8.985	10.0125	8.6	10.3	4
Polonium 210-Dissolved (pCi/L)	0.725	0.914239		0.5	1.675		1.9	4
Polonium 210-Suspended (pCi/L)	0.475	0.359398	0.225	0.35	0.85	0.2	1	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	13.6	2.152518	12.275	12.7	15.825	12.2	16.8	4
Radium 226-Dissolved (pCi/L)	1.15	0.974679	0.375	0.9	2.175	0.3	2.5	4
Radium 226-Suspended (pCi/L)	0.08	0.567098	-0.3	-0.14	0.68	-0.3	0.9	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	522.5	195.2477	336.75	517	713.75	307	749	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.001125	0.00125	0.0005	0.0005	0.002375	0.0005	0.003	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	4.775	2.083867	3.7	3.75	6.875	3.7	7.9	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	194	2.581989	191.5	194	196.5	191	197	4
Sodium Adsorption Ratio (SAR) (meq/L)	6.65	0.759386	5.975	6.55	7.425	5.9	7.6	4
Solids-Total Dissolved Calculated (mg/L)	756.75	18.39157	739.5	757.5	773.25	738	774	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	722.5	39.47573	690	715	762.5	690	770	4
Strontium-Total (mg.L)	1.15	0.057735	1.1	1.15	1.2	1.1	1.2	4
Sulfate (mg/L)	405.75	16.37834	392	402.5	422.75	390	428	4
TDS Balance (0.80 - 1.20) (dec.%)	0.9525	0.056789	0.8975	0.955	1.005	0.89	1.01	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)								4
Thorium 230-Suspended (pCi/L)	4.175	7.822777	0.025	0.4	12.1		15.9	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00385	0.007234	0.00015	0.000275	0.011125	0.00015	0.0147	4
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

Powertech (USA) Inc.

Well #689				
Analyte	3/30/2008 17:25	4/21/2008 19:50	5/28/2008 22:25	6/25/2008 18:18
A/C Balance (± 5) (%)	-4.96	3.98	2.36	2.76
Alkalinity-Total as CaCO3 (mg/L)	150	148	148	150
Aluminum-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Ammonia (mg/L)	<0.1	0.1	<0.1	<0.1
Anions (meq/L)	12	10.9	11.5	10.8
Antimony-Total (mg/L)	<0.003	0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	0.001	0.001	0.001
Arsenic-Total (mg/L)	<0.003	0.002	0.004	0.003
Barium-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	183	180	180	183
Boron-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	0.1	0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	43.8	48.5	49.2	46.7
Carbonate as CO3 (mg/L)	<5	5	<5	<5
Cations (meq/L)	10.8	11.8	12	11.4
Chloride (mg/L)	7	5	5	5
Chromium-Dissolved (mg/L)	<0.05	0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1080	1110	1010	1270
Copper-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.5	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	64.3	25.5	34.9	36.5
Gross Beta-Dissolved (pCi/L)	21.2	13.2	12.2	15
Gross Gamma-Dissolved (pCi/L)	86		150	
Iron-Dissolved (mg/L)	<0.03	0.03	<0.03	<0.03
Iron-Total (mg/L)	0.72	0.52	1.33	1.15
Lead 210-Dissolved (pCi/L)	-31	-2.4	6.3	-6.5
Lead 210-Suspended (pCi/L)		-0.3	-2	1
Lead-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	0.001	<0.001	0.017
Magnesium-Dissolved (mg/L)	15.6	16.8	16.4	16
Manganese-Dissolved (mg/L)	0.03	0.04	0.04	0.04
Manganese-Total (mg/L)	0.06	0.06	0.08	0.07
Mercury-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	0.001	<0.0001	<0.0002
		0.001		
Molybdenum-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	0.05	<0.1	<0.1

POWERTECH (USA) INC.

Well #689				
Analyte	**3/30/2008 17:25**	**4/21/2008 19:50**	**5/28/2008 22:25**	**6/25/2008 18:18**
Nitrogen, Nitrite as N (mg/L)	<0.1	0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	190	300	210	150
pH	7.85	8.02	7.8	8.08
Polonium 210-Dissolved (pCi/L)	1.1	0.7	-0.4	
Polonium 210-Suspended (pCi/L)	0.6	0.6	0.2	0.1
Potassium-Dissolved (mg/L)	7.4	7.9	8.1	7.7
Radium 226-Dissolved (pCi/L)	7.9	4.2	5.7	5.5
Radium 226-Suspended (pCi/L)	2	0.02	0.5	-0.05
Radon 222-Total (pCi/L)	1950	1540	1390	2520
Selenium-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.7	8	4.6	4.3
Silver-Dissolved (mg/L)	<0.005	0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	5.4	5.7	5.8	5.6
Sodium-Dissolved (mg/L)	165	180	184	174
Solids-Total Dissolved Calculated (mg/L)	771	744	764	718
Solids-Total Dissolved TDS @ 180 C (mg/L)	720	760	730	700
Strontium-Total (mg.L)	0.9	1	1	1
Sulfate (mg/L)	421	374	400	366
TDS Balance (0.80 - 1.20) (dec.%)	0.93	1.02	0.95	0.98
Thallium-Total (mg/L)	<0.001	0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2	0.1		
Thorium 230-Suspended (pCi/L)	0.2	0.3	0.4	0.4
Thorium 232-Dissolved (pCi/L)	<0.005	0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0032	0.0037	0.0043	0.0034
Uranium-Suspended (mg/L)	0.0005	0.0003	0.0004	0.0005
Uranium-Total (mg/L)	0.0041	0.004	0.0117	0.006
Vanadium-Dissolved (mg/L)	<0.1	0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	0.01	<0.01	<0.01

POWERTECH (USA) INC.

Well #689								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.035	4.055626	-3.13	2.56	3.675	-4.96	3.98	4
Alkalinity-Total as CaCO3 (mg/L)	149	1.154701	148	149	150	148	150	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Anions (meq/L)	11.3	0.559762	10.825	11.2	11.875	10.8	12	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.002625	0.001109	0.001625	0.0025	0.00375	0.0015	0.004	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	181.5	1.732051	180	181.5	183	180	183	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	47.05	2.409011	44.525	47.6	49.025	43.8	49.2	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	11.5	0.52915	10.95	11.6	11.95	10.8	12	4
Chloride (mg/L)	5.5	1	5	5	6.5	5	7	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1117.5	109.9621	1027.5	1095	1230	1010	1270	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.5		0.5	0.5	0.5	0.5	0.5	4
Gross Alpha-Dissolved (pCi/L)	40.3	16.71965	27.85	35.7	57.35	25.5	64.3	4
Gross Beta-Dissolved (pCi/L)	15.4	4.0365	12.45	14.1	19.65	12.2	21.2	4
Gross Gamma-Dissolved (pCi/L)	59	72.96575		43	134		150	4
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	4
Iron-Total (mg/L)	0.93	0.374433	0.57	0.935	1.285	0.52	1.33	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.004625	0.00825	0.0005	0.0005	0.012875	0.0005	0.017	4
Lead 210-Dissolved (pCi/L)	-8.4	15.98395	-24.875	-4.45	4.125	-31	6.3	4
Lead 210-Suspended (pCi/L)	-0.325	1.24733	-1.575	-0.15	0.75	-2	1	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	16.2	0.516398	15.7	16.2	16.7	15.6	16.8	4
Manganese-Dissolved (mg/L)	0.0375	0.005	0.0325	0.04	0.04	0.03	0.04	4
Manganese-Total (mg/L)	0.0675	0.009574	0.06	0.065	0.0775	0.06	0.08	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

Well #689								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	212.5	63.44289	160	200	277.5	150	300	4
pH	7.9375	0.13376	7.8125	7.935	8.065	7.8	8.08	4
Polonium 210-Dissolved (pCi/L)	0.35	0.675771	-0.3	0.35	1	-0.4	1.1	4
Polonium 210-Suspended (pCi/L)	0.375	0.262996	0.125	0.4	0.6	0.1	0.6	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	7.775	0.298608	7.475	7.8	8.05	7.4	8.1	4
Radium 226-Dissolved (pCi/L)	5.825	1.534872	4.525	5.6	7.35	4.2	7.9	4
Radium 226-Suspended (pCi/L)	0.6175	0.953533	-0.0325	0.26	1.625	-0.05	2	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1850	505.503	1427.5	1745	2377.5	1390	2520	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	6.15	1.970618	4.375	6.15	7.925	4.3	8	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	175.75	8.261356	167.25	177	183	165	184	4
Sodium Adsorption Ratio (SAR) (meq/L)	5.625	0.170783	5.45	5.65	5.775	5.4	5.8	4
Solids-Total Dissolved Calculated (mg/L)	749.25	23.76798	724.5	754	769.25	718	771	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	727.5	25	705	725	752.5	700	760	4
Strontium-Total (mg.L)	0.975	0.05	0.925	1	1	0.9	1	4
Sulfate (mg/L)	390.25	25.11805	368	387	415.75	366	421	4
TDS Balance (0.80 - 1.20) (dec.%)	0.97	0.039158	0.935	0.965	1.01	0.93	1.02	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.075	0.095743		0.05	0.175		0.2	4
Thorium 230-Suspended (pCi/L)	0.325	0.095743	0.225	0.35	0.4	0.2	0.4	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00365	0.00048	0.00325	0.00355	0.00415	0.0032	0.0043	4
Uranium-Suspended (mg/L)	0.000388	0.000165	0.000213	0.00045	0.0005	0.00015	0.0005	4
Uranium-Total (mg/L)	0.00645	0.003619	0.004025	0.00505	0.010275	0.004	0.0117	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

Powertech (USA) Inc.

Well #694					
Analyte	**3/30/2008 10:11**	**4/21/2008 12:24**	**4/21/2008 12:30**	**5/21/2008 15:54**	**6/24/2008 15:16**
A/C Balance (± 5) (%)	-1.48	3.2	4.23	6.92	6.22
Alkalinity-Total as CaCO3 (mg/L)	204	202	204	192	206
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.2	0.2	0.2	0.2
Anions (meq/L)	15.4	15	15	14.4	14.5
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	0.002	0.002	0.002	0.001
Arsenic-Total (mg/L)	0.005	0.002	0.002	0.004	<0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	249	246	249	234	251
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	91.6	97	98.8	103	103
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	15	15.9	16.3	16.5	16.4
Chloride (mg/L)	11	9	9	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1370	1370	1380	1550	1400
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.2	0.2	0.3	0.3
Gross Alpha-Dissolved (pCi/L)	8.8	19.2	18.1	10.6	23.7
Gross Beta-Dissolved (pCi/L)	10.3	15.7	16.2	12.5	15
Gross Gamma-Dissolved (pCi/L)					
Iron-Dissolved (mg/L)	<0.03	0.05	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0.18	0.14	0.12	0.16	0.14
Lead 210-Dissolved (pCi/L)	-9.8		-2.4	-2.3	-0.1
Lead 210-Suspended (pCi/L)			-2.2	1.4	4.8
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	35.4	37.6	38.4	38.6	37.1
Manganese-Dissolved (mg/L)	0.14	0.15	0.15	0.16	0.16
Manganese-Total (mg/L)	0.2	0.15	0.15	0.17	0.16
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.05	<0.1	<0.1

Well #694					
Analyte	3/30/2008 10:11	4/21/2008 12:24	4/21/2008 12:30	5/21/2008 15:54	6/24/2008 15:16
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	280	360	350	210	140
pH	7.65	7.94	7.84	7.54	7.82
Polonium 210-Dissolved (pCi/L)	1.8	1.4	0.6	0.6	
Polonium 210-Suspended (pCi/L)	0.9	0.2	0.7	-0.1	
Potassium-Dissolved (mg/L)	12.3	13	13.5	13.1	13.6
Radium 226-Dissolved (pCi/L)	1.6	4.2	3.7	1.9	2.2
Radium 226-Suspended (pCi/L)	1	-0.4	-0.09	-0.2	-0.3
Radon 222-Total (pCi/L)	313	251	250	619	611
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	8.4	8.3	4.7	4.6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.7	3.8	3.9	3.8	3.9
Sodium-Dissolved (mg/L)	165	176	180	180	180
Solids-Total Dissolved Calculated (mg/L)	990	988	996	965	965
Solids-Total Dissolved TDS @ 180 C (mg/L)	970	1000	990	970	960
Strontium-Total (mg.L)	2.7	2.8	2.8	3	2.9
Sulfate (mg/L)	531	512	511	493	486
TDS Balance (0.80 - 1.20) (dec.%)	0.98	1.01	1	1.01	1
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.2				0.1
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.3	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0005	0.0005	0.0006	0.0006	0.0006
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0006	0.0006	0.0006	0.0006	0.0006
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	0.02	<0.01	<0.01	<0.01	<0.01

POWERTECH (USA) INC.

Well #694								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.818	3.317095	0.86	4.23	6.57	-1.48	6.92	5
Alkalinity-Total as CaCO3 (mg/L)	201.6	5.549775	197	204	205	192	206	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.2		0.2	0.2	0.2	0.2	0.2	5
Anions (meq/L)	14.86	0.409878	14.45	15	15.2	14.4	15.4	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0018	0.000447	0.0015	0.002	0.002	0.001	0.002	5
Arsenic-Total (mg/L)	0.0029	0.001517	0.00175	0.002	0.0045	0.0015	0.005	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Beryllium-Total (mg/L)	0.0007	0.000447	0.0005	0.0005	0.001	0.0005	0.0015	5
Bicarbonate as HCO3 (mg/L)	245.8	6.83374	240	249	250	234	251	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Calcium-Dissolved (mg/L)	98.68	4.751	94.3	98.8	103	91.6	103	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	16.02	0.614003	15.45	16.3	16.45	15	16.5	5
Chloride (mg/L)	9.4	0.894427	9	9	10	9	11	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1414	77.00649	1370	1380	1475	1370	1550	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.26	0.054772	0.2	0.3	0.3	0.2	0.3	5
Gross Alpha-Dissolved (pCi/L)	16.08	6.223102	9.7	18.1	21.45	8.8	23.7	5
Gross Beta-Dissolved (pCi/L)	13.94	2.482539	11.4	15	15.95	10.3	16.2	5
Gross Gamma-Dissolved (pCi/L)								5
Iron-Dissolved (mg/L)	0.022	0.015652	0.015	0.015	0.0325	0.015	0.05	5
Iron-Total (mg/L)	0.148	0.022804	0.13	0.14	0.17	0.12	0.18	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	-2.92	4.014598	-6.1	-2.3	-0.05	-9.8		5
Lead 210-Suspended (pCi/L)	0.8	2.580698	-1.1		3.1	-2.2	4.8	5
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	37.42	1.281405	36.25	37.6	38.5	35.4	38.6	5
Manganese-Dissolved (mg/L)	0.152	0.008367	0.145	0.15	0.16	0.14	0.16	5
Manganese-Total (mg/L)	0.166	0.020736	0.15	0.16	0.185	0.15	0.2	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000379	0.000208	0.0001	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5

POWERTECH (USA) INC.

Well #694								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5
Nitrogen, Nitrite as N (mg/L)	0.04	0.013693	0.025	0.05	0.05	0.025	0.05	5
Oxidation-Reduction Potential (mV)	268	93.64828	175	280	355	140	360	5
pH	7.758	0.160375	7.595	7.82	7.89	7.54	7.94	5
Polonium 210-Dissolved (pCi/L)	0.88	0.715542	0.3	0.6	1.6		1.8	5
Polonium 210-Suspended (pCi/L)	0.34	0.439318	-0.05	0.2	0.8	-0.1	0.9	5
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	13.1	0.514782	12.65	13.1	13.55	12.3	13.6	5
Radium 226-Dissolved (pCi/L)	2.72	1.156287	1.75	2.2	3.95	1.6	4.2	5
Radium 226-Suspended (pCi/L)	0.002	0.569667	-0.35	-0.2	0.455	-0.4	1	5
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	408.8	189.9768	250.5	313	615	250	619	5
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-Total (mg/L)	0.0006	0.000224	0.0005	0.0005	0.00075	0.0005	0.001	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Silica-Dissolved (mg/L)	6.82	1.984187	4.65	8.1	8.35	4.6	8.4	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	176.2	6.496153	170.5	180	180	165	180	5
Sodium Adsorption Ratio (SAR) (meq/L)	3.82	0.083666	3.75	3.8	3.9	3.7	3.9	5
Solids-Total Dissolved Calculated (mg/L)	980.8	14.72073	965	988	993	965	996	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	978	16.43168	965	970	995	960	1000	5
Strontium-Total (mg.L)	2.84	0.114018	2.75	2.8	2.95	2.7	3	5
Sulfate (mg/L)	506.6	17.70028	489.5	511	521.5	486	531	5
TDS Balance (0.80 - 1.20) (dec.%)	1	0.012247	0.99	1	1.01	0.98	1.01	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.06	0.089443			0.15		0.2	5
Thorium 230-Suspended (pCi/L)	0.1	0.122474		0.1	0.2		0.3	5
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00056	5.48E-05	0.0005	0.0006	0.0006	0.0005	0.0006	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.0006		0.0006	0.0006	0.0006	0.0006	0.0006	5
Vanadium-Dissolved (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.008	0.006708	0.005	0.005	0.0125	0.005	0.02	5

Powertech (USA) Inc.

Well #695			
Analyte	4/22/2008 12:46	5/21/2008 14:45	6/24/2008 17:30
A/C Balance (± 5) (%)	2.68	1.68	7.98
Alkalinity-Total as CaCO3 (mg/L)	174	180	174
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.2	0.2	0.1
Anions (meq/L)	14.3	15	13
Antimony-Total (mg/L)	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.001	<0.001
Arsenic-Total (mg/L)	0.001	0.002	<0.001
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	212	219	212
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	50.1	52.1	52.5
Carbonate as CO3 (mg/L)	<5	<5	<5
Cations (meq/L)	15.1	15.5	15.3
Chloride (mg/L)	11	11	11
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1370	1560	1380
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	29.4	25.6	39.7
Gross Beta-Dissolved (pCi/L)	6	8	11
Gross Gamma-Dissolved (pCi/L)		140	
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03
Iron-Total (mg/L)	0.14	0.12	0.12
Lead 210-Dissolved (pCi/L)	-1.8	3.1	0.7
Lead 210-Suspended (pCi/L)	-2.1	-0.7	2.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	17.6	19.4	18.8
Manganese-Dissolved (mg/L)	0.08	0.09	0.08
Manganese-Total (mg/L)	0.08	0.09	0.08
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	0.06	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.05	<0.1	<0.1

POWERTECH (USA) INC.

Well #695			
Analyte	**4/22/2008 12:46**	**5/21/2008 14:45**	**6/24/2008 17:30**
Oxidation-Reduction Potential (mV)	290	190	120
pH	8.08	7.91	8.14
Polonium 210-Dissolved (pCi/L)	1.6	-0.3	0.1
Polonium 210-Suspended (pCi/L)	0.4	-0.2	
Potassium-Dissolved (mg/L)	8.4	8.8	8.7
Radium 226-Dissolved (pCi/L)	5	3.7	5.2
Radium 226-Suspended (pCi/L)	-0.4	-0.2	-0.1
Radon 222-Total (pCi/L)	1400	2090	2120
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	3.9	4.4	4.4
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	7.8	7.6	7.5
Sodium-Dissolved (mg/L)	251	254	250
Solids-Total Dissolved Calculated (mg/L)	957	996	901
Solids-Total Dissolved TDS @ 180 C (mg/L)	910	920	920
Strontium-Total (mg.L)	1	1	1
Sulfate (mg/L)	504	530	442
TDS Balance (0.80 - 1.20) (dec.%)	0.96	0.92	1.02
Thallium-Total (mg/L)	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)			
Thorium 230-Suspended (pCi/L)	0.3		
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0029	0.0029	0.0027
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	0.0032	0.0029	0.0027
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01

Powertech (USA) Inc.

Well #695								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	4.113333	3.385754	1.68	2.68	7.98	1.68	7.98	3
Alkalinity-Total as CaCO3 (mg/L)	176	3.464102	174	174	180	174	180	3
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Ammonia (mg/L)	0.166667	0.057735	0.1	0.2	0.2	0.1	0.2	3
Anions (meq/L)	14.1	1.014889	13	14.3	15	13	15	3
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	3
Arsenic-Dissolved (mg/L)	0.000833	0.000289	0.0005	0.001	0.001	0.0005	0.001	3
Arsenic-Total (mg/L)	0.001167	0.000764	0.0005	0.001	0.002	0.0005	0.002	3
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Beryllium-Total (mg/L)	0.000833	0.000577	0.0005	0.0005	0.0015	0.0005	0.0015	3
Bicarbonate as HCO3 (mg/L)	214.3333	4.041452	212	212	219	212	219	3
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Calcium-Dissolved (mg/L)	51.56667	1.28582	50.1	52.1	52.5	50.1	52.5	3
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	3
Cation/Anion Balance (%)								
Cations (meq/L)	15.3	0.2	15.1	15.3	15.5	15.1	15.5	3
Chloride (mg/L)	11		11	11	11	11	11	3
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Conductivity @ 25 C (umhos/cm)	1436.667	106.9268	1370	1380	1560	1370	1560	3
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Fluoride (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	3
Gross Alpha-Dissolved (pCi/L)	31.56667	7.295432	25.6	29.4	39.7	25.6	39.7	3
Gross Beta-Dissolved (pCi/L)	8.333333	2.516611	6	8	11	6	11	3
Gross Gamma-Dissolved (pCi/L)	46.66667	80.82904			140		140	3
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	3
Iron-Total (mg/L)	0.126667	0.011547	0.12	0.12	0.14	0.12	0.14	3
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Lead 210-Dissolved (pCi/L)	0.666667	2.45017	-1.8	0.7	3.1	-1.8	3.1	3
Lead 210-Suspended (pCi/L)	0.033333	2.579406	-2.1	-0.7	2.9	-2.1	2.9	3
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	18.6	0.916515	17.6	18.8	19.4	17.6	19.4	3
Manganese-Dissolved (mg/L)	0.083333	0.005774	0.08	0.08	0.09	0.08	0.09	3
Manganese-Total (mg/L)	0.083333	0.005774	0.08	0.08	0.09	0.08	0.09	3
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Mercury-Total (mg/L)	0.000288	0.000246	6.25E-05	0.0003	0.0005	0.00005	0.0005	4
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	3

POWERTECH (USA) INC.

Well #695								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.053333	0.005774	0.05	0.05	0.06	0.05	0.06	3
Nitrogen, Nitrite as N (mg/L)	0.041667	0.014434	0.025	0.05	0.05	0.025	0.05	3
Oxidation-Reduction Potential (mV)	200	85.44004	120	190	290	120	290	3
pH	8.043333	0.119304	7.91	8.08	8.14	7.91	8.14	3
Polonium 210-Dissolved (pCi/L)	0.466667	1.001665	-0.3	0.1	1.6	-0.3	1.6	3
Polonium 210-Suspended (pCi/L)	0.066667	0.305505	-0.2		0.4	-0.2	0.4	3
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	8.633333	0.208167	8.4	8.7	8.8	8.4	8.8	3
Radium 226-Dissolved (pCi/L)	4.633333	0.814453	3.7	5	5.2	3.7	5.2	3
Radium 226-Suspended (pCi/L)	-0.23333	0.152753	-0.4	-0.2	-0.1	-0.4	-0.1	3
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	1870	407.3082	1400	2090	2120	1400	2120	3
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.000667	0.000289	0.0005	0.0005	0.001	0.0005	0.001	3
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	4.233333	0.288675	3.9	4.4	4.4	3.9	4.4	3
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Sodium-Dissolved (mg/L)	251.6667	2.081666	250	251	254	250	254	3
Sodium Adsorption Ratio (SAR) (meq/L)	7.633333	0.152753	7.5	7.6	7.8	7.5	7.8	3
Solids-Total Dissolved Calculated (mg/L)	951.3333	47.75284	901	957	996	901	996	3
Solids-Total Dissolved TDS @ 180 C (mg/L)	916.6667	5.773503	910	920	920	910	920	3
Strontium-Total (mg.L)	1		1	1	1	1	1	3
Sulfate (mg/L)	492	45.21062	442	504	530	442	530	3
TDS Balance (0.80 - 1.20) (dec.%)	0.966667	0.050332	0.92	0.96	1.02	0.92	1.02	3
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Thorium 230-Dissolved (pCi/L)								3
Thorium 230-Suspended (pCi/L)	0.1	0.173205			0.3		0.3	3
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	3
Uranium-Dissolved (mg/L)	0.002833	0.000115	0.0027	0.0029	0.0029	0.0027	0.0029	3
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	3
Uranium-Total (mg/L)	0.002933	0.000252	0.0027	0.0029	0.0032	0.0027	0.0032	3
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	3
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	3

Powertech (USA) Inc.

Well #696				
Analyte	**3/31/2008 13:41**	**4/22/2008 16:58**	**5/21/2008 11:55**	**6/24/2008 15:08**
A/C Balance (± 5) (%)	0.93	5.13	3.21	7.89
Alkalinity-Total as CaCO3 (mg/L)	184	182	182	174
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.4	0.4	0.4	0.4
Anions (meq/L)	14	13.9	14.5	13.3
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.002	0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.003	0.002	0.002	<0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	215	222	222	212
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	28	29.9	31	31.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	14.3	15.4	15.5	15.6
Chloride (mg/L)	15	12	12	12
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1440	1410	1420	1390
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	3.9	5.2	14.3	23.9
Gross Beta-Dissolved (pCi/L)	-2.1	10.7	9	9.9
Gross Gamma-Dissolved (pCi/L)				
Iron-Dissolved (mg/L)	<0.03	0.07	0.09	0.1
Iron-Total (mg/L)	0.04	0.08	0.1	0.67
Lead 210-Dissolved (pCi/L)	-11.2	-4.9	-2.7	-5.3
Lead 210-Suspended (pCi/L)			2.1	5.6
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	10	10.4	10.9	11.1
Manganese-Dissolved (mg/L)	0.05	0.06	0.07	0.07
Manganese-Total (mg/L)	0.05	0.06	0.07	0.07
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.05	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1

Powertech (USA) Inc.

Well #696				
Analyte	**3/31/2008 13:41**	**4/22/2008 16:58**	**5/21/2008 11:55**	**6/24/2008 15:08**
Oxidation-Reduction Potential (mV)	170	200	120	99
pH	8.71	8.47	8.35	8.29
Polonium 210-Dissolved (pCi/L)	0.6	0.9	-0.2	0.2
Polonium 210-Suspended (pCi/L)	0.5	0.6		0.5
Potassium-Dissolved (mg/L)	9.7	9.3	9.2	9.4
Radium 226-Dissolved (pCi/L)	1	0.5	1.8	3.3
Radium 226-Suspended (pCi/L)	0.6	-0.2	-0.1	-0.4
Radon 222-Total (pCi/L)	190	185	497	517
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	8.1	4.4	4.7	5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	11	12	12	12
Sodium-Dissolved (mg/L)	270	293	294	295
Solids-Total Dissolved Calculated (mg/L)	941	951	984	934
Solids-Total Dissolved TDS @ 180 C (mg/L)	880	930	930	920
Strontium-Total (mg.L)	0.7	0.8	0.8	0.8
Sulfate (mg/L)	475	475	505	456
TDS Balance (0.80 - 1.20) (dec.%)	0.94	0.98	0.94	0.99
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)				
Thorium 230-Suspended (pCi/L)	0.2	0.2	0.1	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Uranium-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01

POWERTECH (USA) INC.

Well #696								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	4.29	2.950797	1.5	4.17	7.2	0.93	7.89	4
Alkalinity-Total as CaCO3 (mg/L)	180.5	4.434712	176	182	183.5	174	184	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.4		0.4	0.4	0.4	0.4	0.4	4
Anions (meq/L)	13.925	0.492443	13.45	13.95	14.375	13.3	14.5	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.001	0.000707	0.0005	0.00075	0.00175	0.0005	0.002	4
Arsenic-Total (mg/L)	0.002	0.000816	0.00125	0.002	0.00275	0.001	0.003	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.00075	0.0005	0.0005	0.0005	0.00125	0.0005	0.0015	4
Bicarbonate as HCO3 (mg/L)	217.75	5.057997	212.75	218.5	222	212	222	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	30.125	1.581929	28.475	30.45	31.45	28	31.6	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	15.2	0.60553	14.575	15.45	15.575	14.3	15.6	4
Chloride (mg/L)	12.75	1.5	12	12	14.25	12	15	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	1415	20.81666	1395	1415	1435	1390	1440	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.35	0.057735	0.3	0.35	0.4	0.3	0.4	4
Gross Alpha-Dissolved (pCi/L)	11.825	9.284889	4.225	9.75	21.5	3.9	23.9	4
Gross Beta-Dissolved (pCi/L)	6.875	6.023496	0.675	9.45	10.5	-2.1	10.7	4
Gross Gamma-Dissolved (pCi/L)								4
Iron-Dissolved (mg/L)	0.06875	0.037942	0.02875	0.08	0.0975	0.015	0.1	4
Iron-Total (mg/L)	0.2225	0.299374	0.05	0.09	0.5275	0.04	0.67	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead 210-Dissolved (pCi/L)	-6.025	3.634442	-9.725	-5.1	-3.25	-11.2	-2.7	4
Lead 210-Suspended (pCi/L)	1.925	2.642442		1.05	4.725		5.6	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	10.6	0.496655	10.1	10.65	11.05	10	11.1	4
Manganese-Dissolved (mg/L)	0.0625	0.009574	0.0525	0.065	0.07	0.05	0.07	4
Manganese-Total (mg/L)	0.0625	0.009574	0.0525	0.065	0.07	0.05	0.07	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.000283	0.000238	0.00005	0.0003	0.0005	0.00005	0.0005	6
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

POWERTECH (USA) INC.

Well #696								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	147.25	46.08235	104.25	145	192.5	99	200	4
pH	8.455	0.185742	8.305	8.41	8.65	8.29	8.71	4
Polonium 210-Dissolved (pCi/L)	0.375	0.478714	-0.1	0.4	0.825	-0.2	0.9	4
Polonium 210-Suspended (pCi/L)	0.4	0.270801	0.125	0.5	0.575		0.6	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	9.4	0.216025	9.225	9.35	9.625	9.2	9.7	4
Radium 226-Dissolved (pCi/L)	1.65	1.223383	0.625	1.4	2.925	0.5	3.3	4
Radium 226-Suspended (pCi/L)	-0.025	0.434933	-0.35	-0.15	0.425	-0.4	0.6	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	347.25	184.6553	186.25	343.5	512	185	517	4
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.000625	0.00025	0.0005	0.0005	0.000875	0.0005	0.001	4
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Silica-Dissolved (mg/L)	5.55	1.717556	4.475	4.85	7.325	4.4	8.1	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	288	12.02775	275.75	293.5	294.75	270	295	4
Sodium Adsorption Ratio (SAR) (meq/L)	11.75	0.5	11.25	12	12	11	12	4
Solids-Total Dissolved Calculated (mg/L)	952.5	22.12841	935.75	946	975.75	934	984	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	915	23.80476	890	925	930	880	930	4
Strontium-Total (mg.L)	0.775	0.05	0.725	0.8	0.8	0.7	0.8	4
Sulfate (mg/L)	477.75	20.25463	460.75	475	497.5	456	505	4
TDS Balance (0.80 - 1.20) (dec.%)	0.9625	0.0263	0.94	0.96	0.9875	0.94	0.99	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)								4
Thorium 230-Suspended (pCi/L)	0.125	0.095743	0.025	0.15	0.2		0.2	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4

POWERTECH (USA) INC.

Well #697					
Analyte	**3/30/2008 16:36**	**3/31/2008 16:31**	**4/22/2008 16:02**	**5/21/2008 16:44**	**6/24/2008 18:20**
A/C Balance (± 5) (%)	-1.53	1.52	3.91	2.35	6.52
Alkalinity-Total as CaCO3 (mg/L)	166	176	166	168	168
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.2	0.2	0.1	0.1
Anions (meq/L)	13	13.9	12.5	13.1	12.1
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	<0.001	0.001	0.002	0.002
Arsenic-Total (mg/L)	<0.003	0.002	0.002	0.002	0.003
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	0.2
Beryllium-Total (mg/L)	<0.001	<0.005	<0.001	<0.003	<0.001
Bicarbonate as HCO3 (mg/L)	202	215	202	205	205
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.001	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	49.2	48	50.6	52.8	53.4
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	12.6	14.3	13.5	13.7	13.8
Chloride (mg/L)	10	14	8	8	8
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1250	1390	1230	1380	1230
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.5	0.4	0.5	0.5	0.5
Gross Alpha-Dissolved (pCi/L)	6.1	52.2	8.4	4.1	11.9
Gross Beta-Dissolved (pCi/L)	6.8	16.1	8.4	5.4	8.1
Gross Gamma-Dissolved (pCi/L)					
Iron-Dissolved (mg/L)	0.03	0.07	0.04	0.04	0.04
Iron-Total (mg/L)	0.06	0.11	0.05	0.04	0.08
Lead 210-Dissolved (pCi/L)	-23	-12.4	-0.7	-4.3	0.5
Lead 210-Suspended (pCi/L)	-2.8				2.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	16.9	17.8	17.3	18	17.7
Manganese-Dissolved (mg/L)	0.05	0.07	0.05	0.06	0.06
Manganese-Total (mg/L)	0.05	0.08	0.06	0.06	0.06
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	<0.05	<0.1	0.1

POWERTECH (USA) INC.

Well #697					
Analyte	**3/30/2008 16:36**	**3/31/2008 16:31**	**4/22/2008 16:02**	**5/21/2008 16:44**	**6/24/2008 18:20**
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1
Oxidation-Reduction Potential (mV)	200	230	320	200	140
pH	7.83	8.16	8.07	7.9	8.25
Polonium 210-Dissolved (pCi/L)	1.1	1.1			-0.1
Polonium 210-Suspended (pCi/L)	0.9	0.6		1.2	
Potassium-Dissolved (mg/L)	8.1	8.7	8.5	8.5	8.8
Radium 226-Dissolved (pCi/L)	1.5	6.3	1.7	1.1	0.8
Radium 226-Suspended (pCi/L)	0.6	0.6	-0.1	3.8	-0.4
Radon 222-Total (pCi/L)	323	1400	284	570	413
Selenium-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.001	<0.001	<0.001	<0.001	0.005
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	7.4	7.4	4	4.6	4.6
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	6.2	7.3	6.6	6.5	6.6
Sodium-Dissolved (mg/L)	197	234	215	216	218
Solids-Total Dissolved Calculated (mg/L)	853	925	840	873	829
Solids-Total Dissolved TDS @ 180 C (mg/L)	800	870	810	790	810
Strontium-Total (mg.L)	1.1	0.9	1.3	1.2	1.2
Sulfate (mg/L)	452	476	430	456	409
TDS Balance (0.80 - 1.20) (dec.%)	0.93	0.94	0.97	0.91	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)	0.4				
Thorium 230-Suspended (pCi/L)	0.1	0.1	0.1	0.3	0.2
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	<0.0003	0.003	<0.0003	<0.0003	<0.0003
Uranium-Suspended (mg/L)	<0.0003	<0.0003	<0.0003	0.0007	<0.0003
Uranium-Total (mg/L)	<0.0003	0.0031	<0.0003	<0.0003	<0.0003
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	0.01	<0.01

POWERTECH (USA) INC.

Well #697								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	2.554	2.973118	-0.005	2.35	5.215	-1.53	6.52	5
Alkalinity-Total as CaCO3 (mg/L)	168.8	4.147288	166	168	172	166	176	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.14	0.054772	0.1	0.1	0.2	0.1	0.2	5
Anions (meq/L)	12.92	0.679706	12.3	13	13.5	12.1	13.9	5
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	5
Arsenic-Dissolved (mg/L)	0.0013	0.000671	0.00075	0.001	0.002	0.0005	0.002	5
Arsenic-Total (mg/L)	0.0021	0.000548	0.00175	0.002	0.0025	0.0015	0.003	5
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.08	0.067082	0.05	0.05	0.125	0.05	0.2	5
Beryllium-Total (mg/L)	0.0011	0.000894	0.0005	0.0005	0.002	0.0005	0.0025	5
Bicarbonate as HCO3 (mg/L)	205.8	5.357238	202	205	210	202	215	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0021	0.000894	0.0015	0.0025	0.0025	0.0005	0.0025	5
Calcium-Dissolved (mg/L)	50.8	2.302173	48.6	50.6	53.1	48	53.4	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	13.58	0.622093	13.05	13.7	14.05	12.6	14.3	5
Chloride (mg/L)	9.6	2.607681	8	8	12	8	14	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Conductivity @ 25 C (umhos/cm)	1296	81.73127	1230	1250	1385	1230	1390	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Fluoride (mg/L)	0.48	0.044721	0.45	0.5	0.5	0.4	0.5	5
Gross Alpha-Dissolved (pCi/L)	16.54	20.1443	5.1	8.4	32.05	4.1	52.2	5
Gross Beta-Dissolved (pCi/L)	8.96	4.164493	6.1	8.1	12.25	5.4	16.1	5
Gross Gamma-Dissolved (pCi/L)								5
Iron-Dissolved (mg/L)	0.044	0.015166	0.035	0.04	0.055	0.03	0.07	5
Iron-Total (mg/L)	0.068	0.027749	0.045	0.06	0.095	0.04	0.11	5
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead 210-Dissolved (pCi/L)	-7.98	9.792701	-17.7	-4.3	-0.1	-23	0.5	5
Lead 210-Suspended (pCi/L)	0.02	2.01544	-1.4		1.45	-2.8	2.9	5
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	17.54	0.439318	17.1	17.7	17.9	16.9	18	5
Manganese-Dissolved (mg/L)	0.058	0.008367	0.05	0.06	0.065	0.05	0.07	5
Manganese-Total (mg/L)	0.062	0.010954	0.055	0.06	0.07	0.05	0.08	5
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5

POWERTECH (USA) INC.

Well #697								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.055	0.027386	0.0375	0.05	0.075	0.025	0.1	5
Nitrogen, Nitrite as N (mg/L)	0.045	0.01118	0.0375	0.05	0.05	0.025	0.05	5
Oxidation-Reduction Potential (mV)	218	65.72671	170	200	275	140	320	5
pH	8.042	0.175414	7.865	8.07	8.205	7.83	8.25	5
Polonium 210-Dissolved (pCi/L)	0.42	0.622093	-0.05		1.1	-0.1	1.1	5
Polonium 210-Suspended (pCi/L)	0.54	0.536656		0.6	1.05		1.2	5
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	8.52	0.268328	8.3	8.5	8.75	8.1	8.8	5
Radium 226-Dissolved (pCi/L)	2.28	2.274203	0.95	1.5	4	0.8	6.3	5
Radium 226-Suspended (pCi/L)	0.9	1.679286	-0.25	0.6	2.2	-0.4	3.8	5
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	598	461.6368	303.5	413	985	284	1400	5
Selenium-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Selenium-Total (mg/L)	0.0015	0.001969	0.0005	0.0005	0.003	0.0005	0.005	5
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Silica-Dissolved (mg/L)	5.6	1.661325	4.3	4.6	7.4	4	7.4	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Sodium-Dissolved (mg/L)	216	13.13393	206	216	226	197	234	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.64	0.403733	6.35	6.6	6.95	6.2	7.3	5
Solids-Total Dissolved Calculated (mg/L)	864	37.82856	834.5	853	899	829	925	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	816	31.30495	795	810	840	790	870	5
Strontium-Total (mg.L)	1.14	0.151658	1	1.2	1.25	0.9	1.3	5
Sulfate (mg/L)	444.6	25.7449	419.5	452	466	409	476	5
TDS Balance (0.80 - 1.20) (dec.%)	0.944	0.026077	0.92	0.94	0.97	0.91	0.97	5
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Thorium 230-Dissolved (pCi/L)	0.08	0.178885			0.2		0.4	5
Thorium 230-Suspended (pCi/L)	0.16	0.089443	0.1	0.1	0.25	0.1	0.3	5
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00072	0.001275	0.00015	0.00015	0.001575	0.00015	0.003	5
Uranium-Suspended (mg/L)	0.00026	0.000246	0.00015	0.00015	0.000425	0.00015	0.0007	5
Uranium-Total (mg/L)	0.00074	0.001319	0.00015	0.00015	0.001625	0.00015	0.0031	5
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.006	0.002236	0.005	0.005	0.0075	0.005	0.01	5

POWERTECH (USA) INC.

Well #697						
Analyte	**3/30/2008 14:04**	**3/30/2008 14:10**	**4/22/2008 11:30**	**5/28/2008 12:35**	**5/28/2008 12:45**	**6/24/2008 11:55**
A/C Balance (± 5) (%)	2.58	-1.6	0.92	9.13	5.02	3.88
Alkalinity-Total as CaCO3 (mg/L)	124	122	120	114	118	114
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.1	0.1	0.2	0.2	0.2	0.1
Anions (meq/L)	29.9	32.6	32.8	28.9	30.9	33.1
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)	0.004	0.003	<0.001	0.002	0.003	0.005
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	151	149	146	139	144	139
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.2	0.1	<0.1
Boron-Total (mg/L)	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	338	340	366	382	375	393
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5	<5
Cations (meq/L)	31.4	31.6	33.4	34.8	34.2	35.8
Chloride (mg/L)	12	11	9	9	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2390	2400	2420	2280	2460	2530
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.2	0.3	0.3	0.5	0.6	0.3
Gross Alpha-Dissolved (pCi/L)	1750	1880	2110	1210	1390	1790
Gross Beta-Dissolved (pCi/L)	657	659	604	380	383	470
Gross Gamma-Dissolved (pCi/L)	790	840	680	4100	3500	170
Iron-Dissolved (mg/L)	1.56	1.58	2.49	1.69	1.56	1.6
Iron-Total (mg/L)	4.06	3.99	4.53	4.6	4.88	5.48
Lead 210-Dissolved (pCi/L)	-14	-9.6	-3.5	5.5	9.4	-1.7
Lead 210-Suspended (pCi/L)				2.6	9	7.4
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Magnesium-Dissolved (mg/L)	125	126	129	137	135	141
Manganese-Dissolved (mg/L)	2.18	2.22	2.39	2.31	2.23	2.56
Manganese-Total (mg/L)	2.31	2.29	2.5	2.32	2.45	2.66
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Powertech (USA) Inc.

Well #697						
Analyte	**3/30/2008 14:04**	**3/30/2008 14:10**	**4/22/2008 11:30**	**5/28/2008 12:35**	**5/28/2008 12:45**	**6/24/2008 11:55**
Nitrogen, Nitrate as N (mg/L)	<0.1	<0.1	0.09	<0.1	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
Oxidation-Reduction Potential (mV)	280	190	110	200	220	94
pH	6.91	6.91	7.15	6.78	6.75	7.09
Polonium 210-Dissolved (pCi/L)	1	1.3	1.4	0.2		1.1
Polonium 210-Suspended (pCi/L)	1.2	0.8	-0.2	1.4	1.3	1.2
Potassium-Dissolved (mg/L)	14.6	14.4	15.6	15.5	15.4	15.9
Radium 226-Dissolved (pCi/L)	387	398	370	413	412	429
Radium 226-Suspended (pCi/L)	15.3	12.4	6.4	14	13.5	11.6
Radon 222-Total (pCi/L)	32200	29400	25800	25600	22400	40700
Selenium-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.002	0.002	<0.001	<0.001	<0.001	<0.002
Selenium-VI-Dissolved (mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	9.5	9.5	4.8	5.2	5.1	5.5
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	1	0.98	1	0.98	0.98	0.98
Sodium-Dissolved (mg/L)	84.6	83.7	89	88	87	89
Solids-Total Dissolved Calculated (mg/L)	1970	2110	2140	1980	2060	2200
Solids-Total Dissolved TDS @ 180 C (mg/L)	2200	2200	2300	2200	2100	2100
Strontium-Total (mg.L)	4.9	4.8	5.2	4.8	5	5.2
Sulfate (mg/L)	1300	1430	1450	1270	1360	1470
TDS Balance (0.80 - 1.20) (dec.%)	1.13	1.07	1.05	1.09	1.04	0.97
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)		-0.1				
Thorium 230-Suspended (pCi/L)	0.4	0.3	0.2	0.7	0.5	0.7
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.109	0.109	0.11	0.101	0.103	0.104
Uranium-Suspended (mg/L)	0.0024	0.0024	0.0006	0.0038	0.0032	0.0043
Uranium-Total (mg/L)	0.123	0.122	0.119	0.116	0.119	0.113
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc-Dissolved (mg/L)	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Zinc-Total (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	0.01

POWERTECH (USA) INC.

Well #698								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	3.321667	3.673518	0.29	3.23	6.0475	-1.6	9.13	6
Alkalinity-Total as CaCO3 (mg/L)	118.6667	4.131182	114	119	122.5	114	124	6
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Ammonia (mg/L)	0.15	0.054772	0.1	0.15	0.2	0.1	0.2	6
Anions (meq/L)	31.36667	1.733974	29.65	31.75	32.875	28.9	33.1	6
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	6
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Arsenic-Total (mg/L)	0.002917	0.001563	0.001625	0.003	0.00425	0.0005	0.005	6
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Bicarbonate as HCO3 (mg/L)	144.6667	5.006662	139	145	149.5	139	151	6
Boron-Dissolved (mg/L)	0.083333	0.060553	0.05	0.05	0.125	0.05	0.2	6
Boron-Total (mg/L)	0.058333	0.020412	0.05	0.05	0.0625	0.05	0.1	6
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Calcium-Dissolved (mg/L)	365.6667	22.47369	339.5	370.5	384.75	338	393	6
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	6
Cation/Anion Balance (%)								
Cations (meq/L)	33.53333	1.760303	31.55	33.8	35.05	31.4	35.8	6
Chloride (mg/L)	9.833333	1.32916	9	9	11.25	9	12	6
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Conductivity @ 25 C (umhos/cm)	2413.333	82.86535	2362.5	2410	2477.5	2280	2530	6
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	6
Fluoride (mg/L)	0.366667	0.150555	0.275	0.3	0.525	0.2	0.6	6
Gross Alpha-Dissolved (pCi/L)	1688.333	330.6005	1345	1770	1937.5	1210	2110	6
Gross Beta-Dissolved (pCi/L)	525.5	131.0218	382.25	537	657.5	380	659	6
Gross Gamma-Dissolved (pCi/L)	1680	1670.126	552.5	815	3650	170	4100	6
Iron-Dissolved (mg/L)	1.746667	0.367351	1.56	1.59	1.89	1.56	2.49	6
Iron-Total (mg/L)	4.59	0.551507	4.0425	4.565	5.03	3.99	5.48	6
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Lead-Total (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Lead 210-Dissolved (pCi/L)	-2.31667	8.828458	-10.7	-2.6	6.475	-14	9.4	6
Lead 210-Suspended (pCi/L)	3.166667	4.058407		1.3	7.8		9	6
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	132.1667	6.462714	125.75	132	138	125	141	6
Manganese-Dissolved (mg/L)	2.315	0.141527	2.21	2.27	2.4325	2.18	2.56	6
Manganese-Total (mg/L)	2.421667	0.144141	2.305	2.385	2.54	2.29	2.66	6
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Mercury-Total (mg/L)	0.000314	0.000232	0.00005	0.0005	0.0005	0.00005	0.0005	7
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Molybdenum-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	6

Powertech (USA) Inc.

Well #698								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.056667	0.01633	0.05	0.05	0.06	0.05	0.09	6
Nitrogen, Nitrite as N (mg/L)	0.045833	0.010206	0.04375	0.05	0.05	0.025	0.05	6
Oxidation-Reduction Potential (mV)	182.3333	69.80449	106	195	235	94	280	6
pH	6.931667	0.161049	6.7725	6.91	7.105	6.75	7.15	6
Polonium 210-Dissolved (pCi/L)	0.833333	0.588784	0.15	1.05	1.325		1.4	6
Polonium 210-Suspended (pCi/L)	0.95	0.599166	0.55	1.2	1.325	-0.2	1.4	6
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	15.23333	0.595539	14.55	15.45	15.675	14.4	15.9	6
Radium 226-Dissolved (pCi/L)	401.5	21.04044	382.75	405	417	370	429	6
Radium 226-Suspended (pCi/L)	12.2	3.11705	10.3	12.95	14.325	6.4	15.3	6
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	29350	6510.223	24800	27600	34325	22400	40700	6
Selenium-Dissolved (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Selenium-Total (mg/L)	0.001083	0.000736	0.0005	0.00075	0.002	0.0005	0.002	6
Selenium-VI-Dissolved (mg/L)	0.000583	0.000204	0.0005	0.0005	0.000625	0.0005	0.001	6
Silica-Dissolved (mg/L)	6.6	2.257432	5.025	5.35	9.5	4.8	9.5	6
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Sodium-Dissolved (mg/L)	86.88333	2.261342	84.375	87.5	89	83.7	89	6
Sodium Adsorption Ratio (SAR) (meq/L)	0.986667	0.010328	0.98	0.98	1	0.98	1	6
Solids-Total Dissolved Calculated (mg/L)	2076.667	90.92121	1977.5	2085	2155	1970	2200	6
Solids-Total Dissolved TDS @ 180 C (mg/L)	2183.333	75.27727	2100	2200	2225	2100	2300	6
Strontium-Total (mg.L)	4.983333	0.183485	4.8	4.95	5.2	4.8	5.2	6
Sulfate (mg/L)	1380	82.94577	1292.5	1395	1455	1270	1470	6
TDS Balance (0.80 - 1.20) (dec.%)	1.058333	0.053821	1.0225	1.06	1.1	0.97	1.13	6
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	6
Thorium 230-Dissolved (pCi/L)	-0.01667	0.040825	-0.025			-0.1		6
Thorium 230-Suspended (pCi/L)	0.466667	0.206559	0.275	0.45	0.7	0.2	0.7	6
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	6
Uranium-Dissolved (mg/L)	0.106	0.003795	0.1025	0.1065	0.10925	0.101	0.11	6
Uranium-Suspended (mg/L)	0.002783	0.001309	0.00195	0.0028	0.003925	0.0006	0.0043	6
Uranium-Total (mg/L)	0.118667	0.003724	0.11525	0.119	0.12225	0.113	0.123	6
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	6
Zinc-Dissolved (mg/L)	0.006667	0.002582	0.005	0.005	0.01	0.005	0.01	6
Zinc-Total (mg/L)	0.005833	0.002041	0.005	0.005	0.00625	0.005	0.01	6

Powertech (USA) Inc.

Well #3026				
Analyte	**3/30/2008 18:45**	**4/22/2008 14:30**	**5/28/2008 15:15**	**6/24/2008 20:06**
A/C Balance (± 5) (%)	-2.96	3.12	5.9	1.44
Alkalinity-Total as CaCO3 (mg/L)	130	126	166	172
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	1.2	0.8	0.7	0.6
Anions (meq/L)	34.2	34.6	34.5	41.2
Antimony-Total (mg/L)	<0.003	<0.003	<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.004	0.012	0.002	<0.001
Arsenic-Total (mg/L)	0.023	0.022	0.028	0.025
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Beryllium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	158	134	202	210
Boron-Dissolved (mg/L)	<0.1	<0.1	0.2	0.2
Boron-Total (mg/L)	<0.1	<0.1	0.1	0.2
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Calcium-Dissolved (mg/L)	284	331	407	461
Carbonate as CO3 (mg/L)	<5	10	<5	<5
Cations (meq/L)	32.2	36.8	38.8	42.4
Chloride (mg/L)	37	16	15	15
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2770	2730	2610	2970
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)	<0.01	<0.01	<0.01	<0.01
Fluoride (mg/L)	0.6	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	47.6	43.8	92.4	116
Gross Beta-Dissolved (pCi/L)	21.1	24.4	28.3	33.9
Gross Gamma-Dissolved (pCi/L)				
Iron-Dissolved (mg/L)	0.1	2.67	0.23	0.04
Iron-Total (mg/L)	1.75	5.38	11.1	21.8
Lead 210-Dissolved (pCi/L)	<1		-0.7	-5.3
Lead 210-Suspended (pCi/L)	-3	-8.2	4	6.9
Lead-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)	67.9	86.8	105	137
Manganese-Dissolved (mg/L)	0.42	0.36	0.82	1.42
Manganese-Total (mg/L)	0.13	0.46	0.87	1.46
Mercury-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Mercury-Total (mg/L)	<0.001	<0.001	<0.0001	<0.0002
Molybdenum-Dissolved (mg/L)	0.2	0.1	<0.1	<0.1
Molybdenum-Total (mg/L)	0.3	0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)	0.1	0.09	<0.1	<0.1
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.05	<0.1	<0.1

Powertech (USA) Inc.

Well #3026				
Analyte	**3/30/2008 18:45**	**4/22/2008 14:30**	**5/28/2008 15:15**	**6/24/2008 20:06**
Oxidation-Reduction Potential (mV)	200	240	210	85
pH	7.63	8.49	6.95	6.82
Polonium 210-Dissolved (pCi/L)	0.4	0.2		0.2
Polonium 210-Suspended (pCi/L)	1.9		-0.1	0.2
Potassium-Dissolved (mg/L)	21.3	23.7	25.3	22.3
Radium 226-Dissolved (pCi/L)	3.6	2.8	9.6	4.7
Radium 226-Suspended (pCi/L)	3.3	0.1	1.2	-0.1
Radon 222-Total (pCi/L)	440	304	213	950
Selenium-Dissolved (mg/L)	0.006	<0.001	<0.001	<0.001
Selenium-IV-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001
Selenium-Total (mg/L)	0.007	0.002	<0.001	0.005
Selenium-VI-Dissolved (mg/L)	0.006	<0.001	<0.001	<0.001
Silica-Dissolved (mg/L)	5.7	2.1	2.3	1.9
Silver-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Silver-Total (mg/L)	<0.005	<0.005	<0.005	<0.005
Sodium Adsorption Ratio (SAR) (meq/L)	3.7	3.6	2.4	1.8
Sodium-Dissolved (mg/L)	271	284	209	171
Solids-Total Dissolved Calculated (mg/L)	2240	2340	2340	2710
Solids-Total Dissolved TDS @ 180 C (mg/L)	2300	2300	2400	2700
Strontium-Total (mg.L)	4.8	6.3	7	7.4
Sulfate (mg/L)	1470	1520	1480	1790
TDS Balance (0.80 - 1.20) (dec.%)	1.03	0.99	1.03	1.01
Thallium-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Thorium 230-Dissolved (pCi/L)		0.1	0.1	
Thorium 230-Suspended (pCi/L)	1	0.3	0.2	
Thorium 232-Dissolved (pCi/L)	<0.005	<0.005	<0.005	<0.005
Uranium-Dissolved (mg/L)	0.0151	0.015	0.0281	0.0183
Uranium-Suspended (mg/L)	0.004	0.001	0.0013	0.0015
Uranium-Total (mg/L)	0.0097	0.0196	0.0322	0.0216
Vanadium-Dissolved (mg/L)	<0.1	<0.1	<0.1	0.1
Zinc-Dissolved (mg/L)	<0.01	0.01	<0.01	<0.01
Zinc-Total (mg/L)	<0.01	0.01	0.01	0.01

Well #3026								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	1.875	3.711114	-1.86	2.28	5.205	-2.96	5.9	4
Alkalinity-Total as CaCO3 (mg/L)	148.5	23.85372	127	148	170.5	126	172	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.825	0.262996	0.625	0.75	1.1	0.6	1.2	4
Anions (meq/L)	36.125	3.3876	34.275	34.55	39.55	34.2	41.2	4
Antimony-Total (mg/L)	0.0015		0.0015	0.0015	0.0015	0.0015	0.0015	4
Arsenic-Dissolved (mg/L)	0.004625	0.005121	0.000875	0.003	0.01	0.0005	0.012	4
Arsenic-Total (mg/L)	0.0245	0.002646	0.02225	0.024	0.02725	0.022	0.028	4
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Beryllium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Bicarbonate as HCO3 (mg/L)	176	36.14784	140	180	208	134	210	4
Boron-Dissolved (mg/L)	0.125	0.086603	0.05	0.125	0.2	0.05	0.2	4
Boron-Total (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Calcium-Dissolved (mg/L)	370.75	78.66543	295.75	369	447.5	284	461	4
Carbonate as CO3 (mg/L)	4.375	3.75	2.5	2.5	8.125	2.5	10	4
Cation/Anion Balance (%)								
Cations (meq/L)	37.55	4.253234	33.35	37.8	41.5	32.2	42.4	4
Chloride (mg/L)	20.75	10.84358	15	15.5	31.75	15	37	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Conductivity @ 25 C (umhos/cm)	2770	149.6663	2640	2750	2920	2610	2970	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Fluoride (mg/L)	0.45	0.1	0.4	0.4	0.55	0.4	0.6	4
Gross Alpha-Dissolved (pCi/L)	74.95	35.15655	44.75	70	110.1	43.8	116	4
Gross Beta-Dissolved (pCi/L)	26.925	5.502954	21.925	26.35	32.5	21.1	33.9	4
Gross Gamma-Dissolved (pCi/L)								4
Iron-Dissolved (mg/L)	0.76	1.2758	0.055	0.165	2.06	0.04	2.67	4
Iron-Total (mg/L)	10.0075	8.753222	2.6575	8.24	19.125	1.75	21.8	4
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead 210-Dissolved (pCi/L)	-1.375	2.662549	-4.15	-0.35	0.375	-5.3	0.5	4
Lead 210-Suspended (pCi/L)	-0.075	6.827091	-6.9	0.5	6.175	-8.2	6.9	4
Lead 210-Total (pCi/L)								
Magnesium-Dissolved (mg/L)	99.175	29.41614	72.625	95.9	129	67.9	137	4
Manganese-Dissolved (mg/L)	0.755	0.488092	0.375	0.62	1.27	0.36	1.42	4
Manganese-Total (mg/L)	0.73	0.57312	0.2125	0.665	1.3125	0.13	1.46	4
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00033	0.000233	0.000075	0.0005	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.1	0.070711	0.05	0.075	0.175	0.05	0.2	4
Molybdenum-Total (mg/L)	0.125	0.119024	0.05	0.075	0.25	0.05	0.3	4
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4

POWERTECH (USA) INC.

Well #3026								
Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.0725	0.0263	0.05	0.07	0.0975	0.05	0.1	4
Nitrogen, Nitrite as N (mg/L)	0.04375	0.0125	0.03125	0.05	0.05	0.025	0.05	4
Oxidation-Reduction Potential (mV)	183.75	67.99203	113.75	205	232.5	85	240	4
pH	7.4725	0.765697	6.8525	7.29	8.275	6.82	8.49	4
Polonium 210-Dissolved (pCi/L)	0.2	0.163299	0.05	0.2	0.35		0.4	4
Polonium 210-Suspended (pCi/L)	0.5	0.94163	-0.075	0.1	1.475	-0.1	1.9	4
Polonium 210-Total (pCi/L)								
Potassium-Dissolved (mg/L)	23.15	1.738774	21.55	23	24.9	21.3	25.3	4
Radium 226-Dissolved (pCi/L)	5.175	3.051093	3	4.15	8.375	2.8	9.6	4
Radium 226-Suspended (pCi/L)	1.125	1.558578	-0.05	0.65	2.775	-0.1	3.3	4
Radium 226-Total (pCi/L)								
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	476.75	328.9999	235.75	372	822.5	213	950	4
Selenium-Dissolved (mg/L)	0.001875	0.00275	0.0005	0.0005	0.004625	0.0005	0.006	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Selenium-Total (mg/L)	0.003625	0.002926	0.000875	0.0035	0.0065	0.0005	0.007	4
Selenium-VI-Dissolved (mg/L)	0.001875	0.00275	0.0005	0.0005	0.004625	0.0005	0.006	4
Silica-Dissolved (mg/L)	3	1.807392	1.95	2.2	4.85	1.9	5.7	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Sodium-Dissolved (mg/L)	233.75	53.1123	180.5	240	280.75	171	284	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.875	0.928709	1.95	3	3.675	1.8	3.7	4
Solids-Total Dissolved Calculated (mg/L)	2407.5	207.103	2265	2340	2617.5	2240	2710	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	2425	189.2969	2300	2350	2625	2300	2700	4
Strontium-Total (mg.L)	6.375	1.144188	5.175	6.65	7.3	4.8	7.4	4
Sulfate (mg/L)	1565	151.5476	1472.5	1500	1722.5	1470	1790	4
TDS Balance (0.80 - 1.20) (dec.%)	1.015	0.019149	0.995	1.02	1.03	0.99	1.03	4
Thallium-Total (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Thorium 230-Dissolved (pCi/L)	0.05	0.057735		0.05	0.1		0.1	4
Thorium 230-Suspended (pCi/L)	0.375	0.434933	0.05	0.25	0.825		1	4
Thorium 230-Total (pCi/L)								
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.019125	0.006177	0.015025	0.0167	0.02565	0.015	0.0281	4
Uranium-Suspended (mg/L)	0.00195	0.001382	0.001075	0.0014	0.003375	0.001	0.004	4
Uranium-Total (mg/L)	0.020775	0.009224	0.012175	0.0206	0.02955	0.0097	0.0322	4
Vanadium-Dissolved (mg/L)	0.0625	0.025	0.05	0.05	0.0875	0.05	0.1	4
Zinc-Dissolved (mg/L)	0.00625	0.0025	0.005	0.005	0.00875	0.005	0.01	4
Zinc-Total (mg/L)	0.00875	0.0025	0.00625	0.01	0.01	0.005	0.01	4

POWERTECH (USA) INC.

Well #4002					
Analyte	**9/27/2007 14:35**	**9/27/2007 14:39**	**11/14/2007 11:45**	**2/12/2008 11:47**	**5/19/2008 13:00**
A/C Balance (± 5) (%)	-4.1	0.215	-1.56	-2.61	2.11
Alkalinity-Total as CaCO3 (mg/L)	140	138	140	138	144
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	<0.1	<0.1	<0.1	<0.1
Anions (meq/L)	11.3	11	12.3	12.8	12.4
Antimony-Total (mg/L)				<0.003	<0.003
Arsenic-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic-Total (mg/L)				<0.001	0.002
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)				<0.1	<0.1
Beryllium-Total (mg/L)				<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	171	168	171	168	176
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)				<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)				<0.005	<0.001
Calcium-Dissolved (mg/L)	36.8	38.7	41.4	42.4	46.6
Carbonate as CO3 (mg/L)	<5	<5	<5	<5	<5
Cations (meq/L)	10.4	11.1	12	12.1	13
Chloride (mg/L)	7	7	7	7	6
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)				<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	1190	1210	1130	1230	1340
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)				<0.01	<0.01
Fluoride (mg/L)	0.3	0.3	0.4	0.4	0.4
Gross Alpha-Dissolved (pCi/L)	120	141	227	314	127
Gross Beta-Dissolved (pCi/L)	45.5	49.6	87.9	101	30.1
Gross Gamma-Dissolved (pCi/L)	120	<20	2200	650	210
Iron-Dissolved (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03
Iron-Total (mg/L)				2.23	2.29
Lead 210-Dissolved (pCi/L)	2	<1	6.2	<1	-2.6
Lead 210-Suspended (pCi/L)	9.7	<1	<1	<1	1.4
Lead-Dissolved (mg/L)	12	<1			
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)				<0.001	<0.001
Manganese-Dissolved (mg/L)	11.9	12.4	13.9	14.2	15.8
Manganese-Total (mg/L)	0.08	0.07	0.08	0.08	0.08
Mercury-Dissolved (mg/L)				0.08	0.08
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.0002	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)				<0.01	<0.01
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05

POWERTECH (USA) INC.

Well #4002					
Analyte	**9/27/2007 14:35**	**9/27/2007 14:39**	**11/14/2007 11:45**	**2/12/2008 11:47**	**5/19/2008 13:00**
Nitrogen, Nitrate as N (mg/L)				<0.05	<0.05
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1	0.1
Oxidation-Reduction Potential (mV)	<0.1	<0.1	<0.1	<0.1	<0.1
pH			140	190	250
Polonium 210-Dissolved (pCi/L)	7.81	7.85	7.65	7.83	8.02
Polonium 210-Suspended (pCi/L)	<1	<1	<1	2.1	
Potassium-Dissolved (mg/L)	<1	<1	<1	<1	0.1
Radium 226-Dissolved (pCi/L)	<1	<1			
Radium 226-Suspended (pCi/L)	7.2	7.3	7.3	7.4	7.1
Radon 222-Total (pCi/L)	63.6	60	54.2	57	52.3
Selenium-Dissolved (mg/L)	<0.2	19.4		37	8.4
Selenium-IV-Dissolved (mg/L)	62.7	79.4			
Selenium-Total (mg/L)			8010	9890	8780
Selenium-VI-Dissolved (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.005
Silica-Dissolved (mg/L)			<0.001	<0.001	<0.001
Silver-Dissolved (mg/L)				<0.001	<0.001
Silver-Total (mg/L)			<0.001	<0.001	<0.001
Sodium Adsorption Ratio (SAR) (meq/L)	6.6	6.9	7.6	7.3	3.8
Sodium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Solids-Total Dissolved Calculated (mg/L)				<0.005	<0.005
Solids-Total Dissolved TDS @ 180 C (mg/L)			6.7	6.7	6.8
Strontium-Total (mg.L)	170	182	197	198	211
Sulfate (mg/L)	716	717	799	842	834
TDS Balance (0.80 - 1.20) (dec.%)	820	800	850	830	790
Thallium-Total (mg/L)				0.8	0.9
Thorium 230-Dissolved (pCi/L)	454	453	448	470	450
Thorium 230-Suspended (pCi/L)	1.15	1.12	1.06	0.98	0.94
Thorium 232-Dissolved (pCi/L)				<0.001	<0.001
Uranium-Dissolved (mg/L)	0.5	0.6	<0.2	0.2	
Uranium-Suspended (mg/L)	<0.2	<0.2	<0.2	<0.2	0.1
Uranium-Total (mg/L)	<0.2	<0.2			
Vanadium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc-Dissolved (mg/L)	0.0026	0.0026	0.0026	0.0026	0.0023
Zinc-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003

Powertech (USA) Inc.

Well #4002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-1.189	2.423088	-3.355	-1.56	1.1625	-4.1	2.11	5
Alkalinity-Total as CaCO3 (mg/L)	140	2.44949	138	140	142	138	144	5
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Ammonia (mg/L)	0.1	0.111803	0.05	0.05	0.175	0.05	0.3	5
Anions (meq/L)	11.96	0.770065	11.15	12.3	12.6	11	12.8	5
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Arsenic-Total (mg/L)	0.00125	0.001061		0.00125		0.0005	0.002	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	170.8	3.271085	168	171	173.5	168	176	5
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Cadmium-Total (mg/L)	0.0015	0.001414		0.0015		0.0005	0.0025	2
Calcium-Dissolved (mg/L)	41.18	3.749933	37.75	41.4	44.5	36.8	46.6	5
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	5
Cation/Anion Balance (%)								
Cations (meq/L)	11.72	0.998499	10.75	12	12.55	10.4	13	5
Chloride (mg/L)	6.8	0.447214	6.5	7	7	6	7	5
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	1220	76.81146	1160	1210	1285	1130	1340	5
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.36	0.054772	0.3	0.4	0.4	0.3	0.4	5
Gross Alpha-Dissolved (pCi/L)	185.8	83.55657	123.5	141	270.5	120	314	5
Gross Beta-Dissolved (pCi/L)	62.82	30.13332	37.8	49.6	94.45	30.1	101	5
Gross Gamma-Dissolved (pCi/L)	638	906.3498	65	210	1425	10	2200	5
Iron-Dissolved (mg/L)	0.015		0.015	0.015	0.015	0.015	0.015	5
Iron-Total (mg/L)	2.26	0.042426		2.26		2.23	2.29	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	1.32	3.201094	-1.05	0.5	4.1	-2.6	6.2	5
Lead 210-Suspended (pCi/L)	2.52	4.032617	0.5	0.5	5.55	0.5	9.7	5
Lead 210-Total (pCi/L)	6.25	8.131728		6.25		0.5	12	2
Magnesium-Dissolved (mg/L)	13.64	1.550161	12.15	13.9	15	11.9	15.8	5
Manganese-Dissolved (mg/L)	0.078	0.004472	0.075	0.08	0.08	0.07	0.08	5
Manganese-Total (mg/L)	0.08			0.08		0.08	0.08	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	5
Mercury-Total (mg/L)	0.00025	0.000229	0.000075	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Molybdenum-Total (mg/L)	0.005			0.005		0.005	0.005	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	5
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

POWERTECH (USA) INC.

Well #4002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
Nitrogen, Nitrate as N (mg/L)	0.06	0.022361	0.05	0.05	0.075	0.05	0.1	5
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Oxidation-Reduction Potential (mV)	193.3333	55.07571	140	190	250	140	250	3
pH	7.832	0.131605	7.73	7.83	7.935	7.65	8.02	5
Polonium 210-Dissolved (pCi/L)	0.72	0.801249	0.25	0.5	1.3		2.1	5
Polonium 210-Suspended (pCi/L)	0.42	0.178885	0.3	0.5	0.5	0.1	0.5	5
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	2
Potassium-Dissolved (mg/L)	7.26	0.114018	7.15	7.3	7.35	7.1	7.4	5
Radium 226-Dissolved (pCi/L)	57.42	4.516857	53.25	57	61.8	52.3	63.6	5
Radium 226-Suspended (pCi/L)	16.225	15.94707	2.175	13.9	32.6	0.1	37	4
Radium 226-Total (pCi/L)	71.05	11.80868		71.05		62.7	79.4	2
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	8893.333	945.1102	8010	8780	9890	8010	9890	3
Selenium-Dissolved (mg/L)	0.0009	0.000894	0.0005	0.0005	0.0015	0.0005	0.0025	5
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.44	1.524139	5.2	6.9	7.45	3.8	7.6	5
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	191.6	15.85244	176	197	204.5	170	211	5
Sodium Adsorption Ratio (SAR) (meq/L)	6.733333	0.057735	6.7	6.7	6.8	6.7	6.8	3
Solids-Total Dissolved Calculated (mg/L)	781.6	61.58977	716.5	799	838	716	842	5
Solids-Total Dissolved TDS @ 180 C (mg/L)	818	23.87467	795	820	840	790	850	5
Strontium-Total (mg.L)	0.85	0.070711		0.85		0.8	0.9	2
Sulfate (mg/L)	455	8.717798	449	453	462	448	470	5
TDS Balance (0.80 - 1.20) (dec.%)	1.05	0.089443	0.96	1.06	1.135	0.94	1.15	5
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.28	0.258844	0.05	0.2	0.55		0.6	5
Thorium 230-Suspended (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	5
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	2
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	5
Uranium-Dissolved (mg/L)	0.00254	0.000134	0.00245	0.0026	0.0026	0.0023	0.0026	5
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	5
Uranium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	5
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	5
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

POWERTECH (USA) INC.

Well #7002				
Analyte	**9/28/2007 17:48**	**11/12/2007 8:10**	**2/20/2008 8:30**	**5/29/2008 10:44**
A/C Balance (± 5) (%)	-4.65	2.47	-5.62	7.56
Alkalinity-Total as CaCO3 (mg/L)	280	250	260	254
Aluminum-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Ammonia (mg/L)	0.3	0.3	0.2	0.2
Anions (meq/L)	26.3	26.9	28	26.5
Antimony-Total (mg/L)			<0.003	<0.003
Arsenic-Dissolved (mg/L)	0.001	0.001	0.001	<0.001
Arsenic-Total (mg/L)			0.001	0.004
Barium-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Barium-Total (mg/L)			<0.1	<0.1
Beryllium-Total (mg/L)			<0.001	<0.001
Bicarbonate as HCO3 (mg/L)	341	305	317	310
Boron-Dissolved (mg/L)	<0.1	<0.1	<0.1	<0.1
Boron-Total (mg/L)			<0.1	<0.1
Cadmium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Cadmium-Total (mg/L)			<0.005	<0.005
Calcium-Dissolved (mg/L)	206	237	213	264
Carbonate as CO3 (mg/L)	<5	<5	<5	<5
Cations (meq/L)	23.9	28.2	25	30.9
Chloride (mg/L)	10	11	9	9
Chromium-Dissolved (mg/L)	<0.05	<0.05	<0.05	<0.05
Chromium-Total (mg/L)			<0.05	<0.05
Conductivity @ 25 C (umhos/cm)	2200	2210	2420	2480
Copper-Dissolved (mg/L)	<0.01	<0.01	<0.01	<0.01
Copper-Total (mg/L)			<0.01	<0.01
Fluoride (mg/L)	0.2	0.2	0.5	0.3
Gross Alpha-Dissolved (pCi/L)	45.6	39.8	91.4	29.5
Gross Beta-Dissolved (pCi/L)	29.7	34.1	41.4	28.4
Gross Gamma-Dissolved (pCi/L)	1200	1600	370	
Iron-Dissolved (mg/L)	<0.03	0.25	0.28	0.06
Iron-Total (mg/L)			1.25	1.32
Lead 210-Dissolved (pCi/L)	<1	<1	13	-0.6
Lead 210-Suspended (pCi/L)	<1	<1	7.9	-1.1
Lead-Dissolved (mg/L)	<1			
Lead-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Magnesium-Dissolved (mg/L)			<0.001	<0.001
Manganese-Dissolved (mg/L)	77.7	90.4	81.7	103
Manganese-Total (mg/L)	0.39	0.37	0.38	0.41
Mercury-Dissolved (mg/L)			0.37	0.4
Mercury-Total (mg/L)	<0.001	<0.001	<0.001	<0.001
Molybdenum-Dissolved (mg/L)	<0.0002	<0.001	<0.001	<0.0001
Molybdenum-Total (mg/L)	<0.1	<0.1	<0.1	<0.1
Nickel-Dissolved (mg/L)			<0.01	<0.1
Nickel-Total (mg/L)	<0.05	<0.05	<0.05	<0.05
Nitrogen, Nitrate as N (mg/L)			<0.05	<0.05
Nitrogen, Nitrite as N (mg/L)	<0.1	<0.1	<0.1	<0.1

POWERTECH (USA) INC.

Well #7002				
Analyte	**9/28/2007 17:48**	**11/12/2007 8:10**	**2/20/2008 8:30**	**5/29/2008 10:44**
Oxidation-Reduction Potential (mV)	<0.1	<0.1	<0.1	<0.1
pH		190	170	230
Polonium 210-Dissolved (pCi/L)	7.29	7.22	7.56	7.36
Polonium 210-Suspended (pCi/L)	1.3	4.1	<1	0.1
Potassium-Dissolved (mg/L)	<1	<1	<1	0.2
Radium 226-Dissolved (pCi/L)	<1			
Radium 226-Suspended (pCi/L)	19.9	22.2	21	21.7
Radon 222-Total (pCi/L)	8.5	8.1	8.8	8
Selenium-Dissolved (mg/L)	<0.2	<0.2	<0.9	
Selenium-IV-Dissolved (mg/L)	6.3			
Selenium-Total (mg/L)		938	752	1270
Selenium-VI-Dissolved (mg/L)	0.001	<0.001	0.001	<0.001
Silica-Dissolved (mg/L)		<0.001	<0.001	<0.001
Silver-Dissolved (mg/L)			<0.001	<0.001
Silver-Total (mg/L)		<0.001	<0.001	<0.001
Sodium Adsorption Ratio (SAR) (meq/L)	7.3	8.2	7.8	3.4
Sodium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Solids-Total Dissolved Calculated (mg/L)			<0.005	<0.005
Solids-Total Dissolved TDS @ 180 C (mg/L)		2.7	2.4	2.6
Strontium-Total (mg.L)	152	192	162	197
Sulfate (mg/L)	1620	1750	1750	1780
TDS Balance (0.80 - 1.20) (dec.%)	1900	1900	1900	1800
Thallium-Total (mg/L)			6.6	7.7
Thorium 230-Dissolved (pCi/L)	1160	1040	1080	1020
Thorium 230-Suspended (pCi/L)	1.19	1.09	1.07	1.03
Thorium 232-Dissolved (pCi/L)			<0.001	<0.001
Uranium-Dissolved (mg/L)	<0.2	<0.2	<0.2	0.1
Uranium-Suspended (mg/L)	<0.2	<0.2	<0.2	
Uranium-Total (mg/L)	<0.2			
Vanadium-Dissolved (mg/L)	<0.005	<0.005	<0.005	<0.005
Zinc-Dissolved (mg/L)	0.0007	0.0006	0.0006	0.0005
Zinc-Total (mg/L)	<0.0003	<0.0003	<0.0003	<0.0003

Powertech (USA) Inc.

Well #7002								
Analyte	**Mean**	**StDev**	**Q1**	**Median**	**Q3**	**Minimum**	**Maximum**	**n**
A/C Balance (± 5) (%)	-0.06	6.230222	-5.3775	-1.09	6.2875	-5.62	7.56	4
Alkalinity-Total as CaCO3 (mg/L)	261	13.31666	251	257	275	250	280	4
Aluminum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Ammonia (mg/L)	0.25	0.057735	0.2	0.25	0.3	0.2	0.3	4
Anions (meq/L)	26.925	0.758837	26.35	26.7	27.725	26.3	28	4
Antimony-Total (mg/L)	0.0015			0.0015		0.0015	0.0015	2
Arsenic-Dissolved (mg/L)	0.000875	0.00025	0.000625	0.001	0.001	0.0005	0.001	4
Arsenic-Total (mg/L)	0.0025	0.002121		0.0025		0.001	0.004	2
Barium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Barium-Total (mg/L)	0.05			0.05		0.05	0.05	2
Beryllium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Bicarbonate as HCO3 (mg/L)	318.25	15.94522	306.25	313.5	335	305	341	4
Boron-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Boron-Total (mg/L)	0.05			0.05		0.05	0.05	2
Cadmium-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Cadmium-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Calcium-Dissolved (mg/L)	230	26.26785	207.75	225	257.25	206	264	4
Carbonate as CO3 (mg/L)	2.5		2.5	2.5	2.5	2.5	2.5	4
Cation/Anion Balance (%)								
Cations (meq/L)	27	3.175951	24.175	26.6	30.225	23.9	30.9	4
Chloride (mg/L)	9.75	0.957427	9	9.5	10.75	9	11	4
Chromium-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Chromium-Total (mg/L)	0.025			0.025		0.025	0.025	2
Conductivity @ 25 C (umhos/cm)	2327.5	143.6141	2202.5	2315	2465	2200	2480	4
Copper-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Copper-Total (mg/L)	0.005			0.005		0.005	0.005	2
Fluoride (mg/L)	0.3	0.141421	0.2	0.25	0.45	0.2	0.5	4
Gross Alpha-Dissolved (pCi/L)	51.575	27.37205	32.075	42.7	79.95	29.5	91.4	4
Gross Beta-Dissolved (pCi/L)	33.4	5.864583	28.725	31.9	39.575	28.4	41.4	4
Gross Gamma-Dissolved (pCi/L)	792.5	735.9065	92.5	785	1500		1600	4
Iron-Dissolved (mg/L)	0.15125	0.13319	0.02625	0.155	0.2725	0.015	0.28	4
Iron-Total (mg/L)	1.285	0.049497		1.285		1.25	1.32	2
Lead-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Lead-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Lead 210-Dissolved (pCi/L)	3.35	6.454198	-0.325	0.5	9.875	-0.6	13	4
Lead 210-Suspended (pCi/L)	1.95	4.037739	-0.7	0.5	6.05	-1.1	7.9	4
Lead 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Magnesium-Dissolved (mg/L)	88.2	11.20089	78.7	86.05	99.85	77.7	103	4
Manganese-Dissolved (mg/L)	0.3875	0.017078	0.3725	0.385	0.405	0.37	0.41	4
Manganese-Total (mg/L)	0.385	0.021213		0.385		0.37	0.4	2
Mercury-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	4
Mercury-Total (mg/L)	0.00024	0.000238	0.00005	0.0001	0.0005	0.00005	0.0005	5
Molybdenum-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Molybdenum-Total (mg/L)	0.0275	0.03182		0.0275		0.005	0.05	2
Nickel-Dissolved (mg/L)	0.025		0.025	0.025	0.025	0.025	0.025	4
Nickel-Total (mg/L)	0.025			0.025		0.025	0.025	2

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Well #7002

Analyte	Mean	StDev	Q1	Median	Q3	Minimum	Maximum	n
Nitrogen, Nitrate as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Nitrogen, Nitrite as N (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Oxidation-Reduction Potential (mV)	196.6667	30.5505	170	190	230	170	230	3
pH	7.3575	0.1466	7.2375	7.325	7.51	7.22	7.56	4
Polonium 210-Dissolved (pCi/L)	1.5	1.8037	0.2	0.9	3.4	0.1	4.1	4
Polonium 210-Suspended (pCi/L)	0.425	0.15	0.275	0.5	0.5	0.2	0.5	4
Polonium 210-Total (pCi/L)	0.5			0.5		0.5	0.5	1
Potassium-Dissolved (mg/L)	21.2	0.996661	20.175	21.35	22.075	19.9	22.2	4
Radium 226-Dissolved (pCi/L)	8.35	0.369685	8.025	8.3	8.725	8	8.8	4
Radium 226-Suspended (pCi/L)	0.1625	0.197379	0.025	0.1	0.3625		0.45	4
Radium 226-Total (pCi/L)	6.3			6.3		6.3	6.3	1
Radium 226 (pCi/L)								
Radon 222-Total (pCi/L)	986.6667	262.4068	752	938	1270	752	1270	3
Selenium-Dissolved (mg/L)	0.00075	0.000289	0.0005	0.00075	0.001	0.0005	0.001	4
Selenium-IV-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Selenium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Selenium-VI-Dissolved (mg/L)	0.0005		0.0005	0.0005	0.0005	0.0005	0.0005	3
Silica-Dissolved (mg/L)	6.675	2.214159	4.375	7.55	8.1	3.4	8.2	4
Silver-Dissolved (mg/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Silver-Total (mg/L)	0.0025			0.0025		0.0025	0.0025	2
Sodium-Dissolved (mg/L)	175.75	22.12653	154.5	177	195.75	152	197	4
Sodium Adsorption Ratio (SAR) (meq/L)	2.566667	0.152753	2.4	2.6	2.7	2.4	2.7	3
Solids-Total Dissolved Calculated (mg/L)	1725	71.41428	1652.5	1750	1772.5	1620	1780	4
Solids-Total Dissolved TDS @ 180 C (mg/L)	1875	50	1825	1900	1900	1800	1900	4
Strontium-Total (mg.L)	7.15	0.777817		7.15		6.6	7.7	2
Sulfate (mg/L)	1075	61.91392	1025	1060	1140	1020	1160	4
TDS Balance (0.80 - 1.20) (dec.%)	1.095	0.068069	1.04	1.08	1.165	1.03	1.19	4
Thallium-Total (mg/L)	0.0005			0.0005		0.0005	0.0005	2
Thorium 230-Dissolved (pCi/L)	0.1		0.1	0.1	0.1	0.1	0.1	4
Thorium 230-Suspended (pCi/L)	0.075	0.05	0.025	0.1	0.1		0.1	4
Thorium 230-Total (pCi/L)	0.1			0.1		0.1	0.1	1
Thorium 232-Dissolved (pCi/L)	0.0025		0.0025	0.0025	0.0025	0.0025	0.0025	4
Uranium-Dissolved (mg/L)	0.0006	8.16E-05	0.000525	0.0006	0.000675	0.0005	0.0007	4
Uranium-Suspended (mg/L)	0.00015		0.00015	0.00015	0.00015	0.00015	0.00015	4
Uranium-Total (mg/L)	0.00055	7.07E-05		0.00055		0.0005	0.0006	2
Vanadium-Dissolved (mg/L)	0.05		0.05	0.05	0.05	0.05	0.05	4
Zinc-Dissolved (mg/L)	0.005		0.005	0.005	0.005	0.005	0.005	4
Zinc-Total (mg/L)	0.005			0.005		0.005	0.005	2

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APPENDIX 5.4-A

SUBMITTED METHODOLOGY

6.0 VEGETATION BASELINE STUDIES

6.1 INTRODUCTION

The baseline vegetation study will cover the Dewey-Burdock permit area. The project area may contain all or some of the following four native vegetation community types: upland grassland, ponderosa pine woodland, riparian, and wetland. Field work was conducted in the summer of 2007. Table 6-1 shows the mapping acreages.

Table 6-1. Vegetation Map Units and Associated Acreages

Vegetation Map Units	Proposed Permit Area Acreage
Upland Grassland	To be determined
Ponderosa Pine Woodland	
Riparian	
Wetland	
Total	**9,400**

Vegetation baseline study monitoring will be conducted using the procedures described in this document. Vegetation parameter sampling will be conducted by vegetation community type as specified in Table 6-2. For purposes of this methodology, "project area" will be the same as "study or permit area."

Table 6-2. Vegetation Baseline Sampling—Measured Parameters

Parameter	Upland Grassland	Ponderosa Pine Woodland	Riparian	Wetland[a]
% Absolute Total Ground Cover	Yes	Yes	Yes	No
First Hit % Absolute Total Vegetation Cover	Yes	Yes	Yes	No
Multiple Hit Vegetation	Yes	Yes	Yes	No
Shrub/Subshrub Density	Yes	Yes	Yes	No
Production	No	No	No	No
Tree Count and Distribution	No	Yes	No	No

(a) Wetlands will not be sampled as part of the baseline study but will be included under U.S. Army Corps of Engineers (US ACE) delineation requirements.

6.2 VEGETATION COMMUNITY CLASSIFICATION AND MAPPING

The baseline project area will be classified and mapped before commencing vegetation sampling. Preliminary mapping and classification, based on aerial photography, has identified the four following plant communities:

1. Upland grassland
2. Ponderosa pine woodland
3. Riparian
4. Wetland.

Plant communities will be further mapped using color infra-red (CIR) aerial photography and verified through field survey. Disturbed areas within the project will also be identified and mapped, if possible, based on the scale of available mapping. Disturbed areas will be excluded, however, from all vegetation parameter sampling. All areas within ½ mile of the project area will be mapped, based on a review of CIR aerial photography and known expression of photography within the project area. It will not be necessary to field verify this mapping within a ½ mile nor will vegetation sampling be conducted.

6.3 TRANSECT ORIGIN SELECTION

A computerized systematic grid (through **AutoCAD** or **ArcGIS**) will be used to randomly locate sample points within each vegetation community. These computer-generated random numbers will be uploaded to a hand-held GPS unit for actual location in the field. Sample points will be sampled in numerical order until the minimum sample size is attained and then until either sample adequacy is met or the required maximum number of samples is collected.

6.4 LINE TRANSECT LAYOUT

A 50-meter line transect will be used in the three vegetation communities to be sampled; i.e., upland grassland, ponderosa pine woodland, and riparian. Each 50-meter line transect will begin at its specified random origin point and extend in a randomly generated compass direction.

Transects that exceed the boundaries of the vegetation community being sampled will be redirected back into its vegetation community at a 90-degree angle from the original transect direction at the point of intercept. In instances where a 90-degree angle of reflection does not place the transect within the sampled community, a 45-degree angle of reflection will be used.

6.5 GROUND COVER

Line-transect point-intercept methods will be used to collect percent absolute cover data from the three vegetation communities. In the upland grassland, ponderosa pine woodland, and riparian communities, each 50-meter transect will represent a single sample point. Percent cover measurements will be taken from point-intercepts at 1-meter intervals along a 50-meter transect using a laser pointer. Should a transect run out of the vegetation community boundary or a nonvegetated feature, it will be redirected as described above. Each point-intercept will represent 2 percent toward cover measurements.

Percent cover measurements will record "first-hit" point-intercepts by live foliar vegetation species, litter, rock, or bare ground. Litter will include all organic material that is dead, including manure. Rock fragments will be recorded when they are equal to or greater than 2 centimeters in size (i.e., sheet flow, minimum nonerodible particle size). First-hit data will be recorded and tabulated to evaluate total ground cover and total vegetation cover. Multiple hits on vegetation will be recorded but used only for the purpose of constructing a plant species list for each plant community. Total ground cover is the sum of cover values for percent vegetation, percent litter, and percent rock.

6.6 TOTAL VEGETATION COVER

Vegetation cover data will be recorded by species using first-hit data. All point intercepts of living vegetation and growth produced during the current growing season will be counted toward total vegetation cover. Total vegetation cover measurements will be expressed in absolute percentages for each sample point. Relative cover values for percent species cover will be provided. Percent vegetation cover is the vertical projection of the general outline of plants to the ground surface. Total vegetation cover will include moss.

6.7 TOTAL GROUND COVER

Total ground cover data will be recorded by live vegetation, litter, rock, or bare ground. Litter will include all dead organic matter and manure that is recognizable as well as lichen and moss. Total ground cover measurements will be expressed in absolute percentages for each sample point.

6.8 SPECIES DIVERSITY

The total number of plant species within a 1×50-meter belt transect will be summarized for each vegetation type.

6.9 PRODUCTION

No production sampling will be necessary for the 2007 baseline vegetation assessment.

6.10 SHRUB DENSITY

Shrub density data will be collected in conjunction with randomly selected cover transects, wherever possible. All shrubs, full, half, or sub, will be counted within 50 centimeters on either side of the 50-meter cover transect (1-meter×50-meter belt transect). Sample adequacy will not be calculated on shrub density transects; however, shrub density data will be qualitatively evaluated. The number of belt transects will equal the number of cover transects for a given vegetation type. No shrub height measurements will be collected.

6.11 TREE DENSITY

Within the ponderosa pine woodland vegetation community, tree density will be estimated by gridding the aerial photograph for the project area and counting the number of ponderosa pine per unit area, based on a small number of randomly selected grid intervals. In addition, a range of age distribution will be determined using nondestructive techniques, such as correlating known measures of age and height, or age and diameter at breast height (DBH), or ring counts from recent timber harvest stumps and logs.

Within other vegetation communities, individual ponderosa pine or other tree species found will be directly counted for numbers. Height and DBH may be more appropriate in these vegetation types based on lack of downed timber, such as is present in the ponderosa pine woodland.

6.12 SAMPLE ADEQUACY

A minimum of 20 cover transects per vegetation type will be sampled in upland grassland, ponderosa pine woodland, and riparian communities. Sample adequacy will be calculated and an incremental number of cover transects will be sampled up to the maximum of 50.

Minimum and maximum sample sizes are listed in Table 6-3. The following sample adequacy formula will be utilized to determine the minimum required size of the sample population:

$$n_{min} \geq \frac{2(sz)^2}{(dx)^2} \tag{6-1}$$

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where:

n_{min} = minimum number of sampled line transects needed to adequately represent native vegetation types

s = sample standard deviation

z = the z statistic

d = the amount of reduction desired

x = sample mean for cover.

Table 6-3. Vegetation Monitoring Minimum/Maximum Sample Population Requirements for Upland Grassland, Ponderosa Pine Woodland, and Riparian Communities

Vegetation Community	Parameter	Sample Size	
		Minimum	Maximum
Upland Grassland	Ground Cover	20	50
	Vegetation Cover		
	Shrub Density		
Ponderosa Pine Woodland	Ground Cover	20	50
	Vegetation Cover		
	Shrub Density		
Riparian	Ground Cover	20	50
	Vegetation Cover		
	Shrub Density		
	Vegetation Cover		
	Shrub Density		
Total		**60**	**150**

The three vegetation communities have been identified as "grassland" or "shrubland." Upland grassland is identified as grassland while the ponderosa pine woodland and riparian communities are identified as shrublands. The constant values to be used in statistical test are: z=1.28 and d=0.1 for grasslands. The shrubland values are z=0.84 and d=0.2. All sampled vegetation will be included in the sample adequacy test (i.e., "undesirable" species will not be eliminated from the equation).

6.13 PLANT SPECIES LIST

A vegetation species list by scientific name, common name, and lifeform will be developed individually for each of the three vegetation communities. This list will be compiled from species noted during all vegetation monitoring activities, including point-intercept line transect cover measurements and other opportunistic observations of the sampling area.

6.14 OTHER DATA COLLECTED

Any United States Fish and Wildlife Service (US FWS) threatened or candidate species or any state species of special concern listed in the South Dakota Natural Heritage database will be surveyed and any known location identified on the map. Table 6-4 lists the threatened and candidate species along with their habitat and flowering dates. Table 6-5 lists the species of special concern along with their habitats and flowering dates. All state-listed noxious weed will be noted and significant concentrations identified on the vegetation baseline report map.

Photographs will be taken of the vegetation communities. Photographic locations will be documented and illustrated on a map.

6.15 EXTENDED REFERENCE AREA MAPPING AND JUSTIFICATION

As noted in the Vegetation Community Classification and Mapping section (Section 6.2), all lands within the project area are to be mapped as one of three plant community types. Upland grassland, ponderosa pine woodland, and riparian areas unaffected by the mining operation will serve as an Extended Reference Area (EXREFA). Wetlands will not be sampled under baseline evaluation but included in US ACE delineation. For the purposes of this study, EXREFA means a native land unit which will be used to evaluate revegetation success for each of the same native plant communities which was affected by the mining operation. The EXREFA will be a subset of the mapped native communities and will be included as potential sample points for the cover sampling program. The EXREFA will remain unaffected over the course of the mining operation and will be as large as practical, at least 2 acres, considering land ownership patterns and land management history. The permit application will show the EXREFA on the vegetation map and will include text justifying the choice of the EXREFA.

Table 6-4. Threatened and Candidate Species to Be Sampled

Scientific Name	Common Name	Flowering Date	Habitat	Classification
Botrychium campestre	Prairie Moonwort	May–Early June	Dry prairies and sand dunes, as well as sandy, dry disturbed sites, such as roadsides and old fields	Not ranked (under review)
Botrychium lineare	Moonwort Grape-Fern	May–Early June	Meadows with tall grasses and forbs, beneath trees in wooded areas, on north-facing limestone cliff shelves, and in streamside edges	Not ranked
Botrychium multisided	Leathery Grape-fern	May–Early June	Savannah, prairie, meadow, field	Not ranked (under review)
Carex alopecoidea	Tawny Sedge	July	Seasonally saturated soils in wet meadows, openings in alluvial woods, stream banks, particularly on calcareous substrates	S2
Cypripedium parviflorum	Lesser Yellow Lady's Slipper	May–June	Bogs, shady swamps, wet woods	Not ranked (under review)
Eleocharis elliptica	Elliptic Spikerush	June–August	Very wet, calcareous (or brackish) shores, pool margins, fens, meadows, prairies	Not ranked
Epipactis gigantea	Stream Orchid	April–July	Ledges, stream, river banks	S1
Lycopodium complanatum	Ground Cedar	Unknown	Dry open coniferous or mixed forest alpine slopes	S1
Platanthera orbiculata	Round-Leaved Orchid	July	Moderate moisture; woods, forests; in rich soil	S2
Salix candida	Sage Willow	April–May	Cold, open fens, swamps and bogs	S1
Salix serissima	Autumn Willow	Unknown	Swamp, marsh, bog, fen, lakeshores	S1
Sanguinaria canadensis	Bloodroot	March–April	Rich, deciduous, upland and floodplain woods	S4
Viburnum opulus var. americana	American Cranberrybush	May–July	Cool woods, thickets, rocky shores, slopes	Not ranked (under review)
Viola selkirkii	Great-Spurred Violet	April–June	Cold areas	S1

Table 6-5. Species of Special Concern to Be Sampled

Scientific Name	Common Name	Flowering Date	Habitat	Classification
Adiantum capillus-veneris	Southern Maidenhair-Fern	June–August	Moist, well-drained sand, loam or limestone	S1
Carex bella	Elegant Sedge	June–August	Moist subalpine meadows	S1
Eleocharis rostellata	Beaked Spikerush	July–September	Saline or alkaline wetlands	S1
Gentiana affinis	Northern Gentian	Unknown	Moist	S2
Listera convallarioides	Broad-Lipped Twayblade	June–August	Moist woods	S1
Lycopodium annotinum	Bristly Clubmoss	Unknown	Swampy or moist coniferous forests, mountain forests, and exposed grassy or rocky sites	S1
Oxyria digyna	Mountain Sorrel	June–September	Gravel bars, mudflats, tundra, scree slopes, crevices in rock outcrops, talus slopes	S1
Petasites sagittatus	Sweet-Coltsfoot	May–June	Wet, forests, meadows	S1
Polystichum lonchitis	Northern Holly-Fern	Unknown	Woodland, rocky bluff	S1
Salix lucida	Shining Willow	April–May	Steam and swamp banks, fens, beaches, met meadows, mud flats	S1

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APPENDIX 5.4-B

VEGETATION SPECIES SUMMARY

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			Vegetation Community				
Code	Scientific Name	Common Name	Big Sagebrush Shrubland	Cottonwood Gallery	Greasewood Shrubland	Ponderosa Pine Woodland	Upland Grassland
Cool Season Perennial Grasses							
AGRCRI	*Agropyron cristatum*	crested wheatgrass	X	X	X		X
BROINE	*Bromus inermis*	smooth brome		X	X		
CARFIL	*Carex filifolia*	threadleaf sedge	X		X	X	X
CARGEY	*Carex geyeri*	Geyer's sedge				X	
CARSTE	*Carex stenophylla*	needleleaf sedge	X		X		
ELYCAN	*Elymus canadensis*	Canada wildrye				X	
ELYCIN	*Elymus cinereus*	basin wildrye			X		
ELYELY	*Elymus elymoides*	bottlebrush squirreltail	X				
ELYHIS	*Elymus hispidus*	intermediate wheatgrass			X		
ELYLAN	*Elymus lanceolatus*	thickspike wheatgrass	X		X	X	
ELYSMI	*Elymus smithii*	western wheatgrass	X	X	X	X	X
ELYTRA	*Elymus trachycaulus*	slender wheatgrass			X		
HESCOM	*Hesperostipa comata*	needleandthread	X			X	X
HORJUB	*Hordeum jubatum*	foxtail barley			X		
KOEMAC	*Koeleria macrantha*	prairie junegrass	X			X	
NASVIR	*Nassella viridula*	green needlegrass			X	X	
SCHPAN	*Schedonnardus panniculatus*	common tumblegrass			X		
PHLALP	*Phleum alpinum*	alpine timothy			X		
POAPRA	*Poa pratensis*	Kentucky bluegrass		X	X	X	
POASEC	*Poa secunda*	Sandberg bluegrass	X		X	X	X
Warm Season Perennial Grasses							
ARISPP	*Aristida* spp.	Threeawn	X		X		
ARIPUR	*Aristida purpurea*	purple threeawn	X				X
ARIPUR	*Aristida purpurea var. fendleriana*	Fendler's threeawn				X	
BOUCUR	*Bouteloua curtipendula*	sideoats grama	X			X	X
BOUGRA	*Bouteloua gracilis*	blue grama	X		X	X	X
BUCDAC	*Buchloe dactyloides*	buffalograss	X		X	X	X
DISSTR	*Distichlis stricta*	inland saltgrass		X	X		
SCHSCO	*Schizachyrium scoparium*	little bluestem	X			X	
SPOAIR	*Sporobolus airoides*	alkali sacaton			X		
SPOCRY	*Sporobolus cryptandrus*	sand dropseed			X		
	Species observed but not sampled						

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			Vegetation Community				
Code	Scientific Name	Common Name	Big Sagebrush Shrubland	Cottonwood Gallery	Greasewood Shrubland	Ponderosa Pine Woodland	Upland Grassland
Warm Season Perennial Grasses continued							
PANVIR	*Panicum virgatum*	switchgrass	X	X	X		X
Annual Grasses							
BROJAP	*Bromus japonicus*	Japanese brome	X	X	X	X	X
BROTEC	*Bromus tectorum*	cheatgrass	X	X	X	X	X
HORPUS	*Hordeum pusillum*	little barley	X		X		X
VULOCT	*Vulpia octoflora*	sixweeks fescue			X		X
Annual Forbs							
ALYDES	*Alyssum desertorum*	desert alyssum	X		X	X	X
ATRPAT	*Atriplex patula*	spear saltbush	X		X		X
BASSIE	*Bassia sieversiana*	summer cypress		X	X		
BORAGE	*Boraginaeceae* spp.	borage species	X		X	X	
CAMMIC	*Camelina microcarpa*	littleseed falseflax	X		X		X
CHEALB	*Chenopodium album*	lambsquarters goosefoot	X	X	X	X	
CHEBER	*Chenopodium berlandieri*	pitseed goosefoot	X	X	X	X	
CHELEP	*Chenopodium leptophyllum*	narrowleaf goosefoot	X				
CHOTEN	*Chorispora tenella*	crossflower		X		X	
CRYSPP	*Cryptantha* spp.	cryptantha	X		X		
DESPIN	*Descurainia pinnata*	pinnate tansymustard	X	X	X	X	
DESSOP	*Descurainia sophia*	flixweed tansymustard	X	X	X	X	
DRANEM	*Draba nemorosa*	yellow draba			X	X	X
GERVIS	*Geranium viscosissimum*	sticky purple geranium				X	
HEDHIS	*Hedeoma hispidum*	rough false pennyroyal	X		X	X	X
HELANN	*Helianthus annuus*	annual sunflower				X	
LAPRED	*Lappula redowski*	beggars-tick	X	X	X	X	
LEPDEN	*Lepidium densiflorum*	prairie peppergrass	X		X	X	X
LEPPER	*Lepidium perfoliatum*	clasping peppergrass			X		X
LINAUS	*Linum australe*	southern flax	X				X
LINPUB	*Linum puberulum*	plains flax	X				
LUPUS	*Lupinus pusillus*	rusty lupine	X				
MICGRA	*Microsteris gracilis*	slender phlox				X	
	Species observed but not sampled						

			Vegetation Community				
Code	Scientific Name	Common Name	Big Sagebrush Shrubland	Cottonwood Gallery	Greasewood Shrubland	Ponderosa Pine Woodland	Upland Grassland
Annual Forbs continued							
MONUT	*Monolepis nuttalliana*	Nuttall's povertyweed	X		X		
OROMUL	*Orobanche multiflora*	manyflower broomrape	X				
PLAPAT	*Plantago patagonica*	Pursh's plantain	X		X	X	X
POLAVI	*Polygonum aviculare*	prostrate knotweed			X	X	
SALTRA	*Salsola tragus*	Russian thistle		X	X		
SISALT	*Sisymbrium altissimum*	tumbling hedgemustard	X	X	X		
SOLROS	*Solanum rostratum*	buffalobur nightshade					X
SOLTRI	*Solanum triflorum*	cutleaf nightshade			X		
THLARV	*Thlaspi arvense*	field pennycress	X	X	X	X	X
Biennial Forbs							
IPOAGG	*Ipomopsis aggregata*	scarlet gilia	X				
MELOFF	*Melilotus officinalis*	yellow sweetclover	X		X	X	X
TRADUB	*Tragopogon dubius*	yellow salsify	X		X	X	X
Perennial Forbs							
ACHMIL	*Achillea millefolium*	common yarrow		X			
ALLSPP	*Allium* spp.	onion	X		X		
ALLTEX	*Allium textile*	prairie onion	X		X	X	
AMBPSI	*Ambrosia psilostachya*	western ragweed			X		X
ANTMIC	*Antennaria microphylla*	little-leaf pussytoes	X			X	
ANTPAR	*Antennaria parvifolia*	small-leaf pussytoes				X	
ASCSPE	*Asclepias speciosa*	showy milkweed		X			
CALNUT	*Calochortus nuttallii*	sego mariposalily	X				
CAMROT	*Campanula rotundifolia*	harebell				X	
CERSPP	*Cerastium* spp.	chickweed	X				
CIRCAN	*Circaea canadensis*	broadleaf enchanter's nightshade			X		
CIRARV	*Cirsium arvense*	Canada thistle		X			
CIRSPP	*Cirsium* spp	thistle	X				
COMUMB	*Comandra umbellata*	common bastardtoadflax	X			X	
CONARV	*Convolvulus arvensis*	field bindweed			X		
CRESPP	*Crepis* spp.	hawksbeard	X				
	Species observed but not sampled						

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			Vegetation Community				
Code	Scientific Name	Common Name	Big Sagebrush Shrubland	Cottonwood Gallery	Greasewood Shrubland	Ponderosa Pine Woodland	Upland Grassland
Perennial Forbs continued							
DALCAN	*Dalea candida*	white prairie-clover					X
DALENN	*Dalea ennandra*	nineanther prairie-clover				X	
DALPUR	*Dalea purpurea*	purple prairie-clover	X				
ECHANG	*Echinacea angustifolia*	purple coneflower					X
EREHOO	*Eremogone hookeri*	Hooker sandwort	X			X	
ERISPP	*Erigeron* spp	fleabane	X			X	
GAISPP	*Gaillardia* spp.	blanketflower				X	
GAUCOC	*Gaura coccinea*	scarlet gaura	X				
GRISQU	*Grindelia squarrosa*	curlycup gumweed	X			X	
HELPAU	*Helianthus pauciflorus*	stiff sunflower					X
HELSPP	*Helianthus* spp.	sunflower	X	X			
HESPUM	*Hesperochiron pumilus*	dwarf hesperochiron	X				
HETVIL	*Heterotheca villosa*	goldenaster	X			X	
LIAPUN	*Liatris punctata*	dotted blazingstar	X			X	
MACSPP	*Machaeranthera* spp.	tansyaster	X				
PEDARG	*Pediomelum argophyllum*	silverleaf scurfpea	X				X
PENSPP	*Penstemon* spp.	penstemon	X			X	
PHLMUL	*Phlox multiflora*	flowery phlox				X	
PHLSPP	*Phlox* spp.	phlox	X		X	X	X
PSOSPP	*Psoralidium* spp.	scurfpea	X				
PSOTEN	*Psoralidium tenuiflorum*	slimflower scurfpea				X	
PTESPP	*Pterospora* spp.	pinedrops				X	
SPHCOC	*Sphaeralcea coccinea*	scarlet globemallow	X		X	X	X
THERHO	*Thermopsis rhombifolia*	prairie thermopsis	X			X	
VICAME	*Vicia americana*	American vetch	X			X	X
WOOORE	*Woodsia oregana var. cathcartiana*	Oregon cliff fern				X	
Perennial Half and Sub-shrubs							
ARTFRI	*Artemisia frigida*	fringed sagewort	X	X	X	X	X
ARTLUD	*Artemisia ludoviciana*	Louisiana sagewort				X	
GUTSAR	*Gutierrezia sarothrae*	broom snakeweed	X			X	X
ROSARK	*Rosa arkansana*	prairie rose				X	
	Species observed but not sampled						

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			Vegetation Community				
Code	Scientific Name	Common Name	Big Sagebrush Shrubland	Cottonwood Gallery	Greasewood Shrubland	Ponderosa Pine Woodland	Upland Grassland
Perennial Half and Sub-shrubs continued							
YUCGLA	*Yucca glauca*	yucca (small soapweed)				X	
Perennial Shrubs							
ARTCAN	*Artemisia cana*	silver sagebrush		X	X	X	
ARTTRI	*Artemisia tridentata*	big sagebrush	X	X	X	X	X
CHRVIS	*Chrysothamnus viscidflorus*	Douglas rabbitbrush				X	
ERINAU	*Ericameria nauseosa*	rubber rabbitbrush		X	X	X	
SARVER	*Sarcobatus vermiculatus*	greasewood	X	X	X		
SYMOCC	*Symphoricarpos occidentalis*	western snowberry		X			
Succulents							
CORSPP	*Coryphantha* spp.	ball cactus	X				
OPUPOL	*Opuntia polyacantha*	plains prickly pear	X		X	X	X
PEDSIM	*Pediocactus simpsonii*	mountain ball cactus	X				
Trees							
JUNSCO	*Juniperus scopulorum*	Rocky Mountain juniper				X	
PINPON	*Pinus ponderosa*	ponderosa pine				X	
POPDEL	*Populus deltoides*	plains cottonwood		X			
Lichens and Moss							
LICSPP	*Lichen* spp.	lichen	X		X	X	X
MOSSPP	*Moss* spp.	moss			X	X	
	Species observed but not sampled						

POWERTECH (USA) INC.

APPENDIX 5.4-C

VEGETATION COVER SUMMARY

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: BS
Name: Baseline
Comm. Type/Form: Big Sagebrush
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 27
Report Date: 1-14-08

Species	Cover Mean Absolute	Cover Relative (%)	Std. Dev. n-1	Frequency Absolute	Frequency Relative (%)	I.V.	Rank
Cool Season Perennial Grasses							
Carex filifolia	3.56	7.76	6.14	48.15	7.39	15.14	5
Carex stenophylla	0.07	0.15	0.38	3.70	0.57	0.72	15
Elymus lanceolatus	0.07	0.15	0.38	3.70	0.57	0.72	15
Elymus smithii	3.78	8.24	3.82	70.37	10.80	19.03	4
Hesperostipa comata	0.89	1.94	2.03	18.52	2.84	4.78	11
Poa secunda	0.96	2.09	2.03	25.93	3.98	6.07	8
Sub-total	9.33	20.33					
Warm Season Perennial Grasses							
Aristida purpurea	0.15	0.33	0.53	7.41	1.14	1.46	15
Bouteloua curtipendula	0.22	0.48	0.85	7.41	1.14	1.62	14
Bouteloua gracilis	11.19	24.38	7.45	88.89	13.64	38.02	1
Buchloe dactyloides	9.63	20.98	10.47	77.78	11.93	32.92	2
Panicum virgatum	0.07	0.15	0.38	3.70	0.57	0.72	15
Sub-total	21.26	46.33					
Annual Grasses							
Bromus japonicus	2.81	6.12	3.56	55.56	8.52	14.65	6
Bromus tctorum	1.85	4.03	2.98	40.74	6.25	10.28	7
Sub-total	4.66	10.15					
Annual Forbs							
Alyssum desertorum	0.22	0.48	0.85	7.41	1.14	1.62	14
Camelina microcarpa	0.07	0.15	0.38	3.70	0.57	0.72	15
Hedeoma hispidum	0.07	0.15	0.38	3.70	0.57	0.72	15
Lappula redowski	0.07	0.15	0.38	3.70	0.57	0.72	15
Lepidium densiflorum	0.30	0.65	0.72	11.11	1.70	2.36	13
Linum australe	0.07	0.15	0.38	3.70	0.57	0.72	15
Plantago patagonica	0.07	0.15	0.38	3.70	0.57	0.72	15
Sub-total	0.87	1.90					
Perennial Forbs							
Calochortus nuttallii	0.07	0.15	0.38	3.70	0.57	0.72	15
Phlox spp.	0.07	0.15	0.38	3.70	0.57	0.72	15
Sphaeralcea coccinea	0.37	0.81	1.11	11.11	1.70	2.51	12
Sub-total	0.51	1.11					
Perennial Sub-Shrubs							
Artemisia frigada	1.04	2.27	1.25	22.22	3.41	5.68	9
Gutierrezia sarothrae	0.15	0.33	0.27	7.41	1.14	1.46	15
Sub-total	1.19	2.59					
Perennial Shrubs							
Artemisia tridentata	7.26	15.82	5.82	92.59	14.20	30.03	3
Sub-total	7.26	15.82					
Perennial Succulants							
Opuntia polyacantha	0.81	1.77	0.89	22.22	3.41	5.17	10
Sub-total	0.81	1.77					
Total Vegetation	45.89		13.09				
Lichen	1.26		2.30				
Moss	0.07		0.38				
Litter/Rock	38.52		19.27				
Total Ground Cover	85.78		6.59				
Bare Soil	14.07		6.50				
Total Cover	99.85						
Species Abundance (No. of Species/Sample)	27						

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: GW
Name: Baseline
Comm. Type/Form: Greasewood Shrubland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-08

	Cover			Frequency			
Species	Mean Absolute	Relative (%)	Std. Dev. n-1	Absolute	Relative (%)	I.V.	Rank
Cool Season Perennial Grasses							
Agropyron cristatum	0.49	1.32	2.64	5.41	0.97	2.29	15
Bromus inermis	0.22	0.59	0.79	8.11	1.46	2.05	17
Carex filifolia	0.27	0.73	1.07	8.11	1.46	2.18	16
Carex stenophylla	0.11	0.30	0.66	2.70	0.48	0.78	22
Elymus hispidus	0.05	0.13	0.33	2.70	0.48	0.62	23
Elymus lanceolatus	0.22	0.59	1.03	5.41	0.97	1.56	19
Elymus smithii	8.65	23.31	8.47	89.19	16.02	39.33	1
Hordeum jubatum	0.05	0.13	0.33	2.70	0.48	0.62	23
Poa secunda	0.16	0.43	0.73	5.41	0.97	1.40	20
Schedonnardus panniculatus	0.05	0.13	0.33	2.70	0.48	0.62	23
Sub-total	10.27	27.67					
Warm Season Perennial Grasses							
Artistida spp.	0.05	0.13	0.33	2.70	0.48	0.62	23
Bouteloua gracilis	3.84	10.35	6.10	43.24	7.77	18.11	3
Buchloe dactyloides	3.57	9.62	5.97	45.95	8.25	17.87	4
Distichlis stricta	0.97	2.61	3.93	10.81	1.94	4.56	11
Sporobolus airoides	0.54	1.46	1.68	13.51	2.43	3.88	12
Sporobolus cryptandrus	0.05	0.13	0.33	2.70	0.48	0.62	23
Sub-total	9.02	24.31					
Annual Grasses							
Bromus japonicus	0.22	0.59	0.64	10.81	1.94	2.53	14
Bromus tectorum	1.62	4.37	3.43	29.73	5.34	9.71	5
Sub-total	1.84	4.96					
Annual Forbs							
Bassia sieveriana	1.68	4.53	4.15	21.62	3.88	8.41	8
Camelina microcarpa	0.05	0.13	0.33	2.70	0.48	0.62	23
Chenopodium album	0.16	0.43	0.55	8.11	1.46	1.89	18
Chenopodium berlandieri	0.05	0.13	0.33	2.70	0.48	0.62	23
Cryptantha spp.	0.05	0.13	0.33	2.70	0.48	0.62	23
Descurainia pinnata	0.11	0.30	0.46	5.41	0.97	1.27	21
Lappula redowski	0.22	0.59	0.79	8.11	1.46	2.05	17
Lepidium densiflorum	0.16	0.43	0.73	5.41	0.97	1.40	20
Lepidium perfoliatum	0.27	0.73	0.96	8.11	1.46	2.18	16
Monolepis nuttalliana	0.38	1.02	1.14	13.51	2.43	3.45	13
Plantago patagonica	0.65	1.75	1.89	16.22	2.91	4.66	10
Salsola tragus	0.05	0.13	0.33	2.70	0.48	0.62	23
Sub-total	3.83	10.32					
Perennial Forbs							
Ambrosia psilostachya	0.05	0.13	0.33	2.70	0.48	0.62	23
Convolvulus arvensis	0.05	0.13	0.33	2.70	0.48	0.62	23
Sphaeralcea coccinea	0.05	0.13	0.33	2.70	0.48	0.62	23
Sub-total	0.15	0.40					
Perennial Shrubs							
Artemisia cana	0.59	1.59	1.32	18.92	3.40	4.99	9
Artemisia tridentata	1.57	4.23	3.66	24.32	4.37	8.60	7

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: GW
Name: Baseline
Comm. Type/Form: Greasewood Shrubland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-08

Species	Cover Mean Absolute	Cover Relative (%)	Std. Dev. n-1	Frequency Absolute	Frequency Relative (%)	I.V.	Rank
Perennial Shrubs continued							
Sarcobatus vermiculatus	8.49	22.88	8.79	86.49	15.53	38.41	2
Sub-total	10.65	28.70					
Perennial Succulants							
Opuntia polyacantha	1.35	3.64	1.45	29.73	5.34	8.98	6
Sub-total	1.35	3.64					
Total Vegetation	37.11		10.88				
Lichen	0.48		1.52				
Moss	0.06		0.33				
Litter/Rock	42.54		23.85				
Total Ground Cover	80.19		13.47				
Bare Soil	18.70		13.37				
Total Cover	98.89						
Species Abundance (No. of Species/Sample)	37						

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: PP
Name: Baseline
Comm. Type/Form: Ponderosa Pine Woodland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-08

	Cover			Frequency			
Species	Mean Absolute	Relative (%)	Std. Dev. n-1	Absolute	Relative (%)	I.V.	Rank
Cool Season Perennial Grasses							
Carex filifolia	0.11	0.32	0.66	2.70	0.56	0.88	15
Carex geyeri	4.59	13.37	5.49	56.76	11.87	25.24	2
Elymus lanceolatus	0.05	0.15	0.33	2.70	0.56	0.71	16
Elymus smithii	1.24	3.61	1.96	37.84	7.91	11.52	6
Hesperostipa comata	0.16	0.47	0.73	2.70	0.56	1.03	14
Nassella viridula	0.11	0.32	0.46	5.41	1.13	1.45	13
Poa secunda	0.38	1.11	1.69	5.41	1.13	2.24	11
Sub-total	6.64	19.34					
Warm Season Perennial Grasses							
Andropogon scoparius	0.81	2.36	1.52	24.32	5.08	7.44	7
Aristida purpurea var. fendleriana	0.81	2.36	1.73	24.32	5.08	7.44	7
Bouteloua curtipendula	1.68	4.89	2.93	35.14	7.35	12.24	5
Bouteloua gracilis	4.05	11.80	4.58	62.16	12.99	24.79	3
Buchloe dactyloides	0.32	0.93	0.88	13.51	2.82	3.76	9
Sub-total	7.67	22.34					
Annual Grasses							
Bromus japonicus	0.22	0.64	0.63	10.81	2.26	2.90	10
Bromus tectorum	0.05	0.15	0.33	2.70	0.56	0.71	16
Sub-total	0.27	0.79					
Annual Forbs							
Chenopodium berlandieri	0.05	0.15	0.33	2.70	0.56	0.71	16
Draba nemorosa	0.05	0.15	0.33	2.70	0.56	0.71	16
Lappula redowski	0.05	0.15	0.33	2.70	0.56	0.71	16
Sub-total	0.15	0.44					
Biennial Forbs							
Melilotus officinalis	0.05	0.15	0.33	2.70	0.56	0.71	16
Sub-total	0.05	0.15					
Perennial Forbs							
Antennaria parvifolia	0.05	0.15	0.33	2.70	0.56	0.71	16
Erigeron spp.	0.11	0.32	0.66	2.70	0.56	0.88	15
Liatris punctata	0.05	0.15	0.33	2.70	0.56	0.71	16
Thermopsis rhombifolia	0.16	0.47	0.99	2.70	0.56	1.03	14
Vicia americana	0.05	0.15	0.33	2.70	0.56	0.71	16
Sub-total	0.42	1.22					
Perennial Sub-Shrubs							
Artemisia frigada	0.22	0.64	0.63	10.81	2.26	2.90	10
Sub-total	0.22	0.64					
Perennial Shrubs							
Artemisia cana	0.16	0.47	0.99	2.70	0.56	1.03	14
Artemisia tridentata	0.54	1.57	1.12	21.62	4.52	6.09	8
Sub-total	0.70	2.04					

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: PP
Name: Baseline
Comm. Type/Form: Ponderosa Pine Woodland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-08

	Cover			Frequency			
Species	Mean Absolute	Relative (%)	Std. Dev. n-1	Absolute	Relative (%)	I.V.	Rank
Perennial Succulants							
Opuntia polyacantha	0.16	0.47	0.55	8.11	1.70	2.16	12
Sub-total	0.16	0.47					
Perennial Trees							
Juniperus scopulorum	2.59	7.54	4.52	32.43	6.78	14.32	4
Pinus ponderosa	15.46	45.03	10.79	91.89	19.21	64.24	1
Sub-total	18.05	52.58					
Total Vegetation	34.33		10.51				
Lichen	0.54		1.30				
Moss	0.38		1.14				
Litter/Rock	53.57		24.32				
Total Ground Cover	88.82		7.68				
Bare Soil	10.54		7.74				
Total Cover	99.36						
Species Abundance (No. of Species/Sample)	29						

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: UG
Name: Baseline
Comm. Type/Form: Upland Grassland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 30
Report Date: 1-14-08

	Cover			Frequency			
Species	Mean Absolute	Relative (%)	Std. Dev. n-1	Absolute	Relative (%)	I.V.	Rank
Cool Season Perennial Grasses							
Agropyron cristatum	0.47	1.02	1.63	10.00	2.04	3.06	9
Carex filifolia	3.33	7.24	5.57	50.00	10.20	17.44	5
Elymus smithii	8.53	18.54	7.82	80.00	16.33	34.86	3
Hesperostipa comata	0.33	0.72	1.30	6.67	1.36	2.08	11
Poa secunda	0.07	0.15	0.37	3.33	0.68	0.83	13
Sub-total	12.73	27.66					
Warm Season Perennial Grasses							
Bouteloua gracilis	12.47	27.10	9.82	90.00	18.37	45.46	2
Buchloe dactyloides	12.80	27.81	9.88	90.00	18.37	46.18	1
Sub-total	25.27	54.91					
Annual Grasses							
Bromus japonicus	0.07	0.15	0.37	3.33	0.68	0.83	13
Bromus tectorum	4.07	8.84	5.26	53.33	10.88	19.73	4
Sub-total	4.14	9.00					
Annual Forbs							
Alyssum desertorum	0.67	1.46	1.60	16.67	3.40	4.86	7
Lepidium densiflorum	0.20	0.43	0.81	6.67	1.36	1.80	12
Thlaspi arvense	0.67	1.46	2.31	13.33	2.72	4.18	8
Sub-total	1.54	3.35					
Perennial Forbs							
Sphaeralcea coccinea	0.20	0.43	0.61	10.00	2.04	2.48	10
Sub-total	0.20	0.43					
Perennial Sub-Shrubs							
Artemisia frigada	0.07	0.15	0.37	3.33	0.68	0.83	13
Sub-total	0.07	0.15					
Perennial Succulants							
Opuntia polyacantha	2.07	4.50	2.49	53.33	10.88	15.38	6
Sub-total	2.07	4.50					
Total Vegetation	46.02		13.76				
Lichen	1.80		4.11				
Litter/Rock	41.13		20.69				
Total Ground Cover	88.95		6.07				
Bare Soil	11.07		5.94				
Total Cover	100.02						
Species Abundance (No. of Species/Sample)	15						

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Cover Summary

Site Id: CG
Name: Baseline
Comm. Type/Form: Cottonwood Gallery
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Point Intercept
Sample Size: 50 Meter Transect
Number of Samples: 26
Report Date: 1-14-08

Species	Cover Mean Absolute	Cover Relative (%)	Std. Dev. n-1	Frequency Absolute	Frequency Relative (%)	I.V.	Rank
Cool Season Perennial Grasses							
Bromus inermis	18.23	29.12	16.76	92.31	24.49	53.61	1
Elymus smithii	16.46	26.29	15.60	88.46	23.47	49.76	2
Sub-total	34.69	55.41					
Warm Season Perennial Grasses							
Distichlis stricta	0.23	0.37	1.18	3.85	1.02	1.39	10
Sub-total	0.23	0.37					
Annual Grasses							
Bromus japonicus	0.08	0.13	0.39	3.85	1.02	1.15	11
Bromus tectorum	0.69	1.10	1.95	15.38	4.08	5.18	6
Sub-total	0.77	1.23					
Annual Forbs							
Bassia sieveriana	9.77	15.60	15.98	53.85	14.29	29.89	4
Chenopodium album	1.38	2.20	2.76	26.92	7.14	9.35	5
Descurainia sophia	0.08	0.13	0.39	3.85	1.02	1.15	11
Lappula redowski	0.08	0.13	0.39	3.85	1.02	1.15	11
Sub-total	11.31	18.06					
Perennial Forbs							
Achillea millefolium	0.08	0.13	0.39	3.85	1.02	1.15	11
Cirsium arvense	1.38	2.20	6.66	7.69	2.04	4.24	7
Sub-total	1.46	2.33					
Perennial Shrubs							
Artemisia cana	0.15	0.24	0.54	7.69	2.04	2.28	8
Sarcobatus vermiculatus	0.08	0.13	0.39	3.85	1.02	1.15	11
Symphoricarpos occidentalis	0.54	0.86	2.75	3.85	1.02	1.88	9
Sub-total	0.77	1.23					
Perennial Trees							
Populus deltoides	13.38	21.37	20.28	57.69	15.30	36.68	3
Sub-total	13.38	21.37					
Total Vegetation	62.61		15.29				
Lichen	0.00		0.00				
Litter/Rock	35.00		12.83				
Total Ground Cover	97.62		4.16				
Bare Soil	2.38		4.16				
Total Cover	100.00						
Species Abundance (No. of Species/Sample)	15						

APPENDIX 5.4-D

VEGETATION DENSITY SUMMARY

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: BS
Name: Baseline
Comm. Type/Form: Big Sagebrush
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 27
Report Date: 1-14-08

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia tridentata	24.26	53.65	14.83	0.49	1,964.33
Sub-Total	24.26	53.65		0.49	1,964.33
Sub-Shrubs & Half-Shrubs					
Artemisia frigada	20.52	45.38	40.21	0.41	1,661.50
Gutierrezia sarothrae	0.44	0.97	1.15	0.01	35.63
Sub-Total	20.96	46.35		0.42	1,697.13
Total	45.22	100.00		0.90	3,661.46

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: GW
Name: Baseline
Comm. Type/Form: Greasewood Shrubland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-08

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	3.81	11.91	9.89	0.08	308.50
Artemisia tridentata	5.59	17.48	12.13	0.11	452.62
Ericameria nauseosa	0.22	0.69	1.32	0.00	17.81
Sarcobatus vermiculatus	22.22	69.48	20.88	0.44	1,799.15
Sub-Total	31.84	99.56		0.64	2,578.08
Sub-Shrubs & Half-Shrubs					
Artemisia frigida	0.14	0.44	0.48	0.003	11.34
Sub-Total	0.14	0.44		0.003	11.34
Total	31.98	100.00		0.64	2,589.42

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: PP
Name: Baseline
Comm. Type/Form: Ponderosa Pine Woodland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-2008

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	2.11	13.96	12.82	0.04	170.85
Artemisia tridentata	4.14	27.38	7.05	0.08	335.22
Chrysothamnus viscidflorus	0.22	1.46	0.67	0.004	17.81
Ericameria nauseosa	0.14	0.93	0.54	0.003	11.34
Sub-Total	6.61	43.72		0.13	535.21
Sub-Shrubs & Half-Shrubs					
Artemisia frigada	6.92	45.77	16.08	0.14	560.31
Gutierrezia sarothrae	1.51	9.99	5.86	0.03	122.26
Rosa arkansana	0.03	0.20	0.33	0.001	2.43
Yucca glauca	0.05	0.33	0.16	0.001	4.05
Sub-Total	8.51	56.28		0.17	689.05
Total	15.12	100.00		0.30	1,224.27

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: UG
Name: Baseline
Comm. Type/Form: Upland Grassland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 30
Report Date: 1-14-08

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia tridentata	0.13	20.63	0.43	0.003	10.53
Sub-Total	0.13	20.63		0.003	10.53
Sub-Shrubs & Half-Shrubs					
Artemisia frigada	0.47	74.60	2.56	0.01	38.06
Gutierrezia sarothrae	0.03	4.76	0.18	0.00	2.43
Sub-Total	0.50	79.37		0.01	40.49
Total	0.63	100.00		0.01	51.01

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: CG
Name: Baseline
Comm. Type/Form: Cottonwood Gallery
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 26
Report Date: 1-14-08

	Mean (Number/Plot)	Relative Density	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisa cana	0.5	7.13	1.12	0.01	40.49
Artemisia tridentata	0.04	0.57	0.19	0.00	3.24
Ericameria nauseosa	0.04	0.57	0.19	0.00	3.24
Sarcobatus vermiculatus	0.08	1.14	0.27	0.00	6.48
Symphoricarpos occidentalis	6.35	90.58	31.73	0.13	514.16
Sub-Total	7.01	100.00		0.14	567.60
Total	7.01	100.00		0.14	567.60

Powertech (USA) Inc.

APPENDIX 5.4-E

PONDEROSA PINE WOODLAND TREE DENSITY SUMMARY

POWERTECH (USA) INC.

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: PP
Name: Baseline
Comm. Type/Form: Ponderosa Pine Woodland
Sample Date:7-2-2007 to 7-12-2007

Sample Method: Transect
Sample Size: 50 Meter Transect
Number of Samples: 37
Report Date: 1-14-2008

	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Trees			
Pinus ponderosa	15.10	0.019	75.88
Sub-Total		0.019	75.88
Total		0.019	75.88

POWERTECH (USA) INC.

APPENDIX 5.4-E

PONDEROSA PINE WOODLAND TREE DENSITY SUMMARY

POWERTECH (USA) INC
DEWEY-BURDOCK PROJECT
Report: Density Summary

Site Id: PP	Sample Method: Transect
Name: Baseline	Sample Size: 50 Meter Transect
Comm. Type/Form: Ponderosa Pine Woodland	Number of Samples: 37
Sample Date:7-2-2007 to 7-12-2007	Report Date: 1-14-2008

	Std. Dev. n-1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Trees			
Pinus ponderosa	15.10	0.019	75.88
Sub-Total		0.019	75.88
Total		0.019	75.88

POWERTECH (USA) INC.

APPENDIX 5.4-F

WETLAND PHOTOGRAPHY


W1, R1 P1: Depression, non-wetland


W3, R1 P12: Upstream, non-wetland


W3, R1 P13: Downstream, non-wetland


W4, R1 P2: Upstream, wetland

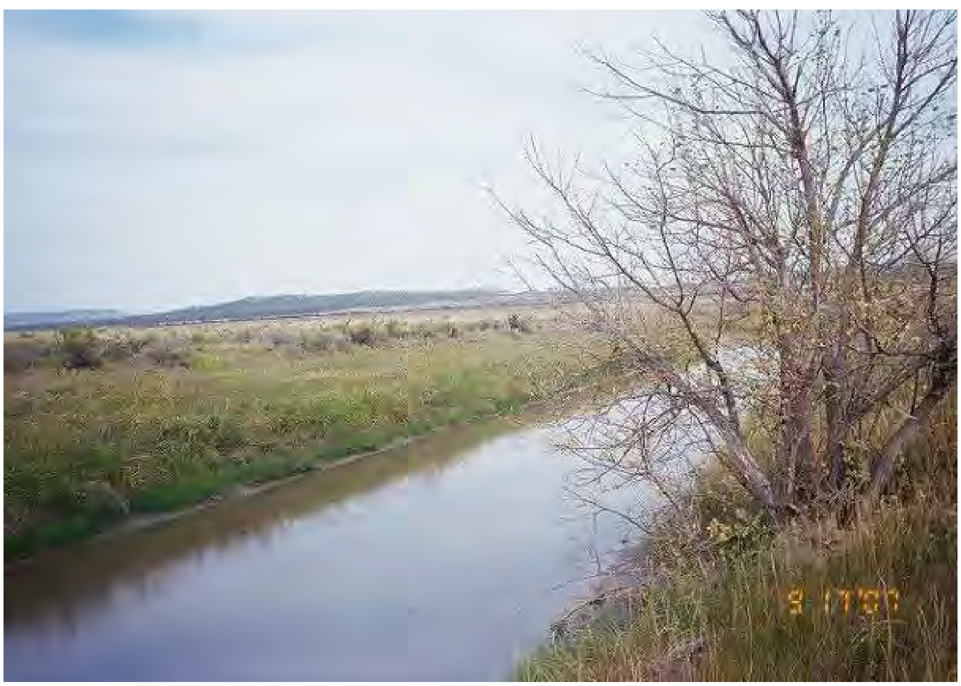
W4, R1 P3: Downstream, wetland

W4, R1 P4: Tributary

Wpt. 3, R1 P6: Upstream, wetland

Wpt. 3, R1 P7: Downstream, wetland

Wpt. 4, R1 P8: Upstream, wetland



Wpt. 4, R1 P9: Downstream, wetland

W5, R1 P5: Upland, non-wetland

W6, R1 P16: View of the drainage

W7, R1 P17: Upstream, wetland

W7, R1 P18: Downstream

W8, R1 P19: Upstream, wetland

W8, R1 P20: Downstream, wetland

W9, R1 P23: Upstream depression, wetland

W9, R1 P24: Downstream depression, wetland


W10, R2 P1: Downstream, wetland


W10, R2 P2: Upstream, wetland

W11, R2 P3: West

W11, R2 P4: East

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W12, R2 P5: West, non-wetland

W12, R2 P6: East, non-wetland

W14, R2 P7: Upstream, wetland

W14, R2 P8: Downstream, wetland

W14, R2 P9: General area of PEMC

W15, R2 P12: Upstream, wetland


W15, R2 P13: Downstream, wetland


Wpt. 22, R2, P14: Upstream wetland

Wpt. 22, R2, P15: Downstream, wetland

W16, R2 P18: Upstream, wetland

W16, R2 P19: Downstream, wetland

W17, R2 P22: Upstream, non-wetland

W17, R2 P23: Downstream, non-wetland

Wpt. 26, R2 P24: Similar to W18, wetland

W18, R3 P1: Upstream, wetland

W18, R3 P2: Downstream, wetland

W19, R3 P3: Northwest, non-wetland

W19, R3 P4: East, non-wetland

Wpt. 27, R3 P5: Drainage, non-wetland

Wpt. 29, R3 P6: Depression, non-wetland

Wpt. 29, R3 P7: Depression, non-wetland

W20, R3 P8: Upstream, wetland

W20, R3 P9: Downstream, wetland

W21, R3 P10: Upstream, wetland

W21, R3 P11: Downstream, wetland

W21, R3 P12: Bridge

W22, R3 P13: Upstream, wetland

W22, R3 P14: Downstream, wetland

W23, R3 P17: Upstream, wetland


W23, R3 P18, Downstream, wetland

Wpt. 35, R4 P23: Upstream, non-wetland

Wpt. 35, R4 P24: downstream, non-wetland

W25, R4 P1: Upstream, non-wetland

W25, R4 P2: Downstream, non-wetland

W26, R4 P3: Upstream, non-wetland


W26, R4 P4: Downstream, non-wetland

W27, R4 P11: Upstream, non-wetland

W27, R4 P12: Downstream, non-wetland

W28, R4 P13: Upstream, non-wetland


W28, R4 P14: Downstream, non-wetland

W29, R4 P17: Upstream, non-wetland

W29, R4 P18: Downstream, non-wetland

W30, R4 P19: East, non-wetland

W30, R4 P20: West, non-wetland

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W31, R4 P21: Northeast, wetland

W31, R4 P22: East-southeast, wetland

W32, R4 P24: Previously mapped PEM wetland, wetland

W32, R4 P25: from the berm, wetland

Powertech (USA) Inc.

W33, R5 P1: Upstream, wetland

W33, R5 P2: Downstream, wetland


Wpt. 56, R5 P3: Depression, non-wetland


Wpt. 56, R5 P4: Depression, non-wetland

Wpt. 57, R5 P5: Depression, non-wetland

Wpt. 58, R5 P8: Surface water ends

POWERTECH (USA) INC.

W34, R5 P9: Upstream, non-wetland

W34, R5 P10: Downstream, non-wetland

W35, R5 P11: Facing East, wetland

W35, R5 P12: Facing south, wetland

Wpt. 60 and 61, R5 P13: Depression, non-wetland

Wpt. 60 and 61, R5 P14: Depression, non-wetland

POWERTECH (USA) INC.

Wpt. 60 and 61, R5 P15: Depression w/ salt crusts, non-wetland

Wpt. 62, R5 P16: Depression, non-wetland

Wpt. 62, R5 P17: Depression, non-wetland

Wpt. 68, R5 P18: Upstream

Powertech (USA) Inc.

Wpt. 68, R5 P19: Downstream

W36, R5 P20: Downstream, wetland

W36, R5 P21: Upstream to stock tank, wetland

Wpt. 74, R6 P1: Depression, non-wetland

Wpt. 74, R6 P2: Depression, non-wetland

Wpt. 78, R6 P5: Depression, non-wetland

W37, R6 P6: Panoramic east to west of old mine pit, non-wetland


W37, R6 P7: Panoramic east to west of old mine pit, non-wetland

W37, R6 P8: Panoramic east to west of old mine pit, non-wetland

W37, R6 P9: Panoramic east to west of old mine pit, non-wetland

W37, R6 P10: Panoramic east to west of old mine pit, non-wetland

W38, R6 P13: East, wetland

W38, R6 P14: West, wetland

Wpt. 83, R6 P15: *Hordeum jubatum* depression, wetland

W39, R6 P16: Depression, wetland

W39, R6 P17: Drainage to the East, wetland

W40, R6 P18: Pond, wetland

W41, R6 P19: Wetland

W41, R6 P20: General area, wetland

W42, R6 P22: Panoramic East to West, wetland


W42, R6 P23: Panoramic East to West, wetland


W42, R6 P24: Panoramic East to West, wetland

Wpt. 88 and 89, R7 P1: Mine Pit, non-wetland

Wpt. 88 and 89, R7 P2: Mine Pit, non-wetland

Wpt. 92, R7 P5: Mine Pit, non-wetland

Wpt. 92, R7 P6: Mine Pit, non-wetland

Wpt. 92, R7 P7: Mine Pit, non-wetland

Wpt. 94, R7 P9: Mine Pit, non-wetland

Wpt. 97, R7 P14: Depression, non-wetland

Wpt. 102, R7 P18: Depression, wetland

Wpt. 102, R7 P19: Depression, wetland

Wpt. 103, R7 P20: Mine Pit, wetland

Wpt. 104, R7 P21: Depression, wetland

Wpt. 104, R7 P22: Depression, wetland

Wpt. 104, R7 P23: Depression, wetland

W44, R7 P24: Northwest, wetland

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W44, R8 P1: North, wetland

W44, R8 P2: East, wetland


W45, R8 P4: Upstream, wetland


W45, R8 P5: Downstream, wetland

POWERTECH (USA) INC.

APPENDIX 5.4-G

WETLAND DETERMINATION DATA FORMS – GREAT PLAINS REGION

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W1

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Depression into tributary Local relief (concave, convex, none): Convex Slope (%): 0%

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEMC

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R1 P1 - Depression
~10' x 15'

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Rosa woodsii*	100	X	FACU
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1. *Hordeum jubatum*	15		FACW
2. *Elymus smithii*	5		FACU
3. *Polygonum aviculare*	5		FACU
4. *Eleocharis palustris*	75	X	OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x1=	75
FACW species	15	x2=	30
FAC species		x3=	
FACU species	110	x4=	440
UPL species		x5=	
Column Totals:	200 (A)		545 (B)

Prevalence Index = B/A = 2.75

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
X Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 3/1	90	10YR 4/8	10	C	RC	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
_X_ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soils Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

	Yes		No		Depth (inches):	
Surface Water Present?	Yes	___	No	X	Depth (inches):	___
Water Table Present?	Yes	___	No	X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	___

Wetland Hydrology Present? Yes ___ No _X_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W2

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 3

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
Isolated wetland

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. *Hordeum jubatum*	10		FACW
2. *Elymus smithii*	15		FACU
3. *Spartina pectinata*	60	X	FACW
4. *Bromus japonicus*	5		FACU
5. *Xanthium strumarium*	2		FAC
6. *Poa pratensis*	3		FACU
7. *Melilotus officinalis*	5		FACU
8.			
9.			
10.			
Total Cover:	100		

Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x1=	0
FACW species	70	x2=	140
FAC species	2	x3=	6
FACU species	28	x4=	112
UPL species	0	x5=	0
Column Totals:	100 (A)		258 (B)
Prevalence Index = B/A =	2.58		

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
X Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL

Sampling Point W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	95	7.5YR 3/3	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F**)
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
X Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

X Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 5
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Soil is moist but not saturated. A definable channel is present.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07
Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W3
Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 0
Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13
Soil Map Unit Name: ____ NWI Classification: ____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present	X	

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R1 P 12: Upstream
R1 P13: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	40	X	FACU
2. *Xanthium strumarium*	1		FAC
3. *Bromus japonicus*	20	X	FACU
4. *Polygonum aviculare*	5		FACU
5. *Lepidium densiflorum*	15		FACU
6. *Poa pratensis*	6		FACU
7. *Melilotus officinalis*	10		FACU-
8. *Symphoricarpos sp.*	3		NI
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

X Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Definable channel is present.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W4

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 3

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present	Yes X	No	

Remarks:
R2 P2: Upstream R2 P3: Downstream R2 P4: Tributary
Channel width is approximately 17 feet
R2 P6: Upstream at waypoint 3 R2 P7: Downstream at waypoint 3
R2 P8 Upstream at waypoint 4 R2 P9: Downstream at waypoint 4

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	35	X	FACW
2. *Cirsium arvense*	10		FACU
3. *Schoenoplectus pungens*	20	X	OBL
4. *Eleocharis palustris*	35	X	OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	Gley1 2.5/N	100					SCL	
2-10	Gley1 3/N	100					SCL	
10-14	Gley1 4/5GY	95	7.5YR 4/6	5			SC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
_X_ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F**)
_X_ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
_X_ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
_X_ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes _X_ No ____

Remarks:
Faint hydrogen sulfide odor was present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_X_ Surface Water (A1)
_X_ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
_X_ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
_X_ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
_X_ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes _X_ No ____ Depth (inches): ____
Water Table Present? Yes _X_ No ____ Depth (inches): 2
Saturation Present? (includes capillary fringe) Yes _X_ No ____ Depth (inches): 2

Wetland Hydrology Present? Yes _X_ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W5

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Uplands Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R1 P5: Upland area near Beaver Creek

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Poa pratensis*	45	X	FACU
2. *Cirsium arvense*	15		FACU
3. *Chenopodium album*	25	X	FAC
4. *Helianthus annuus*	15		FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply by:	
OBL species		x1=		
FACW species		x2=		
FAC species	25	x3=	75	
FACU species	75	x4=	300	
UPL species		x5=		
Column Totals:	100	(A)	375	(B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL

Sampling Point W5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soils Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
_____ Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
_____ Drainage Patterns (B10)
_____ Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
_____ Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
Water Table Present? Yes _____ No X Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W6

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No		
Hydrophytic Vegetation Present?		X	**Is the Sampled Area Within a Wetland**	Yes ____ No X
Hydric Soil Present?		X		
Wetland Hydrology Present		X		

Remarks:
R1 P 17: Upstream
R1 P18: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Rosa woodsii*	100	X	FACU
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1. *Elymus smithii*	85	X	FACU
2. *Astragalus* sp.	5		UPL
3. *Nassella viridula*	5		NI
4. *Ratibida columnifera*	5		NI
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species	85	x4=	340
UPL species	5	x5=	25
Column Totals:	90	(A)	365 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point W6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/1	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soils Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

US Army Corps of Engineers — Great Plains - DRAFT Version 8-30-06

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W7

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R4SB7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R1 P17 Upstream
R1 P18 Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	5		FACU
2. *Cirsium arvense*	5		FACU
3. *Spartina pectinata*	75	X	FACW
4. *Helianthus annuus*	10		FACU
5. *Cynoglossum officinale*	5		NI
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	70	7.5 YR 4/6	30	C	RC	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W8

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 31, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area Within a Wetland**	Yes X No ____
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present	Yes X	No		

Remarks:
R1 P19 Upstream
R1 P20 Downstream
Similar to W4 and all in between

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	15		FACW
2. *Eleocharis palustris*	35	X	OBL
3. *Schoenoplectus pungens*	25	X	OBL
4. *Eleocharis acicularis*	25	X	OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point W8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	Gley1 3/10Y	70	7.5YR 4/4	20	C	M, RC	SC	
			2.5N	10	D	M	SC	
5+	Rock							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
X Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	X	No	Depth (inches):	5
Water Table Present?	Yes	X	No	Depth (inches):	5
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	5

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W9

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 30-31, T6S R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): ______

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PABJH

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes	X	No		

Remarks:
R1 P23 Upstream
R1 P24 Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Xanthium strumarium*	40	X	FAC
2. *Suckleya suckleyanna*	60	X	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	50	5YR 4/6	50	C	RC/M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)

_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
X Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)

_____ Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_____ Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
_____ Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
Water Table Present? Yes _____ No X Depth (inches): _____
Saturation Present? Yes _____ No X Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Slight soil cracks were present.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/17/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W10

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage/ Depression Local relief (concave, convex, none): Convex Slope (%): ______

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUSA

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ______

Remarks:
NWI previously mapped: PEMF
R2 P1: Downstream
R2 P2: Upstream
Transitioning area changing to an upland area.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Carex filifolia*	80	X	UPL
2. *Hordeum jubatum*	20	X	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL species		x1=		
FACW species	20	x2=	40	
FAC species		x3=		
FACU species		x4=		
UPL species	80	x5=	400	
Column Totals:	100	(A)	440	(B)

Prevalence Index = B/A = 4.40

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

SOIL Sampling Point W10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/1	75	5YR 5/8	25	C	RC	C	
5-9	10YR 4/1	93	10YR 5/8	7	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

A few oxidized root channels existed, with a greater percentage in the top five inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W11

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
NWI previously mapped: PEMF
Cottonwoods in area but not in five foot radius
R2 P3: West
R2 P4: East

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Bassia sieveriana*	70	X	FACU
2. *Hordeum jubatum*	5		FACW
3. *Chenopodium album*	15		FAC
4. *Cirsium arvense*	5		FACU
5. *Thlaspi arvense*	5		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	5	x2=	10
FAC species	15	x3=	45
FACU species	80	x4=	320
UPL species		x5=	
Column Totals:	100	(A)	375 (B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/1	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: __________
Depth (inches): __________

Hydric Soils Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W12

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present		X
Is the Sampled Area Within a Wetland		X

Remarks:
NWI previously mapped: PEMF
R2 P5: West
R2 P6: East

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	5		FACW
2. *Chenopodium album*	50	X	FAC
3. *Cirsium arvense*	15		FACU
4. *Thlaspi arvense*	30	X	FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	5	x2=	10
FAC species	50	x3=	150
FACU species	45	x4=	180
UPL species		x5=	
Column Totals:	100 (A)		340 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators

___ Dominance Test is > 50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/1	75	10YR 5/8	25	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
_X_ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
_X_ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ___
Water Table Present? Yes ___ No _X_ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No _X_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W13

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 32, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: R4US

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present	X	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
Just North of the area little bluestem is creeping into the drainage but it is still dominated by *Spartina pectinata.*

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	90	X	FACW
2. *Andropogon scoparius*	5		NI
3. *Chenopodium album*	5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/1	50	7.5YR 5/8	50	C	M	SiCL	
4-10	10YR 4/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes ____ No X

Remarks:
There were small inclusions of mottles present in depths 4-10 in the matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

Project/Site:	Dewey Burdock	City/County:	Custer County	Sampling Date:	9/18/07
Applicant/Owner:	Knight Piesold, Powertech	State:	South Dakota	Sampling Point:	W14
Investigator(s):	C. Robinson and J. Eberly	Section, Township, Range:	Section 32, T6S, R1E		

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R4US

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present	X	
Is the Sampled Area Within a Wetland	X	

Remarks:
R2 P7: Upstream area extends from waypoints 015-019
R2P8: Downstream
R2 P9: General area of PEMC

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	40	X	FACW
2. *Typha latifolia*	20	X	OBL
3. *Juncus balticus*	40	X	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x1=	20
FACW species	80	x2=	160
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:	100 (A)		180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
X Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point W14

POWERTECH (USA) INC.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	Gley1 4/N	55	7.5YR 5/8	45	C	RC	SiCL	
4-14	Gley1 4/N	80	7.5YR 4/6	20	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
X Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______________________
Depth (inches): ______________________

Hydric Soils Present? Yes X No ______

Remarks:
There were small inclusions of mottles present in depths 4-10 in the matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
_____ Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_____ Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? Yes ______ No X Depth (inches): ______
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W15

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 30, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes	X	No		

Remarks:
R2 P12: Upstream
R2 P13: Downstream
Wetland is upstream and the channel width is about 8 feet wide.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	55	X	FACW
2. *Eleocharis palustris*	15		OBL
3. *Juncus balticus*	10		FACW
4. *Kochia scoparia*	10		FAC
5. *Bassia sieveriana*	10		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point W15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 4/1	90	7.5YR 4/6	10	C	RC, M	CL	
8-10	Gley1 3/N	70	7.5YR 5/8	30	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
X Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 10
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W16

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 31, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R2 P18: Upstream
R2 P19: Downstream
Aquatic animals present

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1. *Spartina pectinata*	30	X	FACW
2. *Cirsium arvense*	5		FACU
3. *Eleocharis palustris*	40	X	OBL
4. *Juncus balticus*	15		FACW
5. *Xanthium strumarium*	5		FAC
6. *Chenopodium album*	3		FAC
7. *Schoenoplectus pungens*	2		OBL
8.			
9.			
10.			
Total Cover:	100		

Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	2.5Y 4/1	37	7.5YR 4/6	3	C	RC	C	
			Gley1 2.5/N	60	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 5
Water Table Present? Yes X No ___ Depth (inches): 5
Saturation Present? Yes X No ___ Depth (inches): 5
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W17

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 31, T6S, R1E

Landform (hillslope, terrace, etc.) Ditch around agricultural area Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: ____

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R2 P22: Upstream
R2 P23: Downstream
Previously mapped as PEMA

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Bromus inermis*	95	X	FACU
2. *Cirsium arvense*	2		FACU
3. *Chenopodium album*	3		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Remarks:

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species	3	x3=	9
FACU species	97	x4=	388
UPL species		x5=	
Column Totals:	100	(A)	397 (B)

Prevalence Index = B/A = 3.97

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

POWERTECH (USA) INC.

SOIL

Sampling Point W17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 2.5/1	100					C	
2-8	2.5Y 4/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F)**
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soils Present? Yes ___ No _X_

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crusts (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Oder (C1)
- ___ Dry-Season Water Table (C2)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surfaces (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Frost-Heave Hummocks (C11) (**LRR F**)
- _X_ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ___
Water Table Present? Yes ___ No _X_ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No _X_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock   City/County: Custer County   Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech   State: South Dakota   Sampling Point: W18

Investigator(s): C. Robinson and J. Eberly   Section, Township, Range: Section 31, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage bank   Local relief (concave, convex, none): Concave   Slope (%): 5

Subregion (LRP): Black Hills MLRA62   Lat: ____   Long: ____   Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____   NWI Classification: R2EM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present	Yes X	No

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R3 P1: Upstream
R3 P2: Downstream
Wpt 026 is similar to W18, R2 P24: Upstream
Width of wetland is about 17', width of channel is about 12'

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	80	X	FACW
2. *Xanthium strumarium*	5		FAC
3. *Schoenoplectus pungens*	10		OBL
4. *Juncus balticus*	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 5   % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	Gley1 4/5GY	97	2.5YR 7/8	3	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
X Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
X Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes X	No		Depth (inches):	8
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
The water table was present within 8" of the surface.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W19

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 31, T6S, R1E

Landform (hillslope, terrace, etc.) Low area Local relief (concave, convex, none): Concave Slope (%): ______

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X	**Is the Sampled Area Within a Wetland** Yes ____ No X
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes		No	X	

Remarks:
Low vegetation cover, Normal circumstances present within an active prairie dog community. Previously NWI mapped as PEMF.
R3 P3: Northwest
R3 P4: East

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Chenopodium berlandieri*	99	X	FAC
2. *Bassia sieveriana*	1		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species	99	x3=	297
FACU species	1	x4=	4
UPL species		x5=	
Column Totals:	100	(A)	301 (B)

Prevalence Index = B/A = 3.01

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/1	95	7.5YR 5/8	5	C	M	SiCL	
2-4	10YR 4/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)

____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
__X__ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes __X__ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)

____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
____ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No __X__ Depth (inches): ____
Water Table Present? Yes ____ No __X__ Depth (inches): ____
Saturation Present? Yes ____ No __X__ Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W20

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 9, T7S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?	X		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?		X	
Wetland Hydrology Present	X		

Remarks:
R2 P12: Upstream
R2 P13: Downstream
Wetland is upstream and the channel width is about 8 feet wide.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Schoenoplectus pungens*	90	X	OBL
2. *Cirsium arvense*	5		FACU
3. *Bassia sieveriana*	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL

Sampling Point W20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	98	5YR 5/8	2	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________
Depth (inches): ________

Hydric Soils Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 5
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W21

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 9, T7S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present	Yes X No	

Remarks:
R3 P10: Upstream
R3 P11: Downstream
R3 P12: Bridge
Channel crosses the boundary and extends to the road

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. *Typha latifolia*	55	X	OBL
2. *Asclepias speciosa*	10		FAC
3. *Glycyrrhiza lepidota*	15		FACU
4. *Spartina pectinata*	5		FACW
5. *Helianthus annuus*	5		FACU
6. *Melilotus sp.*	5		FACU
7. *Schoenoplectus pungens*	5		OBL
8.			
9.			
10.			
Total Cover:	100		

Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 3/4	100					SCL	
3-5	10YR 2/2	50	5YR 4/6	50	C	M	SCL	water filled the hole

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0
Water Table Present? Yes X No ___ Depth (inches): ___
Saturation Present? Yes X No ___ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/18/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W22

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 9, T7S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R3 P13: Upstream
R3 P14: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	81	X	FACW
2. *Cirsium arvense*	19		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	81	x2=	162
FAC species		x3=	
FACU species	19	x4=	76
UPL species		x5=	
Column Totals:	100	(A)	238 (B)

Prevalence Index = B/A = 2.38

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 4/6	100					SC	
1-4	2.5YR 3/2	100					SC	Hit rock at 4 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
X Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Dry throughout the area and there was encroachment of upland species.

Powertech (USA) Inc.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock   City/County: Custer County   Sampling Date: 9/18/07
Applicant/Owner: Knight Piesold, Powertech   State: South Dakota   Sampling Point: W23
Investigator(s): C. Robinson and J. Eberly   Section, Township, Range: Section 10, T7S, R1E
Landform (hillslope, terrace, etc.) Drainage   Local relief (concave, convex, none): Concave   Slope (%): 1
Subregion (LRP): Black Hills MLRA62   Lat: ____   Long: ____   Datum: NAD 1983, UTM Zone 13
Soil Map Unit Name: ____   NWI Classification: PEM
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R3 P17: Upstream
R3 P18: Downstream
Possible low spot that collects water, dying cattails present.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	9		FACW
2. *Cirsium arvense*	20	X	FACU
3. *Bassia sieveriana*	10		FACU
4. *Typha latifolia*	60	X	OBL
5. *Chenopodium album*	1		FAC
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 0   % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x1=	60
FACW species	9	x2=	18
FAC species	1	x3=	3
FACU species	30	x4=	120
UPL species		x5=	
Column Totals:	100 (A)		201 (B)

Prevalence Index = B/A = 2.01

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
X Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point W23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					SiC	
2-6	5YR 4/6	95	7.5YR 5/8	5	C	RC	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
_X_ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________
Depth (inches): ________

Hydric Soils Present? Yes _X_ No ____

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
_X_ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No _X_ Depth (inches): ____
Water Table Present? Yes ____ No _X_ Depth (inches): ____
Saturation Present? Yes ____ No _X_ Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No _X_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W25

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 34, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___ , Soil ___ , or Hydrology ___ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present		X
Is the Sampled Area Within a Wetland		X

Remarks:
R4 P1: Upstream
R4 P2: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	100	X	FAC
2.			
3.			
4.			
Total Cover:	100		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	95	X	FACU
2. *Chenopodium album*	5		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species	105	x3= 315
FACU species	95	x4= 380
UPL species		x5=
Column Totals:	200 (A)	695 (B)

Prevalence Index = B/A = 3.48

Hydrophytic Vegetation Indicators

___ Dominance Test is > 50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:
Upland species in drainage and banks, there were two living *Populus deltoids* present.

POWERTECH (USA) INC.

SOIL — Sampling Point W25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	5YR 2.5/1	60					SiCL	
Parent material	5YR 4/4	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
X Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes ___ No X

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock — City/County: Custer County — Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech — State: South Dakota — Sampling Point: W26

Investigator(s): C. Robinson and J. Eberly — Section, Township, Range: Section 34, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage — Local relief (concave, convex, none): Concave — Slope (%): 0

Subregion (LRP): Black Hills MLRA62 — Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: ____

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present	X	
Is the Sampled Area Within a Wetland		X

Remarks:
R4 P3: Upstream
R4 P4: Downstream
Upland vegetation has moved down the banks and in the area of the drainage on either side.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	30	X	FACU
2. *Elymus canadensis*	25	X	FACU
3. *Thlaspi arvense*	5		FACU
4. *Bassia sieveriana*	10		FACU
5. *Phalaris arundinacea*	15		FACW
6. *Chenopodium album*	5		FAC
7. *Xanthium strumarium*	5		FAC
8. *Helianthus annuus*	5		FACU
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 10 — % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	15	x2=	30
FAC species	10	x3=	30
FACU species	75	x4=	300
UPL species		x5=	
Column Totals:	100	(A)	360 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5YR 4/8	100					C	
1-7	7.5YR 4/2	100					C	
7-9	Gley2 2.5/10B	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
X Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
X Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

X Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W27

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 34, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: ____

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present	X	

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R4 P1: Upstream
R4 P2: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	40	X	FACU
2. *Elymus canadensis*	30	X	FACU
3. *Chenopodium album*	10		FAC
4. *Xanthium strumarium*	10		FAC
5. *Helianthus annuuus*	10		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 98 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species	20	x3= 60
FACU species	80	x4= 320
UPL species		x5=
Column Totals:	100 (A)	380 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
The vegetation is only on the banks and not in the drainage; the percent bare ground in channel is 98%.

POWERTECH (USA) INC.

SOIL Sampling Point W27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5Y 5/3	100					C	
0.75	2.5YR 4/8	100					C	
1-8	2.5Y 5/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
X Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soils Present? Yes ___ No X

Remarks:
One inch to the red layer (red layer is about 2 cm thick). The black layer is organic.

HYDROLOGY

Wetland Hydrology Indicators:
Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

X Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Soil is moist but not saturated.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W28

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 34, T6S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: ____

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R4 P13: Upstream
R4 P14: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	100	X	FAC
2.			
3.			
4.			
Total Cover:	100		
Sapling/Shrub Stratum			
1. *Symphoricarpos albus*	100	X	FACU-
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1. *Elymus smithii*	35	X	FACU
2. *Bassia sieveriana*	20	X	FACU
3. *Calamovilfa longifolia*	12		NI
4. *Descurainia pinnata*	1		NI
5. *Thlaspi arvense*	3		FACU
6. *Chenopodium album*	17		FAC
7. *Asclepias speciosa*	2		FAC
8. *Elymus cinerius*	15		NI
9. *Sisymbrium altissimum*	2		UPL
10. *Camelina microcarpa*	1		NI
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species	119	x3=	357
FACU species	158	x4=	632
UPL species	2	x5=	10
Column Totals:	279	(A)	999 (B)

Prevalence Index = B/A = 3.58

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 4/6	100					SC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
X Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes ___ No X

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W29

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 3, T7S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRP): Black Hills MLRA62 Lat: Long: Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: NWI Classification:

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology Significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No		
Hydrophytic Vegetation Present?		X	**Is the Sampled Area Within a Wetland**	Yes ___ No X
Hydric Soil Present?		X		
Wetland Hydrology Present		X		

Remarks:
R4 P17: Upstream
R4 P18: Downstream
Area is similar through the drainage; the upland species are dominant in the drainage. The Drainage is about 3' across on average.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	100	X	FAC
2.			
3.			
4.			
Total Cover:	100		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	10		FACU
2. *Bassia sieveriana*	5		FACU
3. *Elymus canadensis*	40	X	FACU
4. *Helianthus annuus*	5		FACU
5. *Nassella viridula*	10		NI
6. *Chenopodium album*	3		FACU
7. *Asclepias speciosa*	2		FAC
8. *Bromus inermis*	20	X	FACU
9. *Sisymbrium altissimum*	5		UPL
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species	102	x3=	306
FACU species	83	x4=	332
UPL species	5	x5=	25
Column Totals:	190	(A)	663 (B)

Prevalence Index = B/A = 3.49

Hydrophytic Vegetation Indicators

___ Dominance Test is > 50%
___ Prevalence Index is $\leq$ 3.0[1]
___ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 4/6	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F)**
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
- 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- X Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soils Present? Yes ___ No X

Remarks:
Hard to dig soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- Water Stained Leaves (B9)
- ___ Salt Crusts (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Oder (C1)
- ___ Dry-Season Water Table (C2)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

- Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surfaces (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Frost-Heave Hummocks (C11) (**LRR F**)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W30

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 10, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R4 P19: East
R4 P20: West
Waypoints 46-49 mark the boundary

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Elymus smithii*	85	X	FACU
2. *Carex filifolia*	15		UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust

Remarks:

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species	85	x4=	340
UPL species	15	x5=	75
Column Totals:	100	(A)	415 (B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

POWERTECH (USA) INC.

SOIL Sampling Point W30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/1	70	7.5YR 4/6	30	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crusts (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Oder (C1)
- ___ Dry-Season Water Table (C2)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surfaces (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Frost-Heave Hummocks (C11) (**LRR F**)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W31

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 10, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present	X	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R4 P21: Northeast
R4 P22: East- southeast

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Distichlis stricta*	35	X	FACW
2. *Sporobolus airoides*	20	X	FAC
3. *Salsola tragus*	45	X	FACU-
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	35	x2=	70
FAC species	20	x3=	60
FACU species	45	x4=	180
UPL species		x5=	
Column Totals:	100	(A)	310 (B)

Prevalence Index = B/A = 3.10

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-0.5	White salt crust							
0.5-14	10YR 4/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soils Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
X Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_____ Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
_____ Drainage Patterns (B10)
_____ Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
_____ Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
Water Table Present? Yes _____ No X Depth (inches): _____
Saturation Present? Yes _____ No X Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W32

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 10, T7S R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes		No	X	

Remarks:
R4 P24: Of the previously mapped PEM wetland
R4 P25: from the berm

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Echinochloa muricata*	100	X	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	5YR 4/1	50	7.5YR 4/6	50	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F**)
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
X Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

X Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
____ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

US Army Corps of Engineers Great Plains - DRAFT Version 8-30-06

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W33

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 14, T7S, R1E

Landform (hillslope, terrace, etc.) Pond Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R4 P1: Upstream
R4 P2: Downstream

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus balticus*	20	X	FACW
2. *Distichlis stricta*	50	X	FACW
3. *Schoenoplectus tabernaemontani*	30	X	OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Schoenoplectus tabernaemontani dominant on the fringe of the pond.

POWERTECH (USA) INC.

SOIL Sampling Point W33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/6	90	Gley1 2.5/N	10	D	M	C	
4-8	Gley1 3/N	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
X Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:
Orange coloration due to parent material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 2
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 4

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W34

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 14, T7S, R1E

Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: ______

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes ____ No X

Remarks:
R5 P9: Upstream
R5 P10: Downstream
Waypoint 58 indicates the end of surface water (R5 P8)

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Hordeum jubatum*	15	X	FACW
2. *Xanthium strumarium*	10		FAC
3. *Chenopodium album*	10		FACU
4. *Grindelia squarrosa*	15	X	UPL
5. *Cirsium arvense*	10		FACU
6. *Polygonum aviculare*	35	X	FACU
7. *Elymus smithii*	5		FACU
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	15	x2=	30
FAC species	10	x3=	30
FACU species	60	x4=	240
UPL species	15	x5=	75
Column Totals:	100	(A)	375 (B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

POWERTECH (USA) INC.

SOIL

Sampling Point W34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	Gley1 2.5/N	95	2.5YR 4/8	5	C	M, RC	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
_____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
__X__ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soils Present? Yes __X__ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_____ Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
_____ Water Stained Leaves (B9)
_____ Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_____ Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
_____ Drainage Patterns (B10)
_____ Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
__X__ Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes _____ No __X__ Depth (inches): _____
Water Table Present? Yes _____ No __X__ Depth (inches): _____
Saturation Present? Yes _____ No __X__ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Powertech (USA) Inc.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/19/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W35

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 14, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		Is the Sampled Area Within a Wetland Yes X No ____
Hydric Soil Present?	Yes		No	X	
Wetland Hydrology Present	Yes	X	No		

Remarks:
R5 P11: Facing east
R5 P12: Facing south
Possible stock dam

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Distichlis stricta*	80	X	FACW
2. *Melilotus sp.*	20		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species	80	x2=	160
FAC species		x3=	
FACU species	20	x4=	80
UPL species		x5=	
Column Totals:	100 (A)		240 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
X Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Powertech (USA) Inc.

SOIL Sampling Point W35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 2.5/1	80	2.5YR 4/8	20	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soils Present? Yes ___ No _X_

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_X_ Surface Soil Cracks (B6)
_X_ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ___
Water Table Present? Yes ___ No _X_ Depth (inches): ___
Saturation Present? Yes ___ No _X_ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Soil is moist but not saturated.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock   City/County: Custer County   Sampling Date: 9/19/07
Applicant/Owner: Knight Piesold, Powertech   State: South Dakota   Sampling Point: W36
Investigator(s): C. Robinson and J. Eberly   Section, Township, Range: Section 10, T7S, R1E
Landform (hillslope, terrace, etc.) Outfall   Local relief (concave, convex, none): Concave   Slope (%): 0
Subregion (LRP): Black Hills MLRA62   Lat: ______   Long: ______   Datum: NAD 1983, UTM Zone 13
Soil Map Unit Name: ______   NWI Classification: PEM
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present	Yes X No	

Remarks:
R5 P20: Downstream
R5 P21: Upstream to stock tank

Stock tank overflow
-waypoint 60- end of N
- waypoint 68, R5 P18: Upstream, R5 P19: Downstream
- waypoint 67 end of W, further SW there is *Hordeum jubatum was* dominant in channel and water disappears.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Hordeum jubatum*	20	X	FACW
2. *Juncus balticus*	65	X	FACW
3. *Melilotus alba*	10		FACU-
4. *Rumex occidentalis*	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 2   % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Overflow area from stockpond.

POWERTECH (USA) INC.

SOIL Sampling Point W36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/1	70	10YR 5/8	30	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F)**
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
____ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 4
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Soil is moist, but not saturated.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock   City/County: Custer County   Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech   State: South Dakota   Sampling Point: W37

Investigator(s): C. Robinson and J. Eberly   Section, Township, Range: Section 34, T6S R1E

Landform (hillslope, terrace, etc.) Outfall   Local relief (concave, convex, none): Concave   Slope (%): 0

Subregion (LRP): Black Hills MLRA62   Lat: ____   Long: ____   Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____   NWI Classification: Open water

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present	X	
Is the Sampled Area Within a Wetland		X

Remarks:
R6 P6 - P10 Panoramic east to west
Approximately 30 feet across
Previously NWI mapped as PUBGx

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha latifolia*	25	X	OBL
2. *Cirsium arvense*	75	X	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____   % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x1=	25
FACW species		x2=	
FAC species		x3=	
FACU species	75	x4=	300
UPL species		x5=	
Column Totals:	100 (A)		325 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators

____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Cattails dominate on water edge. *Cirsium arvense* dominate from water edge to 3 feet out. Rabbitbrush on upland bank.

POWERTECH (USA) INC.

SOIL Sampling Point W37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	5Y 5/3	100					SCL	Fibrous root channel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

_____ Histosol (A1)
_____ Histic Epipedon (A2)
_____ Black Histic (A3)
_____ Hydrogen Sulfide (A4)
_____ Stratified Layers (A5) (**LRR F)**
_____ 1 cm Muck (A9) (**LRR F, G, H**)
_____ Depleted Below Dark Surface (A11)
_____ Thick Dark Surface (A12)
_____ Sandy Mucky Mineral (S1)
_____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)

_____ Sandy Gleyed Matrix (S4)
_____ Sandy Redox (S5)
_____ Stripped Matrix (S6)
_____ Loamy Mucky Mineral (F1)
_____ Loamy Gleyed Matrix (F2)
_____ Depleted Matrix (F3)
_____ Redox Dark Surface (F6)
_____ Depleted Dark Surface (F7)
_____ Redox Depressions (F8)
_____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

_____ 1 cm Muck (A9) (**LRR C**)
_____ Coast Prairie Redox (A16) (LRR F, G, H)
_____ Dark Surface (S7) (**LRR G**)
_____ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
_____ Reduced Vertic (F18)
_____ Red Parent Material (TF2)
_____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soils Present? Yes _____ No X

Remarks:
Soils likely hydric where cattails are- across unavailable due to steep drop in to pit
Soils are moist not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
_____ High Water Table (A2)
_____ Saturation (A3)
_____ Water Marks (B1)
_____ Sediment Deposits (B2)
_____ Drift Deposits (B3)
_____ Algal Mat or Crust (B4)
_____ Iron Deposits (B5)
_____ Inundation Visible on Aerial Imagery (B7)
Water Stained Leaves (B9)

_____ Salt Crusts (B11)
_____ Aquatic Invertebrates (B13)
_____ Hydrogen Sulfide Oder (C1)
_____ Dry-Season Water Table (C2)
_____ Presence of Reduced Iron (C4)
_____ Thin Muck Surface (C7)
_____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

_____ Surface Soil Cracks (B6)
_____ Sparsely Vegetated Concave Surfaces (B8)
_____ Drainage Patterns (B10)
_____ Oxidized Rhizospheres on Living Roots (C3)
_____ Crayfish Burrows (C8)
_____ Saturation Visible on Aerial Imagery (C9)
_____ Frost-Heave Hummocks (C11) (**LRR F**)
_____ Geomorphic Position (D2)
_____ FAC-Neutral Test (D5)
_____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:
Soil is moist, but not saturated.
Duck swimming in pond

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W38

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 2, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes	X	No		

Remarks:
R6 P13: East
R6 P14: North
300-500 feet across and 80 or 81 feet long

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populous deltoides*	100	X	FAC
2.			
3.			
4.			
Total Cover:	100		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus balticus*	50	X	FACW
2. *Distichlis stricta*	50	X	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
___ Prevalence Index is ≤ 3.0[1]
___ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W38

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 3/2	60	7.5YR 5/8	40	C	M	C	Lots of cow prints in area

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F)**
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
- 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soils Present? Yes X No ___

Remarks:
Soils likely hydric where cattails are- across unavailable due to steep drop in to pit
Soils are moist not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- Water Stained Leaves (B9)
- ___ Salt Crusts (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Oder (C1)
- ___ Dry-Season Water Table (C2)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surfaces (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- ___ Frost-Heave Hummocks (C11) (**LRR F**)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W39

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: ______

Landform (hillslope, terrace, etc.) Depression w/ manmade berm Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R6 P16: of depression
R6 P17: of drainage to East
Waypoint 83, *Hordeum jubatum* depression with like soils as W39. R6 P15
Down the drainage there is HORJUB on banks and in bottom with same soil and hydrology

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Hordeum jubatum*	95	X	FACW
2. *Melilotus officinalis*	5		FACU-
3. *Descurainia pinnata*	5		NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W39

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	5YR 4/1	55	2.5YR 4/6	45	C	M, RC	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
_X_ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

_X_ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
_X_ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
_X_ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ___
Water Table Present? Yes ___ No _X_ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches): ___

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W40

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 1, T7S, R1E

Landform (hillslope, terrace, etc.) Pond Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes	X	No		
Wetland Hydrology Present	Yes	X	No		

Remarks:
R6 P18: Pond

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	100	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W40

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	2.5Y 5/2	65	Gley1 5/N	15	D	RC	SiC	
			10YR 5/8	20	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:
Soil is moist but not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 3
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W41

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 1, T7S, R1E

Landform (hillslope, terrace, etc.) Mine pit Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ____ Long: ____ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ____ NWI Classification: PUB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present		X

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R6 P19: Wetland
R6 P20: General area
Wetland has about a 20' circumference. This area may be a problematic wetland as some of the vegetation was dead.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha latifolia*	20	X	OBL
2. *Grindelia squarrosa*	15		UPL
3. *Symphyotrichum ericoides*	15		FACU
4. *Distichlis stricta*	50	X	FACW
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Grindelia squarrosa, Symphyotrichum ericoides, and rabbit brush are encroaching into the depression.

POWERTECH (USA) INC.

SOIL — Sampling Point W41

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	Gley1 5/10Y	95	10YR 6/8	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR F**)
____ 1 cm Muck (A9) (**LRR F, G, H**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
____ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
__X__ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) (**LRR C**)
____ Coast Prairie Redox (A16) (LRR F, G, H)
____ Dark Surface (S7) (**LRR G**)
____ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____
Depth (inches): ____

Hydric Soils Present? Yes __X__ No ____

Remarks:
Soil is moist but not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Water Stained Leaves (B9)
____ Salt Crusts (B11)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Oder (C1)
____ Dry-Season Water Table (C2)
____ Presence of Reduced Iron (C4)
____ Thin Muck Surface (C7)
____ Other (Explain in Remark)

Secondary Indicators (2 or more required)

____ Surface Soil Cracks (B6)
____ Sparsely Vegetated Concave Surfaces (B8)
____ Drainage Patterns (B10)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Frost-Heave Hummocks (C11) (**LRR F**)
__X__ Geomorphic Position (D2)
____ FAC-Neutral Test (D5)
____ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes ____ No __X__ Depth (inches): ____
Water Table Present? Yes ____ No __X__ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No __X__ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

Other pits within the area are filled with water.

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W42

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 1, T7S, R1E

Landform (hillslope, terrace, etc.) Mine Pit Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PUB

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present	X	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R6 P22- 24: Panoramic west to east.

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Spartina pectinata*	40	X	FACW
2. *Distichlis stricta*	60	X	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Little bluestem dominates the upper banks.

POWERTECH (USA) INC.

SOIL Sampling Point W42

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/1	45	Gley1 4/N	5	D		SC	
			10YR 5/6	50	C			

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soils Present? Yes ___ No X

Remarks:
Soil is moist but not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 6
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock | City/County: Custer County | Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech | State: South Dakota | Sampling Point: W43

Investigator(s): C. Robinson and J. Eberly | Section, Township, Range: Section 36, T6S, R1E (Outside of Project Boundary)

Landform (hillslope, terrace, etc.) Depression, ponded area due to berm | Local relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRP): Black Hills MLRA62 | Lat: ______ | Long: ______ | Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ | NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		**Is the Sampled Area Within a Wetland** Yes X No ____
Hydric Soil Present?	Yes		No	X	
Wetland Hydrology Present	Yes	X	No		

Remarks:
R7 P15: West R7 P17: East of pond
R7 P16: Middle
Cattle grazed here. On the other side of the berm there are *Pinus ponderosa.*

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus balticus*	60	X	FACW
2. *Typha latifolia*	40	X	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Moss is present. *Distichlis stricta* present in the middle of the pond.

POWERTECH (USA) INC.

SOIL Sampling Point W43

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/3	75	Gley1 3/N	20	D	M	C	
			5YR 5/8	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes ___ No X

Remarks:
Soil is moist but not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4
Water Table Present? Yes X No ___ Depth (inches): 3
Saturation Present? Yes X No ___ Depth (inches): 3
(includes capillary fringe)

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W44

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 2, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present	Yes	X	No	

Is the Sampled Area Within a Wetland Yes X No ____

Remarks:
R7 P24: Northwest
R8 P1: North
R8 P2: East

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus balticus*	85	X	FACW
2. *Distichlis stricta*	15		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W44

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 5/2	68	7.5YR 5/8	30	C	M	SiC	
			Gley1 3/N	2	D	M	SiC	
6-8	10YR 3/1	98	7.5YR 5/8	2	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F)**
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ Coast Prairie Redox (A16) (LRR F, G, H)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___
Depth (inches): ___

Hydric Soils Present? Yes X No ___

Remarks:
Soil is moist, concentrations sparse in the 6-8 inches layer.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water Stained Leaves (B9)
___ Salt Crusts (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Oder (C1)
___ Dry-Season Water Table (C2)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surfaces (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
___ Frost-Heave Hummocks (C11) (**LRR F**)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):	3
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

WETLAND DETERMINATION DATA FORM-Great Plains Region (DRAFT)

Project/Site: Dewey Burdock City/County: Custer County Sampling Date: 9/20/07

Applicant/Owner: Knight Piesold, Powertech State: South Dakota Sampling Point: W45

Investigator(s): C. Robinson and J. Eberly Section, Township, Range: Section 1, T7S, R1E

Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRP): Black Hills MLRA62 Lat: ______ Long: ______ Datum: NAD 1983, UTM Zone 13

Soil Map Unit Name: ______ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area Within a Wetland**	Yes X No ____
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present	Yes X	No		

Remarks:
R8 P4: Upstream
R8 P5: Downstream
Stockwater pond (20' wide by 50' long)

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Mimulus guttatus*	70	X	OBL
2. *Distichlis stricta*	30	X	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
3.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test Worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

X Dominance Test is > 50%
____ Prevalence Index is $\leq$ 3.0[1]
____ Morphological Adaptations[1] (Providing supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation (Explain)

[1]Indicators of hydric soils and wetland hydrology must be present

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

POWERTECH (USA) INC.

SOIL Sampling Point W45

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	Gley1 5/10Y	60	7.5Y 5/6	35	C	M, RC	C	
			Gley1 4/N	5	D	M		
8-10	2.5Y 5/4	90	5YR 5/6	10	C	M	SC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F)**
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LFF G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soils Present? Yes X No ___

Remarks:
Soil is moist but not saturated.
Black parent material in 8-10 inch layer.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crusts (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Oder (C1)
- ___ Dry-Season Water Table (C2)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remark)

Secondary Indicators (2 or more required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surfaces (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Frost-Heave Hummocks (C11) (**LRR F**)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Local Soil Survey Data (D8)

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):	3-5
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection), if available:

Remarks:

POWERTECH (USA) INC.

APPENDIX 5.4-H

APPROVED JURISDICTIONAL DETERMINATIONS

REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
SOUTH DAKOTA REGULATORY OFFICE
28563 POWERHOUSE ROAD, ROOM 118
PIERRE SD 57501-6174

pls
1/19/09

January 14, 2009

South Dakota Regulatory Office
28563 Powerhouse Road, Room 118
Pierre, South Dakota 57501

Powertech (USA) Inc.
ATTN: Mr. Richard Blubaugh
5575 DTC Parkway, Suite 140
Greenwood Village, Colorado 80111

Dear Mr. Blubaugh:

Reference is made to Powertech's November 18, 2008, request for approved jurisdictional determinations (JDs) for sites 1 through 17, located within proposed disturbance areas of the Dewey-Burdock In Situ Uranium Project. The project is located in portions of southern Custer County and northern Fall River Counties, South Dakota.

We have completed Approved JDs, for the requested sites, as well as sites 18 through 20. The Approved JDs (Enclosed) are valid for 5 years from the date of this letter. If you are not in agreement with the JDs, you may request an administrative appeal under Corps of Engineers regulations found at 33 C.F.R. 331. Enclosed you will also find a Notification of Administrative Appeal Options and Process and Request for Appeal form (RFA). Should you decide to submit an RFA form, it must be received by the Corps of Engineers Northwestern Division Office within 60 days from the date of this correspondence (March 15, 2009). If you request to appeal this determination you must submit a completed RFA form to the Northwest Division Office at the following address:

US Army Corps of Engineers
Northwestern Division
Attn: David Gesl
Regulatory Program Manager
PO Box 2870
Portland, OR 97208-2870
(503) 808-3888

It is not necessary to submit a RFA if you do not object to the JD.

Should your proposed project require work in any of the jurisdictional waterbodies identified in the JDs, prior Department of the Army (DA) authorization may be required and you should contact this office for a permit determination. In addition, should your project plans change or should the project require work in any other waters of the United

States, including wetlands, not previously identified in your August 21, 2008, JD request, you should notify this office and seek additional jurisdictional and permit determinations prior to the commencement of work in these waterbodies.

You can obtain additional information about the Regulatory Program and download forms from our website: https://www.nwo.usace.army.mil/html/od-rsd/frame.html .

If you have any questions concerning this determination, please feel free to contact this office at the above Regulatory Office address, or telephone Mr. Matthew Mikulecky at (605) 224-8531 and reference action ID NWO-2008-2206.

Sincerely,

Steven E. Naylor

Steven E. Naylor
Regulatory Program Manager,
South Dakota

Enclosures

POWERTECH (USA) INC.

USACOE Approved Jurisdictional Determination of Wetlands at Dewey-Burdock, Action IS: NOW-2008-2206[1]

Site #	Latitude: Northing (GPS)	Longitude: Westing (GPS)	Description	COE Determination
1	43.50106	104.02757	Upland Swale	Nonjurisdictional
2	43.49590	104.02211	Upland Swale	Nonjurisdictional
3	43.48897	104.02025	Ephemeral Tributary to Beaver Creek	Jurisdictional WOUS
4	43.48654	104.01299	Upland Swale	Nonjurisdictional
5	43.48819	104.01023	Upland Swale	Nonjurisdictional
6	43.46919	103.98704	Upland Swale	Nonjurisdictional
7	43.46591	103.98474	Ephemeral Tributary to Pass Creek	Jurisdictional WOUS
8	43.45801	103.97643	Upland Swale	Nonjurisdictional
9	43.45117	103.98366	Upland Swale	Nonjurisdictional
10	43.47719	103.99297	Pass Creek (NonRPW)	Jurisdictional WOUS
11	43.48869	103.96516	Upland Swale	Nonjurisdictional
12	43.48794	103.96532	Upland Swale	Nonjurisdictional
13	43.45098	103.96838	Upland Swale	Nonjurisdictional
14	43.45080	103.96185	Upland Vegetated Drainage lacking a downstream connection to WOUS	Nonjurisdictional
15	43.47863	103.95662	Upland Swale	Nonjurisdictional
16	43.46359	103.94818	Upland Hillside Gully	Nonjurisdictional
17	NA	NA	Artificial Pond created by diking uplands	Nonjurisdictional
18	NA	NA	Beaver Creek (Perennial RPW)	Jurisdictional WOUS
19	NA	NA	Isolated Wetland	Nonjurisdictional
20	NA	NA	Isolated Wetland	Nonjurisdictional

[1]Completion date for Approved Jurisdictional Determination (JD): January 13, 2009
District Office, File Name, and Number: Omaha – Powertech (USA) Inc.- NOW-2008-2206-3-PIE

POWERTECH (USA) INC.

APPENDIX 5.4-I

LAB RESULTS – ENERGY LABORATORY, INC.

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

ANALYTICAL SUMMARY REPORT

June 19, 2008

Jones and Stokes
1901 Energy Ct Ste 115
Gillette, WY 82718

Fish identifications corrected as marked.
A. Wones - ICF Jones & Stokes

Workorder No.: C08040910

Project Name: Dewey-Burdock 010996.07

Energy Laboratories, Inc. received the following 15 samples from Jones and Stokes on 4/18/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C08040910-001	BVC01-Green Sunfish	04/16/08 00:00	04/18/08	Fish	Uranium, Total Digestion For RadioChemistry Lead 210 Polonium 210 Radium 226 Thorium, Isotopic Services Provided by Lab
C08040910-002	BVC01-Plains Killfish	04/16/08 00:00	04/18/08	Fish	Same As Above
C08040910-003	BVC01-Longnose Dace	04/16/08 00:00	04/18/08	Fish	Same As Above
C08040910-004	BVC01-~~Emerald Shiner~~	04/16/08 00:00	04/18/08	Fish	Same As Above Fathead Minnow
C08040910-005	BVC04-Plains Killfish	04/16/08 00:00	04/18/08	Fish	Same As Above
C08040910-006	BVC04-~~Quill Back~~	04/16/08 00:00	04/18/08	Fish	Same As Above River Carpsucker
C08040910-007	BVC04-Green Sunfish	04/16/08 00:00	04/18/08	Fish	Same As Above
C08040910-008	BVC04-~~Emerald Shiner~~	04/16/08 00:00	04/18/08	Fish	Same As Above Fathead Minnow
C08040910-009	BVC04-Channel Catfish	04/16/08 00:00	04/18/08	Fish	Same As Above
C08040910-010	CHR05-~~Quill Back~~	04/15/08 00:00	04/18/08	Fish	Same As Above River Carpsucker
C08040910-011	CHR05-Green Sunfish	04/15/08 00:00	04/18/08	Fish	Same As Above
C08040910-012	CHR05-~~Mottled Sucker~~	04/15/08 00:00	04/18/08	Fish	Same As Ab Shorthead Redhorse Sucker
C08040910-013	CHR05-~~Fine Scale Dace~~	04/15/08 00:00	04/18/08	Fish	Same As Above Creek Chub
C08040910-014	CHR05-Plains Killfish	04/15/08 00:00	04/18/08	Fish	Same As Above
C08040910-015	CHR05-~~Shiner~~	04/15/08 00:00	04/18/08	Fish	Same As Above Sand Shiner

As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By: STEVE CARLSTON

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-001	**DateReceived:**	04/18/08
Client Sample ID:	BVC01-Green Sunfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg		0.02		SW6020	05/11/08 01:09 / ts
Uranium, Activity	ND	uCi/kg	D	2.0E-05		SW6020	05/11/08 01:09 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	U	5.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	6.0E-05	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	U	5.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	2.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	0.0E+00	uCi/kg	U	1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	2.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	3.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	9.0E-05	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-002	**DateReceived:**	04/18/08
Client Sample ID:	BVC01-Plains Killfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.3		SW6020	05/11/08 01:18 / ts
Uranium, Activity	ND	uCi/kg	D	2.0E-04		SW6020	05/11/08 01:18 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	UD	5.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	8.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	2.0E-02	uCi/kg	D	5.0E-04		E909.0M	06/09/08 08:30 / dm
Lead 210 precision (±)	2.0E-02	uCi/kg				E909.0M	06/09/08 08:30 / dm
Thorium 230	2.0E-04	uCi/kg	D	1.0E-04		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	3.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-4.0E-04	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	4.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	9.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey-Burdock 010996.07
Lab ID: C08040910-003
Client Sample ID: BVC01-Longnose Dace

Report Date: 06/19/08
Collection Date: 04/16/08
DateReceived: 04/18/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.9		SW6020	05/11/08 01:22 / ts
Uranium, Activity	ND	uCi/kg	D	6.0E-04		SW6020	05/11/08 01:22 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	2.0E-03	uCi/kg	D	1.0E-03		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	3.0E-03	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	1.0E-03		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	7.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	1.0E-03	uCi/kg	D	3.0E-04		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	1.0E-03	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-2.0E-03	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	1.0E-03	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	3.0E-03	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-004	**DateReceived:**	04/18/08
Client Sample ID:	BVC01-~~Emerald Shiner~~ Fathead Minnow	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.1		SW6020	05/11/08 01:42 / ts
Uranium, Activity	ND	uCi/kg	D	1.0E-04		SW6020	05/11/08 01:42 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	4.0E-04	uCi/kg	D	2.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	5.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	2.0E-04		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	1.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	0.0E+00	uCi/kg	UD	5.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	7.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-1.0E-04	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	2.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	5.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-005	**DateReceived:**	04/18/08
Client Sample ID:	BVC04-Plains Killfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.8		SW6020	05/11/08 01:46 / ts
Uranium, Activity	ND	uCi/kg	D	5.0E-04		SW6020	05/11/08 01:46 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	U	1.0E-03		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	1.0E-03	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	1.0E-03		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	8.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	0.0E+00	uCi/kg	UD	3.0E-04		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	4.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-1.0E-03	uCi/kg	U			E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	1.0E-03	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	2.0E-03	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
- RL - Analyte reporting limit.
- QCL - Quality control limit.
- MDC - Minimum detectable concentration
- U - Not detected at minimum detectable concentration
- MCL - Maximum contaminant level.
- ND - Not detected at the reporting limit.
- D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey-Burdock 010996.07
Lab ID: C08040910-006
Client Sample ID: BVC04-~~Quill Back~~ River Carpsucker

Report Date: 06/19/08
Collection Date: 04/16/08
DateReceived: 04/18/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.03		SW6020	05/11/08 01:51 / ts
Uranium, Activity	ND	uCi/kg	D	2.0E-05		SW6020	05/11/08 01:51 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	4.0E-04	uCi/kg		5.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	2.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	U	5.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	3.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	2.0E-05	uCi/kg		1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	3.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-2.0E-05	uCi/kg	U			E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	6.0E-05	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-007	**DateReceived:**	04/18/08
Client Sample ID:	BVC04-Green Sunfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.3		SW6020	05/11/08 01:55 / ts
Uranium, Activity	ND	uCi/kg	D	2.0E-04		SW6020	05/11/08 01:55 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	6.0E-04	uCi/kg	D	4.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	7.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	4.0E-04		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	3.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	8.0E-04	uCi/kg	D	9.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	6.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-3.0E-04	uCi/kg	U			E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	4.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	9.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey-Burdock 010996.07
Lab ID: C08040910-008
Client Sample ID: BVC04-~~Emerald Shiner~~ Fathead Minnow

Report Date: 06/19/08
Collection Date: 04/16/08
DateReceived: 04/18/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg		0.02		SW6020	05/11/08 01:59 / ts
Uranium, Activity	ND	uCi/kg		1.0E-05		SW6020	05/11/08 01:59 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	U	5.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	2.0E-05	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	U	5.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	9.0E-05	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	1.0E-05	uCi/kg		1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	1.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	1.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	3.0E-05	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	3.0E-05	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/16/08
Lab ID:	C08040910-009	**DateReceived:**	04/18/08
Client Sample ID:	BVC04-Channel Catfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.05	mg/kg	D	0.05		SW6020	05/11/08 02:03 / ts
Uranium, Activity	3.0E-05	uCi/kg	D	3.0E-05		SW6020	05/11/08 02:03 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	9.0E-04	uCi/kg	D	8.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	3.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	8.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	5.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	2.0E-05	uCi/kg	D	2.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	3.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-8.0E-05	uCi/kg	U			E903.0	05/15/08 15:31 / trs
Radium 226 precision (±)	6.0E-05	uCi/kg				E903.0	05/15/08 15:31 / trs
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	05/15/08 15:31 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/15/08
Lab ID:	C08040910-010	**DateReceived:**	04/18/08
Client Sample ID:	CHR05-~~Quill Back~~ River Carpsucker	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.04		SW6020	05/11/08 02:07 / ts
Uranium, Activity	ND	uCi/kg	D	3.0E-05		SW6020	05/11/08 02:07 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	8.0E-04	uCi/kg	D	7.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	3.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	7.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	4.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	0.0E+00	uCi/kg	U	1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	5.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-9.0E-05	uCi/kg	U			E903.0	05/15/08 17:06 / trs
Radium 226 precision (±)	5.0E-05	uCi/kg				E903.0	05/15/08 17:06 / trs
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	05/15/08 17:06 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/15/08
Lab ID:	C08040910-011	**DateReceived:**	04/18/08
Client Sample ID:	CHR05-Green Sunfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.04		SW6020	05/11/08 02:11 / ts
Uranium, Activity	ND	uCi/kg	D	3.0E-05		SW6020	05/11/08 02:11 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	8.0E-05	uCi/kg	UD	7.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	1.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	7.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	4.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	1.0E-05	uCi/kg	U	1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	5.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-6.0E-05	uCi/kg	U			E903.0	05/15/08 17:06 / trs
Radium 226 precision (±)	7.0E-05	uCi/kg				E903.0	05/15/08 17:06 / trs
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	05/15/08 17:06 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/15/08
Lab ID:	C08040910-012	**DateReceived:**	04/18/08
Client Sample ID:	CHR05-~~Mottled Sucker~~ Shorthead Redhorse Sucker	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg		0.02		SW6020	05/11/08 02:15 / ts
Uranium, Activity	ND	uCi/kg		1.0E-05		SW6020	05/11/08 02:15 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	2.0E-04	uCi/kg		5.0E-05		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	1.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	U	5.0E-05		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	1.0E-04	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	2.0E-05	uCi/kg		1.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	2.0E-05	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-1.0E-05	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	2.0E-05	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	3.0E-05	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes		**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07		**Collection Date:**	04/15/08
Lab ID:	C08040910-013		**DateReceived:**	04/18/08
Client Sample ID:	CHR05-~~Fine Scale Dace~~	Creek Chub	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.2		SW6020	05/11/08 02:36 / ts
Uranium, Activity	ND	uCi/kg	D	1.0E-04		SW6020	05/11/08 02:36 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	UD	3.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	3.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	3.0E-04		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	2.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	0.0E+00	uCi/kg	UD	7.0E-05		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	2.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-2.0E-04	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	3.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	6.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07	**Collection Date:**	04/15/08
Lab ID:	C08040910-014	**DateReceived:**	04/18/08
Client Sample ID:	CHR05-Plains Killfish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.4		SW6020	05/11/08 02:40 / ts
Uranium, Activity	ND	uCi/kg	D	3.0E-04		SW6020	05/11/08 02:40 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	UD	6.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	1.0E-03	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	6.0E-04		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	3.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	1.0E-03	uCi/kg	D	1.0E-04		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	8.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-5.0E-04	uCi/kg	U			E903.0	05/16/08 15:11 / trs
Radium 226 precision (±)	5.0E-04	uCi/kg				E903.0	05/16/08 15:11 / trs
Radium 226 MDC	1.0E-03	uCi/kg				E903.0	05/16/08 15:11 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes		**Report Date:**	06/19/08
Project:	Dewey-Burdock 010996.07		**Collection Date:**	04/15/08
Lab ID:	C08040910-015		**DateReceived:**	04/18/08
Client Sample ID:	CHR05-~~Shiner~~	Sand Shiner	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	ND	mg/kg	D	0.4		SW6020	05/11/08 02:44 / ts
Uranium, Activity	ND	uCi/kg	D	3.0E-04		SW6020	05/11/08 02:44 / ts
RADIONUCLIDES - TOTAL							
Polonium 210	0.0E+00	uCi/kg	UD	6.0E-04		RMO-3008	06/02/08 11:15 / plj
Polonium 210 precision (±)	5.0E-04	uCi/kg				RMO-3008	06/02/08 11:15 / plj
Lead 210	0.0E+00	uCi/kg	UD	6.0E-04		E909.0M	05/21/08 09:00 / dm
Lead 210 precision (±)	3.0E-03	uCi/kg				E909.0M	05/21/08 09:00 / dm
Thorium 230	1.0E-03	uCi/kg	D	1.0E-04		E907.0	05/09/08 14:00 / dmf
Thorium 230 precision (±)	7.0E-04	uCi/kg				E907.0	05/09/08 14:00 / dmf
Radium 226	-3.0E-04	uCi/kg	U			E903.0	05/15/08 17:06 / trs
Radium 226 precision (±)	6.0E-04	uCi/kg				E903.0	05/15/08 17:06 / trs
Radium 226 MDC	1.0E-03	uCi/kg				E903.0	05/15/08 17:06 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix interference.

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QA/QC Summary Report

Client: Jones and Stokes | **Report Date:** 06/19/08
Project: Dewey-Burdock 010996.07 | **Work Order:** C08040910

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0									Batch: 18521
Sample ID: C08041154-001AMS — Sample Matrix Spike					Run: BERTHOLD 770_080508E				05/15/08 17:06
Radium 226	0.14	pCi/L		84	70	130			
Sample ID: C08041154-001AMSD — Sample Matrix Spike Duplicate					Run: BERTHOLD 770_080508E				05/15/08 17:06
Radium 226	0.14	pCi/L		87	70	130	0.4	23.7	
Sample ID: MB-18521 — Method Blank					Run: BERTHOLD 770_080508E				05/16/08 15:11
Radium 226	-0.7	pCi/L							U
Sample ID: LCS-18521 — Laboratory Control Sample					Run: BERTHOLD 770_080508E				05/16/08 08:10
Radium 226	15	pCi/L		97	70	130			
Method: E907.0									Batch: 18521
Sample ID: C08041154-001AMS — Sample Matrix Spike					Run: EGG-ORTEC_080509A				05/09/08 14:00
Thorium 230	0.23	pCi/g-dry	0.10	113	70	130			
Sample ID: C08041154-001AMSD — Sample Matrix Spike Duplicate					Run: EGG-ORTEC_080509A				05/09/08 14:00
Thorium 230	0.15	pCi/g-dry	0.10	81	70	130	41	30	R
- The RPD for the MSD is high. The individual spike recoveries are within range, the MB is acceptable, and the LCS is within range, therefore the batch is approved.									
Sample ID: LCS-18521 — Laboratory Control Sample					Run: EGG-ORTEC_080509A				05/09/08 14:00
Thorium 230	0.0431	pCi/g-dry	0.10	93	70	130			
Sample ID: MB-18521 — Method Blank					Run: EGG-ORTEC_080509A				05/09/08 14:00
Thorium 230	-0.0006	pCi/g-dry							
Method: E909.0M									Batch: 18521
Sample ID: C08041154-001AMS — Sample Matrix Spike					Run: PACKARD 3100TR_080521A				05/21/08 09:00
Lead 210	3.5	pCi/g-dry	0.10	130	70	130			
- Spike response is outside of the acceptance range for this analysis. Since the LCS and the MSD are acceptable the batch is approved.									
Sample ID: C08041154-001AMSD — Sample Matrix Spike Duplicate					Run: PACKARD 3100TR_080521A				05/21/08 09:00
Lead 210	2.5	pCi/g-dry	0.10	91	70	130	36	30	R
Sample ID: MB-R101975 — Method Blank					Run: PACKARD 3100TR_080521A				05/21/08 09:00
Lead 210	ND	pCi/g-dry							
Sample ID: LCS-R101975 — Laboratory Control Sample					Run: PACKARD 3100TR_080521A				05/21/08 09:00
Lead 210	0.0528	pCi/g-dry	0.10	76	70	130			

Qualifiers:

RL - Analyte reporting limit.

R - RPD exceeds advisory limit.

ND - Not detected at the reporting limit.

U - Not detected at minimum detectable concentration

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QA/QC Summary Report

Client: Jones and Stokes
Project: Dewey-Burdock 010996.07

Report Date: 06/19/08
Work Order: C08040910

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E909.0M									Batch: R102568
Sample ID: C08050798-003AMS	Sample Matrix Spike				Run: PACKARD 3100TR_080609A				06/09/08 08:30
Lead 210	648	pCi/Filter		48	70	130			S
- Spike response is outside of the acceptance range for this analysis. Since the LCS and the MSD are acceptable the batch is approved.									
Sample ID: C08050798-003AMSD	Sample Matrix Spike Duplicate				Run: PACKARD 3100TR_080609A				06/09/08 08:30
Lead 210	1350	pCi/Filter		108	70	130	70	30	R
Sample ID: MB-R102568	Method Blank				Run: PACKARD 3100TR_080609A				06/09/08 08:30
Lead 210	10	pCi/L							
Sample ID: LCS-R102568	Laboratory Control Sample				Run: PACKARD 3100TR_080609A				06/09/08 08:30
Lead 210	110	pCi/L		84	70	130			
Method: RMO-3008									Batch: 18521
Sample ID: C08040910-015AMS	Sample Matrix Spike				Run: EGG-ORTEC_080602A				06/02/08 11:15
Polonium 210	105	pCi/g-dry	0.10	96	70	130			
Sample ID: C08040910-015AMSD	Sample Matrix Spike Duplicate				Run: EGG-ORTEC_080602A				06/02/08 11:15
Polonium 210	117	pCi/g-dry	0.10	107	70	130	11	30	
Sample ID: LCS-18521	Laboratory Control Sample				Run: EGG-ORTEC_080602A				06/02/08 11:15
Polonium 210	79.2	pCi/g-dry	0.10	91	70	130			
Sample ID: MB-18521	Method Blank				Run: EGG-ORTEC_080602A				06/02/08 11:15
Polonium 210	-0.3	pCi/g-dry							
Method: SW6020									Batch: 18521
Sample ID: MB-18521	Method Blank				Run: ICPMS2-C_080510B				05/11/08 01:01
Uranium	8E-05	mg/kg-dry	6E-05						
Sample ID: LCS1-18521	Laboratory Control Sample				Run: ICPMS2-C_080510B				05/11/08 01:05
Uranium	0.515	mg/kg-dry	0.015	103	75	125			
Sample ID: C08040910-015AMS	Sample Matrix Spike				Run: ICPMS2-C_080510B				05/11/08 02:48
Uranium	316	mg/kg-dry	0.38	100	75	125			
Sample ID: C08040910-015AMSD	Sample Matrix Spike Duplicate				Run: ICPMS2-C_080510B				05/11/08 02:52
Uranium	316	mg/kg-dry	0.38	101	75	125	0.2	20	

Qualifiers:

RL - Analyte reporting limit.

R - RPD exceeds advisory limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

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Date: 19-Jun-08

CLIENT: Jones and Stokes
Project: Dewey-Burdock 010996.07
Sample Delivery Group: C08040910

CASE NARRATIVE

THIS IS THE FINAL PAGE OF THE LABORATORY ANALYTICAL REPORT

ORIGINAL SAMPLE SUBMITTAL(S)
All original sample submittals have been returned with the data package.

SAMPLE TEMPERATURE COMPLIANCE: 4°C (±2°C)
Temperature of samples received may not be considered properly preserved by accepted standards. Samples that are hand delivered immediately after collection shall be considered acceptable if there is evidence that the chilling process has begun.

GROSS ALPHA ANALYSIS
Method 900.0 for gross alpha and gross beta is intended as a drinking water method for low TDS waters. Data provided by this method for non potable waters should be viewed as inconsistent.

RADON IN AIR ANALYSIS
The desired exposure time is 48 hours (2 days). The time delay in returning the canister to the laboratory for processing should be as short as possible to avoid excessive decay. Maximum recommended delay between end of exposure to beginning of counting should not exceed 8 days.

SOIL/SOLID SAMPLES
All samples reported on an as received basis unless otherwise indicated.

ATRAZINE, SIMAZINE AND PCB ANALYSIS USING EPA 505
Data for Atrazine and Simazine are reported from EPA 525.2, not from EPA 505. Data reported by ELI using EPA method 505 reflects the results for seven individual Aroclors. When the results for all seven are ND (not detected), the sample meets EPA compliance criteria for PCB monitoring.

SUBCONTRACTING ANALYSIS
Subcontracting of sample analyses to an outside laboratory may be required. If so, ENERGY LABORATORIES will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

BRANCH LABORATORY LOCATIONS
eli-b - Energy Laboratories, Inc. - Billings, MT
eli-g - Energy Laboratories, Inc. - Gillette, WY
eli-h - Energy Laboratories, Inc. - Helena, MT
eli-r - Energy Laboratories, Inc. - Rapid City, SD
eli-t - Energy Laboratories, Inc. - College Station, TX

CERTFICATIONS:
USEPA: WY00002; FL-DOH NELAC: E87641; Arizona: AZ0699; California: 02118CA
Oregon: WY200001; Utah: 3072350515; Virginia: 00057; Washington: C1903

ISO 17025 DISCLAIMER:
The results of this Analytical Report relate only to the items submitted for analysis.

ENERGY LABORATORIES, INC. - CASPER,WY certifies that certain method selections contained in this report meet requirements as set forth by the above accrediting authorities. Some results requested by the client may not be covered under these certifications. All analysis data to be submitted for regulatory enforcement should be certified in the sample state of origin. Please verify ELI's certification coverage by visiting www.energylab.com

ELI appreciates the opportunity to provide you with this analytical service. For additional information and services visit our web page www.energylab.com.

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ANALYTICAL SUMMARY REPORT

August 22, 2008

Sample ID species corrected. A. Wones ICF Jones & Stokes

Jones and Stokes
1901 Energy Ct Ste 115
Gillette, WY 82718

Workorder No.: C08070647

Project Name: Dewey Burdock 00996.07

Energy Laboratories, Inc. received the following 17 samples from Jones and Stokes on 7/15/2008 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C08070647-001	BVC01-ICF JSA-FHM	07/10/08 00:00	07/15/08	Fish	Uranium, Total Digestion For RadioChemistry Lead 210 Polonium 210 Radium 226 Thorium, Isotopic
C08070647-002	BVC01-Plains Top Minow	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-003	BVC01-Plains Kill Fish	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-004	BVC01-~~Common Shiner~~ Sand Shiner	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-005	BVC01-ICF JSA- CAP Carp	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-006	BVC04-~~Common Shiner~~ Sand Shiner	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-007	BVC04-Short Head Red Horse Sucker	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-008	BVC04-Fathead Minow	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-009	BVC04-PLK	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-010	BVC04-Carp (Cap)	07/10/08 00:00	07/15/08	Fish	Same As Above
C08070647-011	CHR04-~~WSM~~ Sand Shiner	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-012	CHR04-FHM	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-013	CHR04-PLK	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-014	CHR04-SRS	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-015	CHR04-Carp	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-016	CHR04-CHC	07/09/08 00:00	07/15/08	Fish	Same As Above
C08070647-017	CHR04-RCS	07/09/08 00:00	07/15/08	Fish	Composite of two or more samples Uranium, Total Digestion For RadioChemistry Lead 210 Polonium 210 Radium 226 Thorium, Isotopic

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As appropriate, any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By:

STEVE CARLSTON

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-001	**DateReceived:**	07/15/08
Client Sample ID:	BVC01-ICF JSA-FHM	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.026	mg/kg-dry		0.0050		SW6020	07/27/08 05:51 / sml
Uranium, Activity	1.8E-05	uCi/kg		3.4E-06		SW6020	07/27/08 05:51 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	4.0E-04	uCi/kg		9.3E-05		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	2.3E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.4E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	3.6E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	6.0E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.2E-04	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.2E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	2.9E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	-1.2E-05	uCi/kg	U	1.9E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	6.2E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-002	**DateReceived:**	07/15/08
Client Sample ID:	BVC01-Plains Top Minow	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.021	mg/kg-dry		0.0050		SW6020	07/27/08 06:12 / sml
Uranium, Activity	1.4E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:12 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	3.5E-04	uCi/kg		1.1E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	2.8E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	-2.0E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.2E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.1E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.0E-04	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.1E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	2.7E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	1.0E-04	uCi/kg		2.2E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	1.0E-04	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-003	**DateReceived:**	07/15/08
Client Sample ID:	BVC01-Plains Kill Fish	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.035	mg/kg-dry		0.0050		SW6020	07/27/08 06:16 / sml
Uranium, Activity	2.4E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:16 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	4.7E-04	uCi/kg		1.1E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	3.1E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.2E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.2E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.1E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.0E-04	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.1E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	2.8E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	5.7E-06	uCi/kg	U	2.2E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	1.0E-04	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey Burdock 00996.07
Lab ID: C08070647-004
Client Sample ID: BVC01-~~Common Shiner~~ SAS sand shiner

Report Date: 08/22/08
Collection Date: 07/10/08
DateReceived: 07/15/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.031	mg/kg-dry		0.0050		SW6020	07/27/08 06:20 / sml
Uranium, Activity	2.1E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:20 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	2.3E-04	uCi/kg		1.6E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	2.6E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	3.8E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	6.1E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	1.0E-02	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-3.0E-04	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.6E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	4.0E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	9.8E-05	uCi/kg		3.2E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	1.6E-04	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-005	**DateReceived:**	07/15/08
Client Sample ID:	BVC01-ICF JSA- CAP Carp	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.0098	mg/kg-dry		0.0050		SW6020	07/27/08 06:24 / sml
Uranium, Activity	6.7E-06	uCi/kg		3.4E-06		SW6020	07/27/08 06:24 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	7.8E-04	uCi/kg		5.0E-05		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	1.9E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	7.6E-05	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	5.0E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	8.4E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.3E-05	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.6E-05	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	3.6E-05	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	-7.4E-07	uCi/kg	U	2.6E-06		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	9.2E-06	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes		**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07		**Collection Date:**	07/10/08
Lab ID:	C08070647-006		**DateReceived:**	07/15/08
Client Sample ID:	BVC04-~~Common Shiner~~	Sand Shiner	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.024	mg/kg-dry		0.0050		SW6020	07/27/08 06:28 / sml
Uranium, Activity	1.6E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:28 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	5.4E-04	uCi/kg		1.1E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	5.4E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	6.4E-04	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.4E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.3E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-7.7E-05	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.3E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	2.5E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	2.7E-05	uCi/kg		2.3E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	1.0E-04	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes		**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07		**Collection Date:**	07/10/08
Lab ID:	C08070647-007		**DateReceived:**	07/15/08
Client Sample ID:	BVC04-Short Head Red Horse Sucker		**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.0072	mg/kg-dry		0.0050		SW6020	07/27/08 06:32 / sml
Uranium, Activity	4.9E-06	uCi/kg		3.4E-06		SW6020	07/27/08 06:32 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	1.7E-04	uCi/kg		5.0E-05		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	1.0E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.2E-04	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	1.2E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	2.0E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-3.7E-05	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	3.2E-05	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	6.9E-05	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	1.9E-06	uCi/kg	U	6.3E-06		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	2.3E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-008	**DateReceived:**	07/15/08
Client Sample ID:	BVC04-Fathead Minow	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.031	mg/kg-dry		0.0050		SW6020	07/27/08 06:36 / sml
Uranium, Activity	2.1E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:36 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	1.8E-04	uCi/kg		1.2E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	3.1E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	7.9E-04	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.7E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.9E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-1.2E-04	uCi/kg	U			E903.0	08/07/08 10:33 / dm
Radium 226 precision (±)	1.6E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Radium 226 MDC	3.2E-04	uCi/kg				E903.0	08/07/08 10:33 / dm
Thorium 230	-1.2E-05	uCi/kg	U	2.5E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	6.9E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-009	**DateReceived:**	07/15/08
Client Sample ID:	BVC04-PLK	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.019	mg/kg-dry		0.0050		SW6020	07/27/08 06:40 / sml
Uranium, Activity	1.3E-05	uCi/kg		3.4E-06		SW6020	07/27/08 06:40 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	8.5E-05	uCi/kg	U	1.2E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	1.3E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	3.2E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.7E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.8E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.1E-04	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	1.1E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	2.8E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	9.4E-05	uCi/kg		2.4E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	9.1E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/10/08
Lab ID:	C08070647-010	**DateReceived:**	07/15/08
Client Sample ID:	BVC04-Carp (Cap)	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.014	mg/kg-dry		0.0050		SW6020	07/27/08 06:44 / sml
Uranium, Activity	9.4E-06	uCi/kg		3.4E-06		SW6020	07/27/08 06:44 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	1.5E-04	uCi/kg		4.0E-06		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	7.1E-05	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	9.2E-05	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	1.5E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	2.6E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-4.8E-06	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	4.2E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	9.1E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	2.3E-06	uCi/kg		8.0E-07		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	3.7E-06	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/09/08
Lab ID:	C08070647-011	**DateReceived:**	07/15/08
Client Sample ID:	CHR04-WSM	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.040	mg/kg-dry		0.0050		SW6020	07/27/08 07:00 / sml
Uranium, Activity	2.7E-05	uCi/kg		3.4E-06		SW6020	07/27/08 07:00 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	4.9E-04	uCi/kg		1.4E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	3.2E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	4.5E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	5.3E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	8.8E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.8E-04	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	1.5E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	3.8E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	1.4E-04	uCi/kg		2.7E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	1.1E-04	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes		**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07		**Collection Date:**	07/09/08
Lab ID:	C08070647-012		**DateReceived:**	07/15/08
Client Sample ID:	CHR04-FHM		**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.024	mg/kg-dry		0.0050		SW6020	07/27/08 07:04 / sml
Uranium, Activity	1.6E-05	uCi/kg		3.4E-06		SW6020	07/27/08 07:04 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	4.2E-04	uCi/kg		1.1E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	2.8E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.5E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.3E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	7.2E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.1E-04	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	1.3E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	3.0E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	1.3E-05	uCi/kg	U	2.2E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	4.5E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:	RL - Analyte reporting limit.	MCL - Maximum contaminant level.
	QCL - Quality control limit.	ND - Not detected at the reporting limit.
	MDC - Minimum detectable concentration	U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey Burdock 00996.07
Lab ID: C08070647-013
Client Sample ID: CHR04-PLK

Report Date: 08/22/08
Collection Date: 07/09/08
DateReceived: 07/15/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.017	mg/kg-dry		0.0050		SW6020	07/27/08 07:09 / sml
Uranium, Activity	1.2E-05	uCi/kg		3.4E-06		SW6020	07/27/08 07:09 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	4.7E-04	uCi/kg		1.7E-04		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	3.5E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	-1.8E-03	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	6.5E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	1.1E-02	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-2.2E-04	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	1.9E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	4.1E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	1.6E-05	uCi/kg	U	3.4E-05		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	8.9E-05	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client: Jones and Stokes
Project: Dewey Burdock 00996.07
Lab ID: C08070647-014
Client Sample ID: CHR04-SRS

Report Date: 08/22/08
Collection Date: 07/09/08
DateReceived: 07/15/08
Matrix: Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.0066	mg/kg-dry		0.0050		SW6020	07/27/08 07:13 / sml
Uranium, Activity	4.4E-06	uCi/kg		3.4E-06		SW6020	07/27/08 07:13 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	5.0E-04	uCi/kg		1.3E-05		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	1.3E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	2.3E-04	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	4.9E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	8.1E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-8.7E-06	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	1.8E-05	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	3.4E-05	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	3.2E-06	uCi/kg		2.5E-06		E907.0	08/08/08 00:16 / dmf
Thorium 230 precision (±)	5.3E-06	uCi/kg				E907.0	08/08/08 00:16 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/09/08
Lab ID:	C08070647-015	**DateReceived:**	07/15/08
Client Sample ID:	CHR04-Carp	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.010	mg/kg-dry		0.0050		SW6020	07/27/08 07:17 / sml
Uranium, Activity	6.9E-06	uCi/kg		3.4E-06		SW6020	07/27/08 07:17 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	7.4E-04	uCi/kg		3.1E-05		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	2.2E-04	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.5E-04	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	1.2E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	2.0E-03	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-6.4E-05	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	4.4E-05	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	1.0E-04	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	1.7E-05	uCi/kg		6.1E-06		E907.0	08/08/08 11:00 / dmf
Thorium 230 precision (±)	2.7E-05	uCi/kg				E907.0	08/08/08 11:00 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/09/08
Lab ID:	C08070647-016	**DateReceived:**	07/15/08
Client Sample ID:	CHR04-CHC	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.017	mg/kg-dry		0.0050		SW6020	07/27/08 07:21 / sml
Uranium, Activity	1.2E-05	uCi/kg		3.4E-06		SW6020	07/27/08 07:21 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	1.6E-04	uCi/kg		3.5E-06		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	5.2E-05	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	3.2E-05	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	1.4E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	2.3E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	-1.6E-06	uCi/kg	U			E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	4.4E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	8.4E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	9.0E-06	uCi/kg		7.0E-07		E907.0	08/08/08 11:00 / dmf
Thorium 230 precision (±)	2.6E-05	uCi/kg				E907.0	08/08/08 11:00 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

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LABORATORY ANALYTICAL REPORT

Client:	Jones and Stokes	**Report Date:**	08/22/08
Project:	Dewey Burdock 00996.07	**Collection Date:**	07/09/08
Lab ID:	C08070647-017	**DateReceived:**	07/15/08
Client Sample ID:	CHR04-RCS	**Matrix:**	Fish

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	0.031	mg/kg-dry		0.0050		SW6020	07/27/08 07:25 / sml
Uranium, Activity	2.1E-05	uCi/kg		3.4E-06		SW6020	07/27/08 07:25 / sml
RADIONUCLIDES - TOTAL							
Polonium 210	6.6E-07	uCi/kg	U	2.7E-06		RMO-3008	07/31/08 14:15 / plj
Polonium 210 precision (±)	3.2E-06	uCi/kg				RMO-3008	07/31/08 14:15 / plj
Lead 210	1.1E-05	uCi/kg	U			E909.0M	07/28/08 11:15 / dm
Lead 210 precision (±)	1.0E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Lead 210 MDC	1.7E-04	uCi/kg				E909.0M	07/28/08 11:15 / dm
Radium 226	8.0E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 precision (±)	5.4E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Radium 226 MDC	7.3E-06	uCi/kg				E903.0	08/07/08 10:34 / dm
Thorium 230	-1.3E-05	uCi/kg	U	5.3E-07		E907.0	08/08/08 11:00 / dmf
Thorium 230 precision (±)	2.3E-05	uCi/kg				E907.0	08/08/08 11:00 / dmf
FIELD PARAMETERS							
Total Mass	4160	g				FIELD	07/22/08 17:12 / ***

*** Performed by Sampler

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

QA/QC Summary Report

Client: Jones and Stokes
Project: Dewey Burdock 00996.07

Report Date: 08/22/08
Work Order: C08070647

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0									Batch: 19208
Sample ID: C08070647-008AMS	Sample Matrix Spike				Run: BERTHOLD 770_080731C				08/07/08 10:33
Radium 226	23	pCi/g-dry		117	70	130			
Sample ID: C08070647-008AMSD	Sample Matrix Spike Duplicate				Run: BERTHOLD 770_080731C				08/07/08 10:34
Radium 226	20	pCi/g-dry		103	70	130	13	25.9	
Sample ID: MB-19208	Method Blank				Run: BERTHOLD 770_080731C				08/07/08 16:17
Radium 226	-0.002	pCi/g-dry							U
Sample ID: LCS-19208	Laboratory Control Sample				Run: BERTHOLD 770_080731C				08/07/08 16:17
Radium 226	0.077	pCi/g-dry		102	70	130			
Method: E907.0									Batch: 19208
Sample ID: C08070647-013AMS	Sample Matrix Spike				Run: EGG-ORTEC_080731C				08/11/08 09:23
Thorium 230	15.1	pCi/g-dry	0.10	90	70	130			
Sample ID: C08070647-013AMSD	Sample Matrix Spike Duplicate				Run: EGG-ORTEC_080731C				08/11/08 09:41
Thorium 230	18.0	pCi/g-dry	0.10	108	70	130	17	30	
Sample ID: LCS-19208	Laboratory Control Sample				Run: EGG-ORTEC_080731C				08/08/08 11:00
Thorium 230	0.0398	pCi/g-dry	0.10	90	70	130			
Sample ID: MB-19208	Method Blank				Run: EGG-ORTEC_080731C				08/08/08 11:00
Thorium 230	-0.0003	pCi/g-dry							U
Method: E909.0M									Batch: 19208
Sample ID: C08070647-006AMS	Sample Matrix Spike				Run: PACKARD 3100TR_080728D				07/28/08 11:15
Lead 210	150	pCi/g-dry		111	70	130			
Sample ID: C08070647-006AMSD	Sample Matrix Spike Duplicate				Run: PACKARD 3100TR_080728D				07/28/08 11:15
Lead 210	197	pCi/g-dry		146	70	130	27	30	S
- Spike response is outside of the acceptance range for this analysis. Since the LCS and the RPD for the MS MSD pair are acceptable, the response is considered to be matrix related. The batch is approved.									
Sample ID: MB-R106080	Method Blank				Run: PACKARD 3100TR_080728D				07/28/08 11:15
Lead 210	0.0001	pCi/g-dry							U
Sample ID: LCS-R106080	Laboratory Control Sample				Run: PACKARD 3100TR_080728D				07/28/08 11:15
Lead 210	0.103	pCi/g-dry		88	70	130			

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ND - Not detected at the reporting limit.

U - Not detected at minimum detectable concentration

QA/QC Summary Report

Client: Jones and Stokes **Report Date:** 08/22/08
Project: Dewey Burdock 00996.07 **Work Order:** C08070647

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: RMO-3008									Batch: 19208
Sample ID: C08070647-017AMS	Sample Matrix Spike				Run: EGG-ORTEC_080731B				07/31/08 14:15
Polonium 210	0.371	pCi/g-dry	0.10	161	70	130			S
- Spike response is outside of the acceptance range for this analysis. Since the MB, LCS and the MSD are acceptable the batch is approved.									
Sample ID: C08070647-017AMSD	Sample Matrix Spike Duplicate				Run: EGG-ORTEC_080731B				07/31/08 14:15
Polonium 210	0.229	pCi/g-dry	0.10	100	70	130	47	30	R
Sample ID: LCS-R105592	Laboratory Control Sample				Run: EGG-ORTEC_080731B				07/31/08 14:15
Polonium 210	0.0918	pCi/g-dry	0.10	106	70	130			
Sample ID: MB-R105592	Method Blank				Run: EGG-ORTEC_080731B				07/31/08 14:15
Polonium 210	7E-05	pCi/g-dry							U
Method: SW6020									Batch: 19208
Sample ID: MB-19208	Method Blank				Run: ICPMS4-C_080726A				07/27/08 05:43
Uranium	9E-06	mg/kg-dry	2E-06						
Sample ID: LCS1-19208	Laboratory Control Sample				Run: ICPMS4-C_080726A				07/27/08 05:47
Uranium	0.0485	mg/kg-dry	0.015	97	75	125			
Sample ID: C08070647-017AMS	Sample Matrix Spike				Run: ICPMS4-C_080726A				07/27/08 07:29
Uranium	1.41	mg/kg-dry	0.015	121	75	125			
Sample ID: C08070647-017AMSD	Sample Matrix Spike Duplicate				Run: ICPMS4-C_080726A				07/27/08 07:33
Uranium	1.41	mg/kg-dry	0.015	120	75	125	0.6	20	

Qualifiers:

RL - Analyte reporting limit.

R - RPD exceeds advisory limit.

U - Not detected at minimum detectable concentration

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

POWERTECH (USA) INC.

APPENDIX 5.4-J

COMPILED HABITAT DATA FORMS

SAMPLE COLLECTION FORM - STREAMS

Site ID	BVC01	Date	4/15/2008

Water Chemistry		
Sample ID	Transect	Comments
		NA - Sampled by Respec

Reach-wide Benthos Sample		
Sample ID	No. of Jars	Comment
BVC01HF	1	High flow sampling. Composit sample from 11 transects. Midge hatch in progress.

Transect		A		B		C		D		E		F		G		H		I		J		K	
Substrate	Channel	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan
Fine/Sand	Pool		P	F	P							F	P	F	P							F	P
Gravel	Glide								G		G										G		
Coarse	Riffle	C				C	R	C		C						C	R	C	R	C			
other	Run																						

Transect		A	B	C	D	E	F	G	H	I	J	K
Sample Location	Left											
	Right											
	Center											

Substrate Size Classes
Fine/Sand - ladybug or smaller (<2mm)
Gravel - ladybug to tennis ball (2 to 64mm)
Coarse - tennis ball to car sized (64 to 4000mm)
Other - bedrock, hardpan, wood etc

SAMPLE COLLECTION FORM - STREAMS

Site ID	BVC04	Date	4/14/2008

Water Chemistry

Sample ID	Transect	Comments
		NA - Sampled by Respec

Reach-wide Benthos Sample

Sample ID	No. of Jars	Comment
BVC04HF	2	Spring sampling. Composit sample from 11 transects. Midge hatch in progress.

Transect		A		B		C		D		E		F		G		H		I		J		K	
Substrate	Channel	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan
Fine/Sand	Pool							F	P	F	P	F	P	F	P			F	P	F	P	F	P
Gravel	Glide	G		G		G																	
Coarse	Riffle		R		R		R									C	R						
other	Run																						

Transect		A	B	C	D	E	F	G	H	I	J	K
Sample Location	Left											
	Right											
	Center											

Substrate Size Classes

Fine/Sand - ladybug or smaller (<2mm)

Gravel - ladybug to tennis ball (2 to 64mm)

Coarse - tennis ball to car sized (64 to 4000mm)

Other - bedrock, hardpan, wood etc

On Site Description Data

Section A

Project Site ID: BVC01		T__7S__, R__1E__, SW____1/4 of Sec_9___		Date: 14 APR 2008
Stream Name: Beaver Creek				Time: 14:51
Transect 1(Downstream)			**Transect 11(Upstream)**	
GPS Coordinates (utm):	Northing: 43°26' 57.11"	Easting: 104°00' 56.12"	Northing: 43°26' 57.00"	Easting: 104°00' 48.26"
Investigators: C. Foreman, G. McKee (Sections A, B, C), A. Wones, K. Shook, E. Krantz (Sections D, E, F, G, H, I, J)				

Section B

Preliminary Mean Stream Width (PMSW)

	Width Number											
	1	2	3	4	5	6	7	8	9	10	Sum	Avg. PMSW
Width (0.1m)	6.7	6.9	7.7	8.8	5.9	11.3	8.2	5.0	5.9	7.1	73.5	7.35

Transect Spacing *****: 22 m

*****If PMSW <10m space transects every 3 PMSW. If >10m, transects are spaced every 2 PMSW.

Total Reach Length: 220 m

Reach Length = 11 Transects, 10 distances apart X 3 PMSW = 30 PMSW or 20 PMSW if width >10m.

Section C

Water Quality

Reading	Time (2400)	Water Temperature (°C)	Air Temperature (oC)	Turbidity (NTU)	Secchi (cm)	Dissolved Oxygen (mg/L	Specific Conductance (µS/cm)	Conductivity (µS/cm)
Morning								
Afternoon	14:55	16.0	16.9	14.3	-	12.21	7,186	

Visual Observations

1) Odor (~~Yes~~ / No) **2) Septic (~~Yes~~ / No)** **3) Deadfish (~~Yes~~ / No)** **4) Surface Film (~~Yes~~ / No)**

5) Color: Clear **6) Ice Cover (~~Yes~~ / No)**

Weather Conditions:	Current	Past 24 hrs
Clear/sunny	✓	✓
Partly cloudy	☐	☐
Intermittent showers	☐	☐
Steady rain	☐	☐
Heavy rain	☐	☐

Field Comments: Heavy silt deposition in pools. WQ by Respec. pH = 8.27

Section D

Habitats Available number of each (also place on map Section E)

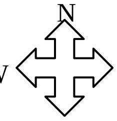
Pool____3___ Run/Glide__2_____ Riffle___3____ Other (describe) see Table 1
Lengths of Riffle(s):__10.7____, ____10.7____, __6.7_____, _______, _______.
Nearest Transect # :__3__, __9___, __11_____, _______, _______.
Total Length (riffles) =____28.0____
Pool Forming Elements See Table 1= _____LS, F

Map, Slope Measurements, and Photo-documentation Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Date: 16 APR 2008

Section E cont.

Draw a map of the site with location of most upstream and most downstream transects. Include locations of photographic points, direction of photograph, and frame number.

N
W  E
S

Approximately 240 m.

Bed Substrate Composition

Project Site ID:BVC01	Stream Name: Beaver Creek	Date: 17 APR 2008

Section F

Organic Substrates

	Description	Tally	Number
Detritus	sticks, wood, coarse plant material (CPOM)		2
Muck-Mud	black, very fine organic (FPOM)		

Inorganic Substrates

	Diameter	Tally	Number
Clay	<0.004 (slick)		1
Silt	0.004-0.062		15
Sand	0.062-2 (gritty)		
Very Fine Gravel	>2-4		
Fine Gravel	>4-8		
Medium Gravel	>8-16		1
Coarse Gravel	>16-32		7
Very Coarse Gravel	>32-64		17
Cobble	>64-128		9
Large Cobble	>128-256		3
Boulder	>256-512		
Large Boulder	>512		
		Total Number:	55

Section G

Large Woody Debris Data

1

Project Site ID:_BVC01________ Stream Name:_Beaver Creek______m/d/yr:_04/17/2008____Page 1 of 1

Transect Spacing	Log Jam Number	LWD Number	Zone	Meander Location	Habitat Association	Angle	Length	Diameter
1-2	0	0						
2-3	0	0						
3-4	0	0						
4-5	0	0						
5-6	0	0						
6-7	0	0						
7-8	0	0						
8-9	0	0						
9-10	0	0						
10-11	0	0						

Zone: Zone 1 is water surface at baseflow, Zone 2 is between baseflow surface and bankfull flow surface, Zone 3 is bankfull channel width above bankfull flow surface.

Meander Location: IM=inside meander, OM=outside meander, CO=crossover, SS=straight section

Habitat Association: PL=pool, RF=riffle, RN=run

LARGE WOODY DEBRIS CATEGORIES (≥10 cm small end diameter; ≥1.5 m length)				
Categories	**1**	**2**	**3**	**4**
Diameter Large End	0.1-<0.3m	0.3-0.6m	0.6-0.8m	>0.8m
Length	>1.5-5m	5-15m	>15m	-

Stream Shade and Canopy Cover Monitoring

Project Site ID:BVC01	Stream Name: Beaver Creek	Date: 17 APR 2008

Section H

Site Name:BVC04							Date: 4/17/2008
Reach Length:				Transect Interval:			Initials:
Transect	Left Bank	Center Upstream	Center Right	Center-downstream	Center Left	Right Bank	Comments:
1	0	0	0	0	0	0	
2	0	0	0	0	0	7	RB = bank
3	0	0	0	0	0	6	RB = bank
4	7	0	0	0	0	5	LB = grass/bank RB = bank
5	9	0	0	0	0	13	LB = grass/bank RB = grass/bank
6	3	0	0	0	0	4	LB = grass RB = grass
7	16	0	0	0	0	3	LB = grass RB = grass
8	4	0	0	0	0	0	LB = grass
9	2	0	0	0	0	0	LB = Bank
10	3	0	0	0	0	0	LB = Grass
11	0	0	0	0	0	0	

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __1___ of 11
Date: 4/15/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.3	1.3
Bank Angle (degrees)	25	21
Streambank length (0.1 m)	8.6	2.7
Length of Streambank Vegetated (0.1 m)	8.6	2.7
Length of Streambank Eroded (0.1 m)	0	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	1.5	0.0		
LEW	3.0	0.4	0.00	
LCB	3.5	0.5	0.09	
STR (@1/4)	4.9	0.5	0.12	
STR (@1/2)	6.1	0.4	0.03	
STR (@3/4)	7.5	0.5	0.09	
RCB	8.8	0.4	0.03	
REW	9.4	0.4	0.00	
RBF	11.8	0.0		
RTB	13.7			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =__13.4__

Bankfull width (RBF-LBF)=____10.2__

Channel Bottom Width (RCB-LCB)=____5.4__

Stream Width (REW-LEW)=___6.3_

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 4/15/08		__2___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	1.7	1.8
Bank Angle (degrees)	**15**	41
Streambank length (0.1 m)	8.6	2.7
Length of Streambank Vegetated (0.1 m)	8.6	2.7
Length of Streambank Eroded (0.1 m)	0	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, not present	seedling/sprout, young/sapling, mature, decadent, dead, not present
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	6.9	0.0		
LEW	8.1	0.3	0.00	
LCB	10.4	0.6	0.30	
STR (@1/4)	9.6	0.4	0.09	
STR (@1/2)	11.8	0.8	0.52	
STR (@3/4)	13.3	0.7	0.43	
RCB	13.9	0.6	0.37	
REW	14.6	0.3	0.00	
RBF	15.0	0.0		
RTB	15.9			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___15.5_____

Bankfull width (RBF-LBF)=____8.1____

Channel Bottom Width (RCB-LCB)=____3.5_____

Stream Width (REW-LEW)=____6.5_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 4/15/08		__3___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	1.6	1.6
Bank Angle (degrees)	8	48
Streambank length (0.1 m)	12.0	3.3
Length of Streambank Vegetated (0.1 m)	12.0	0.5
Length of Streambank Eroded (0.1 m)	0	2.9
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.2	0.2
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	9.8	0.0		
LEW	11.2	0.5	0.00	
LCB	12.7	0.5	0.06	
STR (@1/4)	12.9	0.5	0.09	
STR (@1/2)	14.2	0.5	0.06	
STR (@3/4)	15.1	0.5	0.09	
RCB	15.6	0.5	0.06	
REW	16.0	0.3	0.00	
RBF	16.9	0.0		
RTB	17.7			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___17.4_____

Bankfull width (RBF-LBF)=____7.2____

Channel Bottom Width (RCB-LCB)=____3.0_____

Stream Width (REW-LEW)=____4.8_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __4___ of 11
Date: 4/15/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.7	1.7
Bank Angle (degrees)	15	43
Streambank length (0.1 m)	8.1	2.6
Length of Streambank Vegetated (0.1 m)	8.1	2.6
Length of Streambank Eroded (0.1 m)	0	0
Length of Streambank Deposition (0.1 m)	0.6	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.3	0.1
Undercut Bank (0.1 m)	0.2	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	7.9	0.0		
LEW	7.8	0.2	0.00	
LCB	8.0	0.3	0.12	
STR (@1/4)	9.6	0.3	0.06	
STR (@1/2)	11.2	0.4	0.15	
STR (@3/4)	12.9	0.4	0.15	
RCB	13.9	0.3	0.06	
REW	14.3	0.2	0.00	
RBF	14.4	0.0		
RTB	15.7			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___15.4_____

Bankfull width (RBF-LBF)=____6.5____

Channel Bottom Width (RCB-LCB)=____5.8_____

Stream Width (REW-LEW)=____6.6_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __5___ of 11
Date: 4/16/08, 4/17/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.6	1.5
Bank Angle (degrees)	23	45
Streambank length (0.1 m)	4.0	4.0
Length of Streambank Vegetated (0.1 m)	3.9	3.2
Length of Streambank Eroded (0.1 m)	0.1	0.8
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.0			
LBF	3.7	0.0		
LEW	3.7	0.4	0.07	
LCB	4.7	0.7	0.21	
STR (@1/4)	5.8	0.6	0.29	
STR (@1/2)	7.3	0.6	0.31	
STR (@3/4)	9.5	0.6	0.25	
RCB	10.9	0.6	0.21	
REW	11.3	0.5	0.12	
RBF	11.7	0.1		
RTB	12.9			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___12.9____

Bankfull width (RBF-LBF)=____ 8.0___

Channel Bottom Width (RCB-LCB)=____ 6.2___

Stream Width (REW-LEW)=____7.6

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 4/16/08, 4/17/08		__6___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.8	1.5
Bank Angle (degrees)	25	55
Streambank length (0.1 m)	3.0	2.2
Length of Streambank Vegetated (0.1 m)	3.0	
Length of Streambank Eroded (0.1 m)	0	
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	4.1	0.0		
LEW	4.7	0.9*	0.30	
LCB	4.7	0.9	0.30	
STR (@1/4)	6.4	0.9	0.42	
STR (@1/2)	8.5	1.0	0.64	
STR (@3/4)	10.5	0.9	0.59	
RCB	11.5	0.7	0.31	
REW	11.8	0.5*	0.14	
RBF	12.2	0.0		
RTB	13.1			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =__12.6___

Bankfull width (RBF-LBF)=____ 8.1__

Channel Bottom Width (RCB-LCB)=__6.9____

Stream Width (REW-LEW)=___7.2___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __7___ of 11
Date: 4/16/08, 4/17/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.6	1.8
Bank Angle (degrees)	23	50
Streambank length (0.1 m)	3.0	2.2
Length of Streambank Vegetated (0.1 m)	2.9	1.5
Length of Streambank Eroded (0.1 m)	0.1	0.7
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.2	0.2
Undercut Bank (0.1 m)	0	0.25
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	4.1	0.0		
LEW	4.7	0.7	0.21	
LCB	4.7	0.7	0.21	
STR (@1/4)	6.4	1.0	0.50	
STR (@1/2)	8.4	1.0	0.51	
STR (@3/4)	10.1	0.9	0.40	
RCB	12.0	0.9	0.39	
REW	12.5	0.7	0.16	
RBF	13.2	0.0		
RTB	14.0			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___13.5__

Bankfull width (RBF-LBF)=____ 9.1__

Channel Bottom Width (RCB-LCB)=____7.3___

Stream Width (REW-LEW)=_____7.8__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __8___ of 11
Date: 4/16/08, 4/17/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.5	1.5
Bank Angle (degrees)	23	41
Streambank length (0.1 m)	3.0	3.0
Length of Streambank Vegetated (0.1 m)	3.0	1.8
Length of Streambank Eroded (0.1 m)	0	1.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.2	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	3.4	0.0		
LEW	4.0	0.6	0.10	
LCB	4.4	0.6	0.20	
STR (@1/4)	5.6	0.6	0.20	
STR (@1/2)	7.2	0.6	0.19	
STR (@3/4)	8.8	0.7	0.24	
RCB	10.1	0.7	0.20	
REW	10.6	0.5	0.00	
RBF	11.9	1.0		
RTB	12.5			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___12.0___

Bankfull width (RBF-LBF)=___8.5___

Channel Bottom Width (RCB-LCB)=___ 5.7____

Stream Width (REW-LEW)=___ 6.6

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __9___ of 11
Date: 4/16/08, 4/17/08		
Habitat Type Along Transect (circle one): pool riffle **run**		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	1.6	1.5
Bank Angle (degrees)	25	25
Streambank length (0.1 m)	3.3	4.8
Length of Streambank Vegetated (0.1 m)	2.9	8.8
Length of Streambank Eroded (0.1 m)	0.4	0.4
Length of Streambank Deposition (0.1 m)	0	1.0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.7
Undercut Bank (0.1 m)	0.2	0
Riparian landuse (circle one)	Cropland, **pasture/rangeland**, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, **pasture/rangeland**, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, **moderate**, high	none, low, **moderate**, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, **shrubs**, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, **shrubs**, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, **none**	seedling/sprout, young/sapling, **mature**, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	3.7	0.0		
LEW	4.0	0.5	0.00	
LCB	4.7	0.5	0.18	
STR (@1/4)	5.6	0.5	0.19	
STR (@1/2)	6.9	0.5	0.19	
STR (@3/4)	8.7	0.5	0.11	
RCB	9.4	0.4	0.11	
REW	10.9	0.5	0.01	
RBF	12.5	0.0		
RTB	14.3			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___13.8___

Bankfull width (RBF-LBF)=____ 8.8___

Channel Bottom Width (RCB-LCB)=____ 4.7___

Stream Width (REW-LEW)=____6.9

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __10___ of 11
Date: 4/16/08, 4/17/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank		Right Bank	
Bank Substrate (dominant)	Silt/Clay		Silt/Clay	
Bank Slumpage (present, p or absent, a)	P		P	
Bank Height (0.1 m)	1.8		2.0	
Bank Angle (degrees)	29		20	
Streambank length (0.1 m)	2.8		6	
Length of Streambank Vegetated (0.1 m)	2.4		5.8	
Length of Streambank Eroded (0.1 m)	0.4		0.2	
Length of Streambank Deposition (0.1 m)	0		0	
Riparian Buffer Width (m)	0		0	
Overhanging Vegetation (0.1 m)	0.2		0	
Undercut Bank (0.1 m)	0		0	
Riparian landuse (circle one)	Cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify	cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify
Animal Vegetation Use (circle one)	none low	moderate high	none low	moderate high
Riparian Vegetation Type (Dominant)	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout young/sapling mature	decadent dead none	seedling/sprout young/sapling mature	decadent dead none
Submergent Macrophytes (0.1 m)	0			
Emergent Macrophytes (0.1 m)	0			

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	3.4	0.0		
LEW	3.6	0.4	0.02	
LCB	3.9	0.6	0.20	
STR (@1/4)	4.9	0.7	0.32	
STR (@1/2)	6.1	0.8	0.38	
STR (@3/4)	7.5	0.8	0.19	
RCB	8.0	0.8	0.14	
REW	8.5	0.7	0.00	
RBF	10.2	0.2		
RTB	14.3			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___13.8___

Bankfull width (RBF-LBF)=____ 6.8__

Channel Bottom Width (RCB-LCB)=____4.0

Stream Width (REW-LEW)=____4.9____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 4/16/08, 4/17/08		__11___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank		Right Bank	
Bank Substrate (dominant)	Silt/Clay		Silt/Clay	
Bank Slumpage (present, p or absent, a)	P		A	
Bank Height (0.1 m)				
Bank Angle (degrees)	35		10	
Streambank length (0.1 m)	5.0		10.4	
Length of Streambank Vegetated (0.1 m)	2.4		9.7	
Length of Streambank Eroded (0.1 m)	2.6		0.7	
Length of Streambank Deposition (0.1 m)	0		0	
Riparian Buffer Width (m)	0		0	
Overhanging Vegetation (0.1 m)	0.2		0	
Undercut Bank (0.1 m)	0		0	
Riparian landuse (circle one)	Cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify	cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify
Animal Vegetation Use (circle one)	none low	moderate high	none low	moderate high
Riparian Vegetation Type (Dominant)	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout young/sapling mature	decadent dead none	seedling/sprout young/sapling mature	decadent dead none
Submergent Macrophytes (0.1 m)	0			
Emergent Macrophytes (0.1 m)	0			

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	1.5	0.0		
LEW	3.3	0.5	0.01	
LCB	3.5	0.7	0.13	
STR (@1/4)	4.2	0.7	0.20	
STR (@1/2)	5.1	0.7	0.18	
STR (@3/4)	5.8	0.7	0.11	
RCB	6.3	0.7	0.08	
REW	6.7	0.5	0.00	
RBF	8.8	0.2		
RTB	16.8			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.3__

Bankfull width (RBF-LBF)=_____7.3_

Channel Bottom Width (RCB-LCB)=___2.9

Stream Width (REW-LEW)=____ 3.5__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

SAMPLE COLLECTION FORM - STREAMS

Site ID	BVC01	Date	7/9/2008

Water Chemistry		
Sample ID	Transect	Comments
		NA

Reach-wide Benthos Sample		
Sample ID	No. of Jars	Comment
BVC01	1	Low flow sampling. Composit sample from 11 transects. Appears to have low benthic abundance.

Transect		A		B		C		D		E		F		G		H		I		J		K	
Substrate	Channel	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan
Fine/Sand	Pool								P		P		P								P		P
Gravel	Glide	G	GL	G	GL			G		G		G		G		G		G		G		G	
Coarse	Riffle					C	R								R		R		R				
other	Run																						

Transect		A	B	C	D	E	F	G	H	I	J	K
Sample Location	Left	X			X			X			X	
	Right		X			X			X			X
	Center			X			X			X		

Substrate Size Classes
Fine/Sand - ladybug or smaller (<2mm)
Gravel - ladybug to tennis ball (2 to 64mm)
Coarse - tennis ball to car sized (64 to 4000mm)
Other - bedrock, hardpan, wood etc

SAMPLE COLLECTION FORM - STREAMS

Site ID	BVC04	Date	7/8/2008

Water Chemistry		
Sample ID	Transect	Comments

Reach-wide Benthos Sample		
Sample ID	No. of Jars	Comment
BVC04	2	Spring sampling. Composit sample from 11 transects.

Transect		A		B		C		D		E		F		G		H		I		J		K	
Substrate	Channel	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan	Sub	Chan
Fine/Sand	Pool											F				F	P	F	P	F	P		P
Gravel	Glide		GL			G	GL	G		G			GL	G									
Coarse	Riffle	C		C	R				R		R				R							C	
other	Run																						

Transect		A	B	C	D	E	F	G	H	I	J	K
Sample Location	Left	X			X			X			X	
	Right		X			X			X			X
	Center			X			X			X		

Substrate Size Classes

Fine/Sand - ladybug or smaller (<2mm)

Gravel - ladybug to tennis ball (2 to 64mm)

Coarse - tennis ball to car sized (64 to 4000mm)

Other - bedrock, hardpan, wood etc

On Site Description Data

Section A

Project Site ID: BVC01	T_____, R_____, _____1/4 of Sec______	**Date:** **09 JUL 2008**
Stream Name: Beaver Creek		Time: 14:51

Transect 1(Upstream)			Transect 11(Downstream)	
GPS Coordinates (utm): WGS84	Northing: 4820631.96	Easting: 0571323.79	Northing: 4820515.00	Easting: 0571485.75
Investigators: C. Foreman, G. McKee (Sections A, B, C), A. Wones, K. Shook, M. Winland (Sections D, E, F, G, H, I, J)				

Section B

Preliminary Mean Stream Width (PMSW)

	Width Number											
	1	2	3	4	5	6	7	8	9	10	Sum	Avg. PMSW
Width (0.1m)	6.7	6.9	7.7	8.8	5.9	11.3	8.2	5.0	5.9	7.1	73.5	7.35

Transect Spacing *****: 22 m

*****If PMSW <10m space transects every 3 PMSW. If >10m, transects are spaced every 2 PMSW.

Total Reach Length: 220 m

Reach Length = 11 Transects, 10 distances apart X 3 PMSW = 30 PMSW or 20 PMSW if width >10m.

Section C

Water Quality

Reading	**Time (2400)**	**Water Temperature (°C)**	**Air Temperature (oC)**	**Turbidity (NTU)**	**Secchi (cm)**	**Dissolved Oxygen (mg/L**	**Specific Conductance (µS/cm)**	**Conductivity (µS/cm)**
Morning	0945	23.63	25.5			8.41		5,939
Afternoon								

Visual Observations

1) Odor (~~Yes~~ / $\boxed{\text{No}}$) **2) Septic (~~Yes~~ / $\boxed{\text{No}}$)** **3) Deadfish (~~Yes~~ / $\boxed{\text{No}}$)** **4) Surface Film (~~Yes~~ / $\boxed{\text{No}}$)**

5) Color: Olive Drab, clear

6) Ice Cover (~~Yes~~ / $\boxed{\text{No}}$)

Weather Conditions:	**Current**	**Past 24 hrs**
Clear/sunny	☐	☐
Partly cloudy	✓	✓
Intermittent showers	☐	☐
Steady rain	☐	☐
Heavy rain	☐	☐

Field Comments: wind 5-10 mph, sparse high clouds.

Section D

Habitats Available number of each (also place on map Section E)	Pool____2__ Run/Glide__1_____ Riffle___2____ Other (describe) see Table 1 Lengths of Riffle(s):__13____, ____57.8____, __6.7_____, ________, ________. Nearest Transect # :___3__, ___7___, ______, ________, ________. Total Length (riffles) =____70.8____ Pool Forming Elements See Table 1= _____ F

Map, Slope Measurements, and Photo-documentation Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Date: 09 JUL 2008

Section E cont.

Draw a map of the site with location of most upstream and most downstream transects. Include locations of photographic points, direction of photograph, and frame number.

N
W E
S

Approximately 320 m.

Bed Substrate Composition

Project Site ID:BVC01	Stream Name: Beaver Creek	Date: 09 JUL 2008

Section F

Organic Substrates

	Description	Tally	Number
Detritus	sticks, wood, coarse plant material (CPOM)		2
Muck-Mud	black, very fine organic (FPOM)		6

Inorganic Substrates

	Diameter	Tally	Number
Clay	<0.004 (slick)		1
Silt	0.004-0.062		8
Sand	0.062-2 (gritty)		1
Very Fine Gravel	>2-4		6
Fine Gravel	>4-8		2
Medium Gravel	>8-16		19
Coarse Gravel	>16-32		15
Very Coarse Gravel	>32-64		28
Cobble	>64-128		20
Large Cobble	>128-256		5
Boulder	>256-512		1
Large Boulder	>512		1
		Total Number:	105

Section G

Large Woody Debris Data

1

Project Site ID: BVC01________ Stream Name: Beaver Creek______m/d/yr:_07/09/2008____Page 1 of 1

Transect Spacing	Log Jam Number	LWD Number	Zone	Meander Location	Habitat Association	Angle	Length	Diameter
1-2	0	0						
2-3	0	0						
3-4	0	0						
4-5	0	0						
5-6	0	0						
6-7	0	0						
7-8	0	0						
8-9	0	0						
9-10	0	0						
10-11	0	0						

Zone: Zone 1 is water surface at baseflow, Zone 2 is between baseflow surface and bankfull flow surface, Zone 3 is bankfull channel width above bankfull flow surface.
Meander Location: IM=inside meander, OM=outside meander, CO=crossover, SS=straight section
Habitat Association: PL=pool, RF=riffle, RN=run

LARGE WOODY DEBRIS CATEGORIES (≥10 cm small end diameter; ≥1.5 m length)				
Categories	**1**	**2**	**3**	**4**
Diameter Large End	0.1-<0.3m	0.3-0.6m	0.6-0.8m	>0.8m
Length	>1.5-5m	5-15m	>15m	-

Stream Shade and Canopy Cover Monitoring

Project Site ID:BVC01	Stream Name: Beaver Creek	Date: 17 APR 2008

Section H

Site Name:BVC01							Date: 7/09/2008
Reach Length:				Transect Interval:			Initials:
Transect	Left Bank	Center Upstream	Center Right	Center-downstream	Center Left	Right Bank	Comments:
1	0	0	0	0	0	0	
2	0	0	0	0	0	4	RB = bank
3	0	0	0	0	0	7	RB = bank
4	0	0	0	0	0	0	LB = grass/bank RB = bank
5	0	0	0	0	0	0	LB = grass/bank RB = grass/bank
6	0	0	0	0	0	3	LB = grass RB = grass
7	0	0	0	0	0	0	LB = grass RB = grass
8	0	0	0	0	0	0	LB = grass
9	0	0	0	0	0	0	LB = Bank
10	0	0	0	0	0	0	LB = Grass
11	0	0	0	0	0	0	

Transect Data

Project Site ID: BVC01 Date: 7/11/08	Stream Name: Beaver Creek	Transect Number __1___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.56	1.52
Bank Angle (degrees)	24	16
Streambank length (0.1 m)	3.5	6.4
Length of Streambank Vegetated (0.1 m)	3.5	6.4
Length of Streambank Eroded (0.1 m)	0	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.2	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.0			
LBF	1.0	0.0		
LEW	2.6	0.66	0.00	
LCB	3.3	0.73	0.12	
STR (@1/4)	4.5	0.74	0.18	
STR (@1/2)	6.0	0.77	0.23	
STR (@3/4)	7.8	0.77	0.25	
RCB	8.7	0.69	0.16	
REW	9.2	0.56	0.00	
RBF	10.9	0.18		
RTB	14.6			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =__14.6__

Bankfull width (RBF-LBF)=____9.9__

Channel Bottom Width (RCB-LCB)=____5.4__

Stream Width (REW-LEW)=___6.6_

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __2___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	2.57	2.80
Bank Angle (degrees)	**8**	55
Streambank length (0.1 m)	10.35	3.2
Length of Streambank Vegetated (0.1 m)	10.32	3.2
Length of Streambank Eroded (0.1 m)	0	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.10
Undercut Bank (0.1 m)	0	010
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, not present	seedling/sprout, young/sapling, mature, decadent, dead, not present
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.5	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	20.5			
LBF	27.3	0.0		
LEW	28.0	0.59	0.00	
LCB	30.0	0.95	0.35	
STR (@1/4)	31.0	1.09	0.48	
STR (@1/2)	32.4	1.20	0.54	
STR (@3/4)	33.9	1.24	0.53	
RCB	34.7	1.18	0.46	
REW	35.0	0.77	0.00	
RBF	35.0	0.25		
RTB	36.2			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___15.7_____

Bankfull width (RBF-LBF)=____7.7____

Channel Bottom Width (RCB-LCB)=____4.7_____

Stream Width (REW-LEW)=____7.0_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__3___ of 11
Habitat Type Along Transect (circle one): pool **riffle** run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.9	2.5
Bank Angle (degrees)	8	54
Streambank length (0.1 m)	12.7	3.0
Length of Streambank Vegetated (0.1 m)	12.7	2.0
Length of Streambank Eroded (0.1 m)	0	1.0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, **pasture/rangeland**, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, **pasture/rangeland**, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, **moderate**, high	none, low, **moderate**, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, **grass/forb**, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, **grass/forb**, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, **none**	seedling/sprout, young/sapling, mature, **decadent**, dead, **none**
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp*. 0.2, grass sp. 0.2. Total = 0.4	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	20.0			
LBF	29.1	0.00		
LEW	31.7	0.67	0.00	
LCB	32.4	0.77	0.11	
STR (@1/4)	33.2	0.85	0.17	
STR (@1/2)	34.1	0.87	0.19	
STR (@3/4)	35.0	0.93	0.18	
RCB	35.4	0.91	0.15	
REW	35.8	0.77	0.00	
RBF	35.9	0.35		
RTB	37.0			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___17.0_____

Bankfull width (RBF-LBF)=____6.8____

Channel Bottom Width (RCB-LCB)=____3.0_____

Stream Width (REW-LEW)=____4.1_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __4___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.6	2.0
Bank Angle (degrees)	14	25
Streambank length (0.1 m)	7.9	6.0
Length of Streambank Vegetated (0.1 m)	7.4	5.4
Length of Streambank Eroded (0.1 m)	0.5	0.6
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	*Chara sp.* 0.5	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.5	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	5.8	0.00		
LEW	6.1	0.65	0.00	
LCB	7.6	0.80	0.27	
STR (@1/4)	8.5	0.81	0.23	
STR (@1/2)	9.9	0.91	0.29	
STR (@3/4)	11.8	1.10	0.26	
RCB	12.7	0.85	0.22	
REW	13.4	0.70	0.00	
RBF	13.9	0.00		
RTB	19.4			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___19.1_____

Bankfull width (RBF-LBF)=____8.2____

Channel Bottom Width (RCB-LCB)=____5.1_____

Stream Width (REW-LEW)=____7.3_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __5___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	2.1	2.1
Bank Angle (degrees)	21	32
Streambank length (0.1 m)	7.7	4.2
Length of Streambank Vegetated (0.1 m)	7.7	3.18
Length of Streambank Eroded (0.1 m)	0	0.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.2	0.1
Undercut Bank (0.1 m)	0.2	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.3	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.4			
LBF	6.2	0.00		
LEW	6.5	0.70	0.02	
LCB	7.2	0.98	0.35	
STR (@1/4)	8.5	1.12	0.49	
STR (@1/2)	10.1	1.28	0.59	
STR (@3/4)	12.5	1.12	0.48	
RCB	13.8	0.99	0.30	
REW	14.1	0.87	0.15	
RBF	14.6	0.00		
RTB	17.0			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.6____

Bankfull width (RBF-LBF)=____ 8.4___

Channel Bottom Width (RCB-LCB)=____ 6.7___

Stream Width (REW-LEW)=____7.7

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __6___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.9	1.9
Bank Angle (degrees)	22	36
Streambank length (0.1 m)	7.0	3.4
Length of Streambank Vegetated (0.1 m)	6.9	3.2
Length of Streambank Eroded (0.1 m)	0.1	0.2
Length of Streambank Deposition (0.1 m)	0	2.5
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0.1
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.1	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	2.0			
LBF	5.0	0.00		
LEW	5.7	0.61	0.00	
LCB	5.8	0.89	0.34	
STR (@1/4)	7.4	0.90	0.48	
STR (@1/2)	9.4	1.03	0.55	
STR (@3/4)	11.7	0.98	0.44	
RCB	13.4	0.91	0.37	
REW	13.9	0.79	0.24	
RBF	14.5	0.05		
RTB	15.3			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =__13.3___

Bankfull width (RBF-LBF)=____ 9.5__

Channel Bottom Width (RCB-LCB)=__7.6____

Stream Width (REW-LEW)=___8.2___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__7___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.7	1.5
Bank Angle (degrees)	22	23
Streambank length (0.1 m)	5.8	4.8
Length of Streambank Vegetated (0.1 m)	5.7	4.6
Length of Streambank Eroded (0.1 m)	0.1	0.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	*Chara sp.* 0.05	
Emergent Macrophytes (0.1 m)	Juncus Sp. & Grass 0.30	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.0			
LBF	4.7	0.00		
LEW	5.4	0.60	0.17	
LCB	6.0	0.62	0.20	
STR (@1/4)	7.1	0.58	0.16	
STR (@1/2)	8.5	0.50	0.17	
STR (@3/4)	6.0	0.49	0.19	
RCB	10.7	0.44	0.15	
REW	11.2	0.35	0.01	
RBF	13.4	0.03		
RTB	15.0			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___14.0__

Bankfull width (RBF-LBF)=____ 8.7__

Channel Bottom Width (RCB-LCB)=____4.7___

Stream Width (REW-LEW)=_____5.8__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __8___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.9	1.6
Bank Angle (degrees)	25	11
Streambank length (0.1 m)	4.3	5.5
Length of Streambank Vegetated (0.1 m)	3.9	5.3
Length of Streambank Eroded (0.1 m)	0.4	0.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.10	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	*Chara sp.* 0.1	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.25	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.7			
LBF	4.0	0.00		
LEW	4.1	0.58	0.13	
LCB	4.4	0.75	0.30	
STR (@1/4)	5.6	0.58	0.29	
STR (@1/2)	7.0	0.48	0.18	
STR (@3/4)	8.6	0.42	0.17	
RCB	9.9	0.38	0.15	
REW	10.3	0.35	0.10	
RBF	10.6	0.00		
RTB	14.5			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.9_____

Bankfull width (RBF-LBF)=____11.3____

Channel Bottom Width (RCB-LCB)=___8.1_ _____

Stream Width (REW-LEW)=___8.1___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number __9___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	2.2	2.0
Bank Angle (degrees)	32	12.5
Streambank length (0.1 m)	3.9	8.4
Length of Streambank Vegetated (0.1 m)	2.9	8.2
Length of Streambank Eroded (0.1 m)	1.0	0.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0
Undercut Bank (0.1 m)	0.1	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	*Chara sp.* 0.20	
Emergent Macrophytes (0.1 m)	*Juncus sp.* 0.1	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	3.7			
LBF	5.5	0.0		
LEW	6.5	0.2	0.05	
LCB	7.0	0.2	0.10	
STR (@1/4)	8.8	0.4	0.31	
STR (@1/2)	10.4	0.3	0.35	
STR (@3/4)	12.2	0.4	0.31	
RCB	14.3	0.2	0.14	
REW	14.7	0.0	0.01	
RBF	14.9	-0.4		
RTB	22.6			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___18.9___

Bankfull width (RBF-LBF)=____ 9.4___

Channel Bottom Width (RCB-LCB)=____ 7.3___

Stream Width (REW-LEW)=____8.2

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__10___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	2.0	1.7
Bank Angle (degrees)	33	34.5
Streambank length (0.1 m)	6.0	7.6
Length of Streambank Vegetated (0.1 m)	4.5	6.60
Length of Streambank Eroded (0.1 m)	1.5	1.0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp*. 0.1	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	-0.6			
LBF	2.6	0.0		
LEW	2.9	0.60	0.01	
LCB	3.9	1.19	0.60	
STR (@1/4)	5.0	1.04	0.58	
STR (@1/2)	6.3	0.87	0.45	
STR (@3/4)	8.2	0.82	0.24	
RCB	9.2	0.92	0.18	
REW	9.8	0.84	0.00	
RBF	11.5	0		
RTB	16.0			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.6___

Bankfull width (RBF-LBF)=____ 8.9__

Channel Bottom Width (RCB-LCB)=____5.3

Stream Width (REW-LEW)=____6.9____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC01 Date: 7/11/08	Stream Name: Beaver Creek	Transect Number __11___ of 11
Habitat Type Along Transect (circle one):	pool riffle run	

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	2.1	1.9
Bank Angle (degrees)	30	30
Streambank length (0.1 m)	4.3	4.0
Length of Streambank Vegetated (0.1 m)	3.6	3.9
Length of Streambank Eroded (0.1 m)	0.7	0.1
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus Sp.* 0.5	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.0			
LBF	2.8	0.0		
LEW	3.6	0.90	0.00	
LCB	4.0	1.15	0.30	
STR (@1/4)	5.4	1.42	0.52	
STR (@1/2)	7.0	1.53	0.63	
STR (@3/4)	9.0	1.45	0.55	
RCB	9.7	1.30	0.41	
REW	11.0	0.96	0.00	
RBF	11.6	0.44		
RTB	13.6			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___12.6__

Bankfull width (RBF-LBF)=_____8.8_

Channel Bottom Width (RCB-LCB)=___5.6

Stream Width (REW-LEW)=____ 7.4__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

On Site Description Data

Section A

Project Site ID: BVC04		T_____, R_____, _____1/4 of Sec______		**Date:** **14 APR 2008**
Stream Name: Beaver Creek				Time: 17:32
Transect 1(Upstream)			**Transect 11(Downstream)**	
GPS Coordinates (utm):	Northing: 4810963	Easting: 0579684	Northing:	Easting:
Investigators: C. Foreman, G. McKee (Sections A, B, C), A. Wones, K. Shook, E. Krantz (Sections D, E, F, G, H, I, J)				

Section B

Preliminary Mean Stream Width (PMSW)												
	Width Number											
	1	2	3	4	5	6	7	8	9	10	Sum	Avg. PMSW
Width (0.1m)	6.1	7.1	3.6	6.7	7.7	7.0	8.0	5.5	5.4	4.5	61.6	6.2
Transect Spacing *****:	18.5											
*****If PMSW <10m space transects every 3 PMSW. If >10m, transects are spaced every 2 PMSW.												
Total Reach Length: 184.9												
Reach Length = 11 Transects, 10 distances apart X 3 PMSW = 30 PMSW or 20 PMSW if width >10m.												

Section C

Water Quality								
Reading	**Time (2400)**	**Water Temperature (°C)**	**Air Temperature (oC)**	**Turbidity (NTU)**	**Secchi (cm)**	**Dissolved Oxygen (mg/L**	**Specific Conductance (µS/cm)**	**Conductivity (µS/cm)**
Morning	11:28	7.0	-	-	-	-	-	-
Afternoon	18:43	16.03	-	11.8	-	9.20	5109	

Visual Observations			
1) Odor (~~Yes~~ / No)	**2) Septic (~~Yes~~ / No)**	**3) Deadfish (~~Yes~~ / No)**	**4) Surface Film (~~Yes~~ / No)**
5) Color: Clear		**6) Ice Cover (~~Yes~~ / No)**	
Weather Conditions:	**Current**	**Past 24 hrs**	**Field Comments: Heavy silt deposition in pools.**
Clear/sunny	✓	✓	
Partly cloudy	☐	☐	
Intermittent showers	☐	☐	
Steady rain	☐	☐	
Heavy rain	☐	☐	

Section D

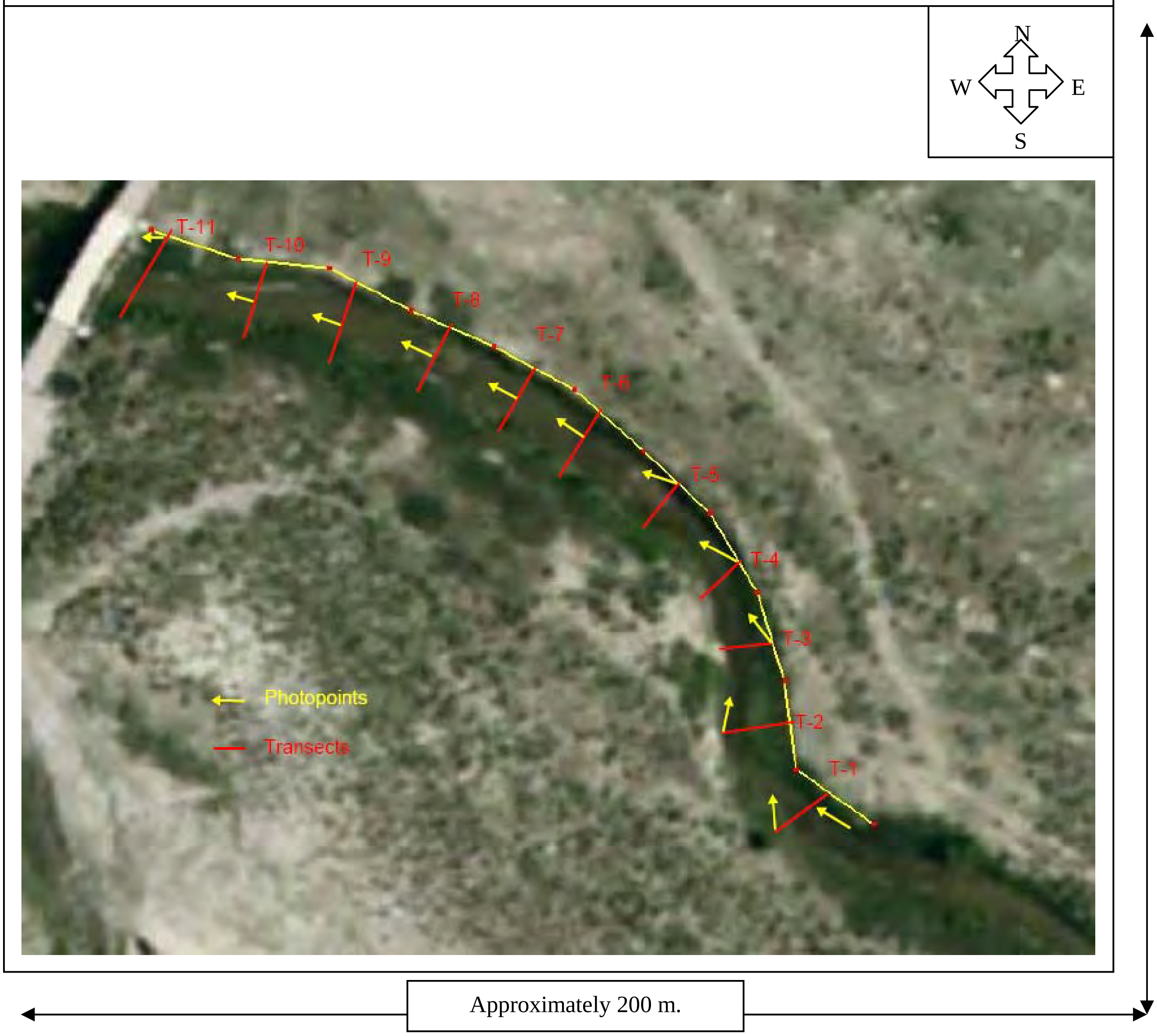
Habitats Available number of each (also place on map Section E)	Pool___2___ Run/Glide__2_____ Riffle___3____ Other (describe) see Table 1 Lengths of Riffle(s):__22.0____, ___22.0___, __10.7____, ________, ________. Nearest Transect # :__1,2_, __2,3__, __8_____, ________, ________. Total Length (riffles) =____54.6____ Pool Forming Elements See Table 1= _____LS, F

Map, Slope Measurements, and Photo-documentation Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Date: 16 APR 2008

Section E cont.

Draw a map of the site with location of most upstream and most downstream transects. Include locations of photographic points, direction of photograph, and frame number.



Bed Substrate Composition

Project Site ID:BVC04	Stream Name: Beaver Creek	Date: 16 APR 2008

Section F

Organic Substrates

	Description	Tally	Number
Detritus	sticks, wood, coarse plant material (CPOM)		1
Muck-Mud	black, very fine organic (FPOM)		

Inorganic Substrates

	Diameter	Tally	Number
Clay	<0.004 (slick)		1
Silt	0.004-0.062		26
Sand	0.062-2 (gritty)		4
Very Fine Gravel	>2-4		3
Fine Gravel	>4-8		3
Medium Gravel	>8-16		3
Coarse Gravel	>16-32		5
Very Coarse Gravel	>32-64		5
Cobble	>64-128		4
Large Cobble	>128-256		
Boulder	>256-512		
Large Boulder	>512		
		Total Number:	55

Section G

Large Woody Debris Data

1

Project Site ID: BVC04________ Stream Name: Beaver Creek______m/d/yr:_04/16/2008____Page 1 of 1

Transect Spacing	Log Jam Number	LWD Number	Zone	Meander Location	Habitat Association	Angle	Length	Diameter
1-2	0	0						
2-3	0	0						
3-4	0	0						
4-5	0	1	2	IM	Run	0	4.5	0.25
5-6	1	1	2	OM	Riffle	90	3.0	0.15
5-6	1	2	2	OM	Riffle	45	1.5	0.10
5-6	1	3	2	OM	Riffle	35	1.8	0.25
5-6	1	4	2	OM	Riffle	125	2.0	0.10
5-6	1	5	2	OM	Riffle	45	1.6	0.15
6-7	0	0						
7-8	0	0						
8-9	0	1	2	SS	Riffle	45	2.0	0.17
8-9	0	2	2	SS	Riffle	45	2.2	0.15
9-10	0	0						
10-11	0	0						

Zone: Zone 1 is water surface at baseflow, Zone 2 is between baseflow surface and bankfull flow surface, Zone 3 is bankfull channel width above bankfull flow surface.
Meander Location: IM=inside meander, OM=outside meander, CO=crossover, SS=straight section
Habitat Association: PL=pool, RF=riffle, RN=run

LARGE WOODY DEBRIS CATEGORIES (≥10 cm small end diameter; ≥1.5 m length)				
Categories	**1**	**2**	**3**	**4**
Diameter Large End	0.1-<0.3m	0.3-0.6m	0.6-0.8m	>0.8m
Length	>1.5-5m	5-15m	>15m	-

Stream Shade and Canopy Cover Monitoring

Project Site ID:BVC04	Stream Name: Beaver Creek	Date: 16 APR 2008

Section H

Site Name:BVC04							Date: 4/16/2008
Reach Length: 220 m				Transect Interval: 22 m			Initials: AW
Transect	Left Bank	Center Upstream	Center Right	Center-downstream	Center Left	Right Bank	Comments:
1	0	0	0	0	0	5	RB = Shrubs
2	0	0	0	0	0	2	RB = Tree
3	0	0	0	0	0	5	RB = Tree
4	2	0	0	0	0	0	LB = Shrubs
5	6	0	0	0	0	0	LB = Shrubs
6	4	0	0	0	0	0	LB = Bank
7	8	0	0	0	0	3	LB = Bank RB = Shrub
8	6	0	0	0	0	0	LB = Bank
9	3	0	0	0	0	10	LB = Bank RB = Shrubs
10	2	0	0	0	0	4	LB = Forbs RB = Grass
11	5	13	0	0	4	4	LB, CU, CL = Bridge RB = Shrubs
Note: No leaves on trees and shrubs. Cover from shrubs reported here is more potential than actual cover at this time of year.							

Transect Data

Project Site ID: BVC04 Date: 4/16/08	Stream Name: Beaver Creek	Transect Number __1___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	3.7	3.9
Bank Angle (degrees)	26.0	40.0
Streambank length (0.1 m)	8.0	6.0
Length of Streambank Vegetated (0.1 m)	8.0	5.4
Length of Streambank Eroded (0.1 m)	0	0.6
Length of Streambank Deposition (0.1 m)	0.4	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub	cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub
Animal Vegetation Use (circle one)	none, moderate, low, high	none, moderate, low, high
Riparian Vegetation Type (Dominant)	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other__________	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, decadent, young/sapling, dead, mature	seedling/sprout, decadent, young/sapling, dead, mature
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	5.1	0.0		
LEW	7.1	* 1.0	0.0	
LCB	7.9	1.1	0.18	
STR (@1/4)	9.1	1.2	0.19	
STR (@1/2)	10.1	1.2	0.21	
STR (@3/4)	11.6	1.4	0.20	
RCB	12.2	1.3	0.17	
REW	13.1	* 1.3	0.09	
RBF	13.5	0.4		
RTB	17.4			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___17.1_____

Bankfull width (RBF-LBF)=____8.4____

Channel Bottom Width (RCB-LCB)=____4.4_____

Stream Width (REW-LEW)=____6.0_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 4/16/08		__2___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	2.3	2.2
Bank Angle (degrees)	**27**	34
Streambank length (0.1 m)	4.6	4.8
Length of Streambank Vegetated (0.1 m)	4.0	3.6
Length of Streambank Eroded (0.1 m)	0.6	1.2
Length of Streambank Deposition (0.1 m)	0	0.4
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, not present	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	1.8	0.0		
LEW	4.1	* 0.3	0.0	
LCB	4.6	0.4	0.20	
STR (@1/4)	5.4	0.3	0.12	
STR (@1/2)	6.4	0.3	0.12	
STR (@3/4)	7.5	0.4	0.17	
RCB	8.1	0.4	0.17	
REW	8.8	* 0.3	0.0	
RBF	10.0	0.0		
RTB	11.0			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___10.7_____

Bankfull width (RBF-LBF)=____8.2____

Channel Bottom Width (RCB-LCB)=____3.5_____

Stream Width (REW-LEW)=____4.7_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __3___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.8	2.0
Bank Angle (degrees)	11	50
Streambank length (0.1 m)	11.3	2.4
Length of Streambank Vegetated (0.1 m)	10.7	1.2
Length of Streambank Eroded (0.1 m)	0.6	1.2
Length of Streambank Deposition (0.1 m)	0	0.4
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	1.0
Undercut Bank (0.1 m)	0	0.1
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.4			
LBF	10.6	0.0		
LEW	11.7	* 0.4	0.0	
LCB	12.0	0.4	0.06	
STR (@1/4)	12.7	0.5	0.11	
STR (@1/2)	13.7	0.5	0.12	
STR (@3/4)	14.9	0.5	0.13	
RCB	15.9	0.6	0.20	
REW	15.9	* 0.6	0.20	
RBF	16.6	0.0		
RTB	17.3			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___15.9_____

Bankfull width (RBF-LBF)=____5.9____

Channel Bottom Width (RCB-LCB)=____4.0_____

Stream Width (REW-LEW)=____4.2_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 4/16/08		__4___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	1.8	1.6
Bank Angle (degrees)	26.5	38.0
Streambank length (0.1 m)	4.7	3.0
Length of Streambank Vegetated (0.1 m)	3.5	2.6
Length of Streambank Eroded (0.1 m)	1.2	0.4
Length of Streambank Deposition (0.1 m)	0.6	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0			
LBF	3.0	0.0		
LEW	4.1	* 0.5	0.0	
LCB	4.5	0.6	0.15	
STR (@1/4)	6.0	0.5	0.09	
STR (@1/2)	7.5	0.4	0.10	
STR (@3/4)	9.1	0.4	0.10	
RCB	10.5	0.4	0.05	
REW	11.0	* 0.4	0	
RBF	12.3	-0.1		
RTB	13.1			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___13.1_____

Bankfull width (RBF-LBF)=____9.3____

Channel Bottom Width (RCB-LCB)=____6.0_____

Stream Width (REW-LEW)=____6.9_____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __5___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	2.5	2.2
Bank Angle (degrees)	48	40.0
Streambank length (0.1 m)	3.2	6.0
Length of Streambank Vegetated (0.1 m)	0.3	5.4
Length of Streambank Eroded (0.1 m)	2.9	0.6
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	1.3	0.0		
LEW	2.5	0.8	0.00	
LCB	2.8	1.0	0.20	
STR (@1/4)	9.7	1.0	0.28	
STR (@1/2)	5.5	0.8	0.15	
STR (@3/4)	7.3	0.7	0.12	
RCB	8.7	0.7	0.06	
REW	9.0	0.7	0.00	
RBF	11.0	0.0		
RTB	14.3			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___14.0____

Bankfull width (RBF-LBF)=____ 9.7___

Channel Bottom Width (RCB-LCB)=____ 5.9___

Stream Width (REW-LEW)=____6.5

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __6___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	3.5	3.6
Bank Angle (degrees)	46	20
Streambank length (0.1 m)	4.6	6.3
Length of Streambank Vegetated (0.1 m)	1.6	5.6
Length of Streambank Eroded (0.1 m)	2.8	0.7
Length of Streambank Deposition (0.1 m)	0	2.5
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.0			
LBF	1.9	0		
LEW	2.7	0.4*	0.00	
LCB	3.2	0.6	0.24	
STR (@1/4)	4.4	0.7	0.31	
STR (@1/2)	6.1	0.7	0.26	
STR (@3/4)	8.0	0.6	0.20	
RCB	8.8	0.6	0.10	
REW	10.0	0.5*	0.00	
RBF	13.1	0.0		
RTB	12.1			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =__17.1___

Bankfull width (RBF-LBF)=____ 11.3__

Channel Bottom Width (RCB-LCB)=__5.6____

Stream Width (REW-LEW)=___7.3___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __7___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	3.2	3.1
Bank Angle (degrees)	55	50
Streambank length (0.1 m)	4.0	5.2
Length of Streambank Vegetated (0.1 m)	1.8	4.2
Length of Streambank Eroded (0.1 m)	2.2	1.0
Length of Streambank Deposition (0.1 m)	0	0.5
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.2
Undercut Bank (0.1 m)	0	0.25
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.6			
LBF	3.4	0.0		
LEW	3.7	0.3	0.00	
LCB	4.0	0.5	0.20	
STR (@1/4)	6.4	0.8	0.60	
STR (@1/2)	8.5	0.6	0.61	
STR (@3/4)	11.4	0.7	0.73	
RCB	13.7	0.4	0.42	
REW	14.3	0.2	0.04	
RBF	14.5	-0.5		
RTB	17.7			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.1__

Bankfull width (RBF-LBF)=____ 11.1__

Channel Bottom Width (RCB-LCB)=____9.7___

Stream Width (REW-LEW)=_____10.7__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __8___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	3.2	3.1
Bank Angle (degrees)	55	25
Streambank length (0.1 m)	3.9	8.3
Length of Streambank Vegetated (0.1 m)	1.3	5.8
Length of Streambank Eroded (0.1 m)	2.6	2.5
Length of Streambank Deposition (0.1 m)	0	0.4
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, $\boxed{\text{pasture/rangeland}}$, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, $\boxed{\text{pasture/rangeland}}$, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, $\boxed{\text{low}}$, moderate, high	none, $\boxed{\text{low}}$, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, $\boxed{\text{grass/forb}}$, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, $\boxed{\text{shrubs}}$, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, $\boxed{\text{none}}$	seedling/sprout, young/sapling, mature, decadent, dead, $\boxed{\text{none}}$
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.4			
LBF	2.4	0.0		
LEW	3.4	0.6*	0.10	
LCB	3.5	0.6	0.04	
STR (@1/4)	4.3	0.6	0.18	
STR (@1/2)	8.5	0.5	0.12	
STR (@3/4)	10.6	0.5	0.18	
RCB	11.6	0.5	0.16	
REW	11.6	0.5*	0.16	
RBF	13.7	0.0		
RTB	18.3			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___16.9_____

Bankfull width (RBF-LBF)=____11.3____

Channel Bottom Width (RCB-LCB)=___8.1_ _____

Stream Width (REW-LEW)=___8.1___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __9___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	3.2	3.2
Bank Angle (degrees)	48	24.5
Streambank length (0.1 m)	4.1	9.0
Length of Streambank Vegetated (0.1 m)	2.1	8.8
Length of Streambank Eroded (0.1 m)	2.0	0.2
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.7
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	3.7			
LBF	5.5	0.0		
LEW	6.5	0.2	0.05	
LCB	7.0	0.2	0.10	
STR (@1/4)	8.8	0.4	0.31	
STR (@1/2)	10.4	0.3	0.35	
STR (@3/4)	12.2	0.4	0.31	
RCB	14.3	0.2	0.14	
REW	14.7	0.0	0.01	
RBF	14.9	-0.4		
RTB	22.6			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___18.9___

Bankfull width (RBF-LBF)=____ 9.4___

Channel Bottom Width (RCB-LCB)=____ 7.3___

Stream Width (REW-LEW)=____8.2

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04 Date: 4/16/08	Stream Name: Beaver Creek	Transect Number __10___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	1.7	1.8
Bank Angle (degrees)	25	28
Streambank length (0.1 m)	3.0	4.2
Length of Streambank Vegetated (0.1 m)	2.7	3.8
Length of Streambank Eroded (0.1 m)	0.3	0.4
Length of Streambank Deposition (0.1 m)	0.8	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub	cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub
Animal Vegetation Use (circle one)	none, moderate, low, high	none, moderate, low, high
Riparian Vegetation Type (Dominant)	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other___________	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, decadent, young/sapling, dead, mature, none	seedling/sprout, decadent, young/sapling, dead, mature, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.7			
LBF	1.8	0.0		
LEW	3.2	0.5	0.02	
LCB	3.5	0.6	0.10	
STR (@1/4)	4.9	0.7	0.26	
STR (@1/2)	7.3	0.7	0.35	
STR (@3/4)	8.5	0.6	0.30	
RCB	10.1	0.6	0.17	
REW	10.3	0.5	0.00	
RBF	10.4	0.1		
RTB	13.1			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___12.4___

Bankfull width (RBF-LBF)=____ 8.6__

Channel Bottom Width (RCB-LCB)=____6.6

Stream Width (REW-LEW)=____7.1____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __11___ of 11
Date: 4/16/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	P
Bank Height (0.1 m)	1.9	2.1
Bank Angle (degrees)	30	37
Streambank length (0.1 m)	3.2	3.7
Length of Streambank Vegetated (0.1 m)	1.7	2.7
Length of Streambank Eroded (0.1 m)	1.5	1.0
Length of Streambank Deposition (0.1 m)	2.0	0.5
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	0	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.0			
LBF	0.6	0.0		
LEW	3.0	0.6	0.01	
LCB	3.7	0.8	0.20	
STR (@1/4)	4.9	0.8	0.24	
STR (@1/2)	6.1	1.0	0.35	
STR (@3/4)	7.9	1.0	0.31	
RCB	8.8	1.0	0.20	
REW	9.6	0.8	0.00	
RBF	7.3	0.4		
RTB	12.5			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___12.5__

Bankfull width (RBF-LBF)=_____6.7_

Channel Bottom Width (RCB-LCB)=___5.2

Stream Width (REW-LEW)=____ 6.5__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

On Site Description Data

Section A

Project Site ID: BVC04		T_____, R_____, _____1/4 of Sec______		Date: 8 JUL 2008
Stream Name: Beaver Creek				Time: 12:05
Transect 1(Upstream)			**Transect 11(Downstream)**	
GPS Coordinates (utm): WGS 84	Northing: 4811175.61	Easting: 0579834.93	Northing: 4811171.63	Easting: 0579653.03
Investigators: A. Wones, K. Shook, L. Dunn				

Section B

Preliminary Mean Stream Width (PMSW)

	Width Number											
	1	2	3	4	5	6	7	8	9	10	Sum	Avg. PMSW
Width (0.1m)	6.1	7.1	3.6	6.7	7.7	7.0	8.0	5.5	5.4	4.5	61.6	6.2

Transcect Spacing *****: 18.5

*****If PMSW <10m space transects every 3 PMSW. If >10m, transects are spaced every 2 PMSW.

Total Reach Length: 184.9

Reach Length = 11 Transects, 10 distances apart X 3 PMSW = 30 PMSW or 20 PMSW if width >10m.

Section C

Water Quality

Reading	Time (2400)	Water Temperature (°C)	Air Temperature (oC)	Turbidity (NTU)	Secchi (cm)	Dissolved Oxygen (mg/L	Specific Conductance (µS/cm)	Conductivity (µS/cm)
Morning			-	-	-	-	-	-
Afternoon	12:05	24	25	-	-	-	-	-

Visual Observations

1) Odor (~~Yes~~ / $\boxed{\text{No}}$)	**2) Septic (~~Yes~~ / $\boxed{\text{No}}$)**	**3) Deadfish (~~Yes~~ / $\boxed{\text{No}}$)**	**4) Surface Film (~~Yes~~ / $\boxed{\text{No}}$)**
5) Color: Clear, Olive drab		**6) Ice Cover (~~Yes~~ / $\boxed{\text{No}}$)**	

Weather Conditions:	Current	Past 24 hrs
Clear/sunny	☐	☐
Partly cloudy	✓	☐
Intermittent showers	☐	✓
Steady rain	☐	☐
Heavy rain	☐	☐

Field Comments: Heavy silt deposition in pools.

Section D

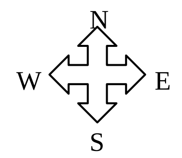
Habitats Available number of each (also place on map Section E)	Pool____1__ Run/Glide__3_____ Riffle___3____ Other (describe) see Table 1 Lengths of Riffle(s):__25.3___, __18.6 *___, __14.0* . * Two sides of an island__. Nearest Transect # :__2_, __4__, __7____, _______, _______. Total Length (riffles) =____57.9____ Pool Forming Elements See Table 1= ____ F

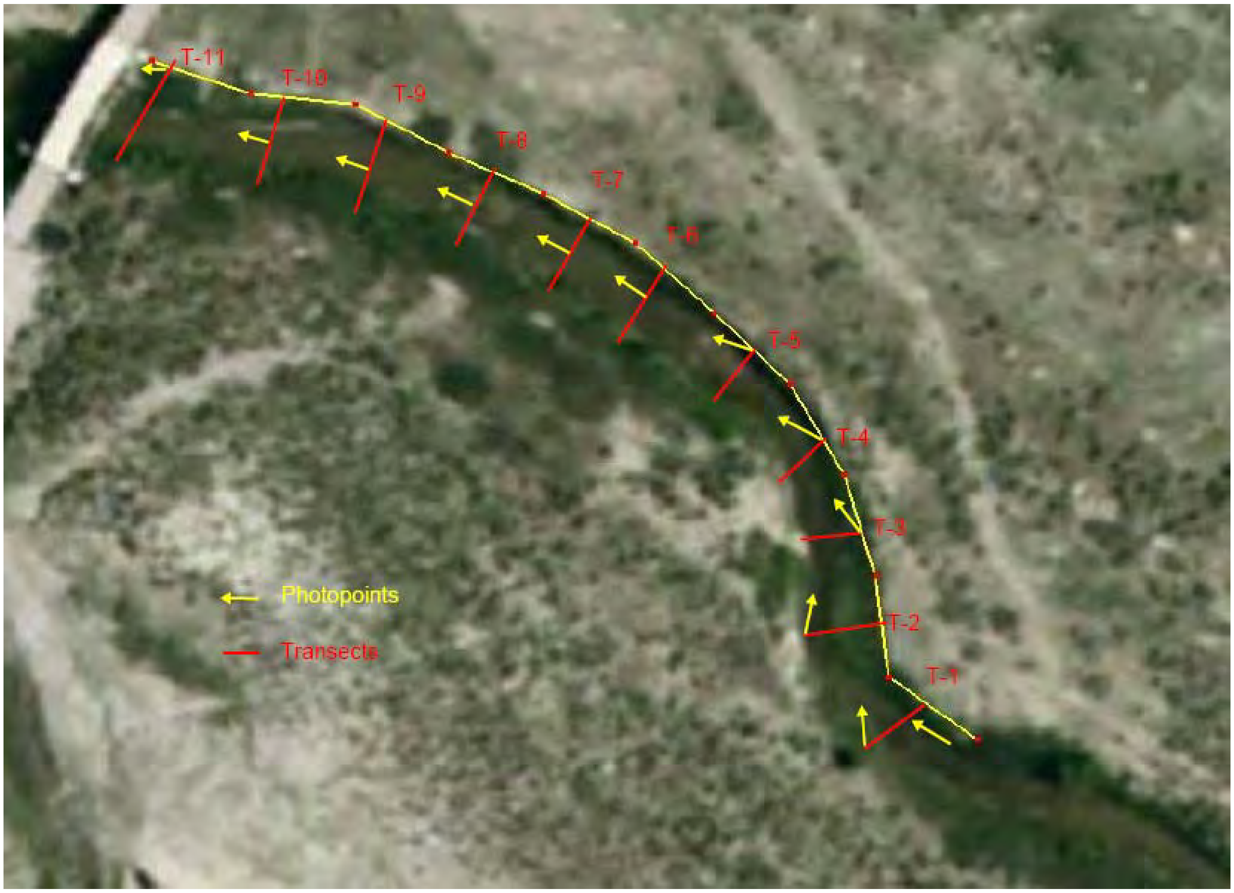
Map, Slope Measurements, and Photo-documentation Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Date: 8 July 2008

Section E cont.

Draw a map of the site with location of most upstream and most downstream transects. Include locations of photographic points, direction of photograph, and frame number.





Approximately 200 m.

Bed Substrate Composition

Project Site ID:BVC04	Stream Name: Beaver Creek	Date: 8JUL 2008

Section F

Organic Substrates

	Description	Tally	Number
Detritus	sticks, wood, coarse plant material (CPOM)		
Muck-Mud	black, very fine organic (FPOM)		20

Inorganic Substrates

	Diameter	Tally	Number
Clay	<0.004 (slick)		1
Silt	0.004-0.062		15
Sand	0.062-2 (gritty)		10
Very Fine Gravel	>2-4		0
Fine Gravel	>4-8		7
Medium Gravel	>8-16		9
Coarse Gravel	>16-32		13
Very Coarse Gravel	>32-64		18
Cobble	>64-128		11
Large Cobble	>128-256		1
Boulder	>256-512		
Large Boulder	>512		
		Total Number:	105

Section G

Large Woody Debris Data

1

Project Site ID: BVC04________ Stream Name: Beaver Creek______m/d/yr:_07/11/2008____Page 1 of 1

Transect Spacing	Log Jam Number	LWD Number	Zone	Meander Location	Habitat Association	Angle	Length	Diameter
1-2	0	0						
2-3	0	0						
3-4	0	0						
4-5	0	0						
5-6	0	0						
6-7	0	0						
7-8	0	1	2	SS	Riffle	250	2.0	0.12
8-9	0	0						
9-10	0	0						
10-11	0	2	3	SS	Pool	180	8.0	0.4

Zone: Zone 1 is water surface at baseflow, Zone 2 is between baseflow surface and bankfull flow surface, Zone 3 is bankfull channel width above bankfull flow surface.
Meander Location: IM=inside meander, OM=outside meander, CO=crossover, SS=straight section
Habitat Association: PL=pool, RF=riffle, RN=run

LARGE WOODY DEBRIS CATEGORIES (≥10 cm small end diameter; ≥1.5 m length)				
Categories	**1**	**2**	**3**	**4**
Diameter Large End	0.1-<0.3m	0.3-0.6m	0.6-0.8m	>0.8m
Length	>1.5-5m	5-15m	>15m	-

Stream Shade and Canopy Cover Monitoring

Project Site ID:BVC04	Stream Name: Beaver Creek	Date: 8 JUL 2008

Section H

Site Name:BVC04							Date: 7/8/2008
Reach Length: 185 m				Transect Interval: 18.5 m			Initials: KS, LD
Transect	Left Bank	Center Upstream	Center Right	Center-downstream	Center Left	Right Bank	Comments:
1	0	0	0	0	0	8	RB = Shrubs
2	0	0	0	0	0	0	RB = Tree
3	2	0	0	0	0	1	RB = Tree
4	4	0	0	0	0	0	LB = Shrubs
5	8	0	0	0	0	4	LB = Shrubs
6	5	0	0	0	0	3	LB = Bank
7	13	0	0	0	0	3	LB = Bank RB = Shrub
8	8	0	0	0	0	9	LB = Bank
9	3	0	0	0	0	13	LB = Bank RB = Shrubs
10	11	0	0	0	0	11	LB = Forbs RB = Grass
11	12	16	2	0	9	12	LB, CU, CL = Bridge RB = Shrubs
Note: Cover in Transect 11 from bridge.							

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __1___ of 11
Date: 7/8/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	2.1	2.8
Bank Angle (degrees)	14	57
Streambank length (0.1 m)	8.3	5.0
Length of Streambank Vegetated (0.1 m)	7.3	4.0
Length of Streambank Eroded (0.1 m)	0	1.0
Length of Streambank Deposition (0.1 m)	1.0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0.3
Undercut Bank (0.1 m)	0	0.3
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus Sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.4			
LBF	7.8	0.00		
LEW	9.3	0.58	0.00	
LCB	10.7	0.90	0.32	
STR (@1/4)	11.3	1.31	0.45	
STR (@1/2)	11.8	0.90	0.40	
STR (@3/4)	12.4	0.90	0.40	
RCB	13.3	1.60	0.39	
REW	13.6	0.81	0.35	
RBF	13.7	0.10		
RTB	16.5			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___16.1_____

Bankfull width (RBF-LBF)=____ 6.0___

Channel Bottom Width (RCB-LCB)=____ 2.6

Stream Width (REW-LEW)=___ 4.3____

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__2___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	2.2	2.3
Bank Angle (degrees)	**16**	27
Streambank length (0.1 m)	8.1	4.6
Length of Streambank Vegetated (0.1 m)	8.5	3.1
Length of Streambank Eroded (0.1 m)	0.5	1.0
Length of Streambank Deposition (0.1 m)	0	0.5
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0.1
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, not present	seedling/sprout, young/sapling, mature, decadent, dead, not present
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus Sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.0			
LBF	6.1	0.00		
LEW	8.5	0.25	0.00	
LCB	8.9	0.38	0.11	
STR (@1/4)	9.8	0.41	0.15	
STR (@1/2)	10.6	0.47	0.22	
STR (@3/4)	11.6	0.46	0.17	
RCB	12.0	0.47	0.12	
REW	13.1	0.38	0.00	
RBF	14.2	-0.02		
RTB	16.0			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =__15.0____

Bankfull width (RBF-LBF)=___8.2__

Channel Bottom Width (RCB-LCB)=_3.1___

Stream Width (REW-LEW)=____ __4.6

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __3___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	2.7	2.4
Bank Angle (degrees)	30	25
Streambank length (0.1 m)	5.3	6.3
Length of Streambank Vegetated (0.1 m)	5.0	4.3
Length of Streambank Eroded (0.1 m)	0.3	1.0
Length of Streambank Deposition (0.1 m)	0	1.0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0.1	0.1
Undercut Bank (0.1 m)	0.2	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.5			
LBF	4.0	0.00		
LEW	4.6	0.31	0.05	
LCB	5.1	0.69	0.31	
STR (@1/4)	6.2	0.58	0.29	
STR (@1/2)	7.6	0.44	0.19	
STR (@3/4)	9.0	0.45	0.15	
RCB	9.8	0.43	0.16	
REW	10.3	0.33	0.00	
RBF	12.6	-0.34		
RTB	15.5			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___15.0_____

Bankfull width (RBF-LBF)=____ ___8.6_

Channel Bottom Width (RCB-LCB)=___4.7_ _____

Stream Width (REW-LEW)=____ _____5.7

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__4___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	3.7	3.7
Bank Angle (degrees)	45	22
Streambank length (0.1 m)	4.7	7.3
Length of Streambank Vegetated (0.1 m)	1.0	7.30
Length of Streambank Eroded (0.1 m)	3.7	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.2
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.3			
LBF	3.0	0.0		
LEW	3.4	0.54	0.06	
LCB	3.7	0.74	0.31	
STR (@1/4)	4.6	0.79	0.36	
STR (@1/2)	6.4	0.63	0.12	
STR (@3/4)	8.4	0.71	0.21	
RCB	9.2	0.76	0.17	
REW	10.4	0.67	0.00	
RBF	11.1	0.05		
RTB	17.6			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___17.3_____

Bankfull width (RBF-LBF)=____ _8.1___

Channel Bottom Width (RCB-LCB)=____ _5.5____

Stream Width (REW-LEW)=____ 7.0___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__5___ of 11
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	3.5	3.2
Bank Angle (degrees)	55	21
Streambank length (0.1 m)	4.4	8.0
Length of Streambank Vegetated (0.1 m)	2.0	7.5
Length of Streambank Eroded (0.1 m)	2.4	0.5
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.2
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	0.7			
LBF	2.2	0.0		
LEW	3.0	0.50	0.00	
LCB	3.3	0.84	0.32	
STR (@1/4)	4.6	0.91	0.49	
STR (@1/2)	6.8	0.75	0.38	
STR (@3/4)	8.6	0.50	0.26	
RCB	9.8	0.48	0.21	
REW	10.7	0.40	0.00	
RBF	13.4	0.0		
RTB	17.7			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___17.0____

Bankfull width (RBF-LBF)=____11.2___

Channel Bottom Width (RCB-LCB)=____ 6.6___

Stream Width (REW-LEW)=___7.7_

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number
Date: 7/11/08		__6___ of 11

Habitat Type Along Transect (circle one): pool riffle run

Section I

Streambank and Riparian Features	Left Bank		Right Bank	
Bank Substrate (dominant)	Silt/Clay		Silt/Clay	
Bank Slumpage (present, p or absent, a)	A		A	
Bank Height (0.1 m)	3.7		3.9	
Bank Angle (degrees)	53		40	
Streambank length (0.1 m)	4.6		5.7	
Length of Streambank Vegetated (0.1 m)	4.1		5.7	
Length of Streambank Eroded (0.1 m)	0.5		0	
Length of Streambank Deposition (0.1 m)	0		0	
Riparian Buffer Width (m)	0		0	
Overhanging Vegetation (0.1 m)	0.1		2.0	
Undercut Bank (0.1 m)	0.1		0.3	
Riparian landuse (circle one)	Cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify	cropland pasture/rangeland prairie wetland shrub	woodland/forested barnyard developed other-specify
Animal Vegetation Use (circle one)	none low	moderate high	none low	moderate high
Riparian Vegetation Type (Dominant)	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________	sedge/rush cottonwoods grass/forb green ash	willows silver maple shrubs other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout young/sapling mature	decadent dead none	seedling/sprout young/sapling mature	decadent dead
Submergent Macrophytes (0.1 m)	0			
Emergent Macrophytes (0.1 m)	*Juncus sp.*			

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	8.0			
LBF	10.3	0		
LEW	11.0	0.52	0.06	
LCB	11.3	0.85	0.38	
STR (@1/4)	13.0	0.97	0.52	
STR (@1/2)	14.6	1.02	0.53	
STR (@3/4)	18.4	1.02	0.50	
RCB	20.0	1.07	0.45	
REW	20.9	0.67	0.00	
RBF	21.5	0.0		
RTB	25.5			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___17.5_

Bankfull width (RBF-LBF)=____11.2__

Channel Bottom Width (RCB-LCB)=__8.7__

Stream Width (REW-LEW)=___ 9.9

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __7___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	3.4	3.6
Bank Angle (degrees)	60	29
Streambank length (0.1 m)	3.9	8.0
Length of Streambank Vegetated (0.1 m)	0.1	8.0
Length of Streambank Eroded (0.1 m)	3.8	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.3
Undercut Bank (0.1 m)	0	0.4
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	13.0			
LBF	14.1	0.0		
LEW	14.5	0.68	0.00	
LCB	14.9	0.84	0.19	
STR (@1/4)	15.9	0.99	0.34	
STR (@1/2)	22.2	1.01	0.29	
STR (@3/4)	23.6	1.13	0.23	
RCB	24.4	1.11	0.33	
REW	24.6	1.17	0.30	
RBF	25.3	0.02		
RTB	31.0			

Location Codes:

LTB left top bank
RTB right top bank
LBF left bankfull
RBF right bankfull
LCB left channel bottom
RCB right channel bottom
LEW left edge water
REW right edge water
STR stream

Bank top width (RTB-LTB) =___18.0__

Bankfull width (RBF-LBF)=___11.2__

Channel Bottom Width (RCB-LCB)=____ _9.5__

Stream Width (REW-LEW)=_____10.1__

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __8___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	P
Bank Height (0.1 m)	3.2	3.3
Bank Angle (degrees)	55	30
Streambank length (0.1 m)	4.4	7.6
Length of Streambank Vegetated (0.1 m)	3.4	7.2
Length of Streambank Eroded (0.1 m)	1.0	0
Length of Streambank Deposition (0.1 m)	0	0.4
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.1
Undercut Bank (0.1 m)	0	0
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.0			
LBF	2.8	0.0		
LEW	3.1	1.05	0.00	
LCB	3.5	0.61	0.31	
STR (@1/4)	5.0	0.70	0.34	
STR (@1/2)	7.4	0.89	0.52	
STR (@3/4)	10.5	0.85	0.50	
RCB	11.7	0.70	0.27	
REW	12.5	0.60	0.11	
RBF	13.0	0.0		
RTB	18.0			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___17.0_____

Bankfull width (RBF-LBF)=___10.2____

Channel Bottom Width (RCB-LCB)=___ _8.2

Stream Width (REW-LEW)=__9.4___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __9___ of 11
Date: 7/8/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	3.8	3.7
Bank Angle (degrees)	40	26
Streambank length (0.1 m)	5.2	8.4
Length of Streambank Vegetated (0.1 m)	4.1	8.4
Length of Streambank Eroded (0.1 m)	1.1	0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.2
Undercut Bank (0.1 m)	0	0.1
Riparian landuse (circle one)	Cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub	cropland, woodland/forested, pasture/rangeland, barnyard, prairie, developed, wetland, other-specify, shrub
Animal Vegetation Use (circle one)	none, moderate, low, high	none, moderate, low, high
Riparian Vegetation Type (Dominant)	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other___________	sedge/rush, willows, cottonwoods, silver maple, grass/forb, shrubs, green ash, other___________
Riparian Age Class(es) of Trees, if present	seedling/sprout, decadent, young/sapling, dead, mature, none	seedling/sprout, decadent, young/sapling, dead, mature
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	Juncus sp.	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.0			
LBF	3.5	0.0		
LEW	4.2	0.60	0.02	
LCB	4.3	1.05	0.42	
STR (@1/4)	7.2	0.90	0.44	
STR (@1/2)	9.3	1.02	0.55	
STR (@3/4)	11.2	1.10	0.40	
RCB	12.4	0.95	0.28	
REW	12.9	0.90	0.20	
RBF	13.1	0.0		
RTB	20.0			

Location Codes:

LTB left top bank

RTB right top bank
LBF left bankfull
RBF right bankfull

LCB left channel bottom
RCB right channel bottom
LEW left edge water

REW right edge water
STR stream

Bank top width (RTB-LTB) =___19.0___

Bankfull width (RBF-LBF)=___9.6___

Channel Bottom Width (RCB-LCB___8.1

Stream Width (REW-LEW)=___8.7_

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __10___ of 11
Date: 7/11/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	A	A
Bank Height (0.1 m)	3.5	3.7
Bank Angle (degrees)	20.5	28
Streambank length (0.1 m)	3.0	40
Length of Streambank Vegetated (0.1 m)	10.7	6.8
Length of Streambank Eroded (0.1 m)	10.7	6.8
Length of Streambank Deposition (0.1 m)	0.8	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	0.2
Undercut Bank (0.1 m)	0	0.2
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	1.5			
LBF	9.9	0.0		
LEW	10.3	0.55	0.01	
LCB	11.5	0.82	0.31	
STR (@1/4)	12.5	0.85	0.36	
STR (@1/2)	14.3	0.95	0.41	
STR (@3/4)	16.3	1.04	0.38	
RCB	17.2	1.00	0.32	
REW	17.9	0.75	0.01	
RBF	18.3	0.0		
RTB	22.5			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___21.0___

Bankfull width (RBF-LBF)=____ 8.4__

Channel Bottom Width (RCB-LCB)=___5.7_

Stream Width (REW-LEW)=____ _7.6___

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Transect Data

Project Site ID: BVC04	Stream Name: Beaver Creek	Transect Number __11___ of 11
Date: 7/8/08		
Habitat Type Along Transect (circle one): pool riffle run		

Section I

Streambank and Riparian Features	Left Bank	Right Bank
Bank Substrate (dominant)	Silt/Clay	Silt/Clay
Bank Slumpage (present, p or absent, a)	P	A
Bank Height (0.1 m)	3.2	3.8
Bank Angle (degrees)	35	37
Streambank length (0.1 m)	5.4	6.5
Length of Streambank Vegetated (0.1 m)	4.4	5.5
Length of Streambank Eroded (0.1 m)	1.0	1.0
Length of Streambank Deposition (0.1 m)	0	0
Riparian Buffer Width (m)	0	0
Overhanging Vegetation (0.1 m)	0	1.0
Undercut Bank (0.1 m)	0	0.1
Riparian landuse (circle one)	Cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify	cropland, pasture/rangeland, prairie, wetland, shrub, woodland/forested, barnyard, developed, other-specify
Animal Vegetation Use (circle one)	none, low, moderate, high	none, low, moderate, high
Riparian Vegetation Type (Dominant)	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________	sedge/rush, cottonwoods, grass/forb, green ash, willows, silver maple, shrubs, other__________
Riparian Age Class(es) of Trees, if present	seedling/sprout, young/sapling, mature, decadent, dead, none	seedling/sprout, young/sapling, mature, decadent, dead, none
Submergent Macrophytes (0.1 m)	0	
Emergent Macrophytes (0.1 m)	*Juncus sp.*	

Section J

Transect Data and Depth Velocity Data
(record units under the heading for each column)

Location Code	Station	Bankfull Depth	Water Depth	Velocity
LTB	5.0			
LBF	6.8	0.0		
LEW	8.6	0.78	0.01	
LCB	9.1	0.90	0.24	
STR (@1/4)	11.0	1.21	0.40	
STR (@1/2)	12.9	1.32	0.39	
STR (@3/4)	14.3	1.52	0.42	
RCB	15.8	1.50	0.28	
REW	16.2	1.31	0.14	
RBF	16.6	0.0		
RTB	20.9			

Location Codes:

- LTB left top bank
- RTB right top bank
- LBF left bankfull
- RBF right bankfull
- LCB left channel bottom
- RCB right channel bottom
- LEW left edge water
- REW right edge water
- STR stream

Bank top width (RTB-LTB) =___15.9__

Bankfull width (RBF-LBF)=___9.8__ _

Channel Bottom Width (RCB-LCB)=__6.7_

Stream Width (REW-LEW)=____ __7.7

* Bankfull Depth for LEW or REW should equal L(R)CB Bankfull Depth minus L(R)CB Water Depth.

Photo 1. Site BVC01 looking upstream at Transect 1, April 15, 2008.

Photo 2. Site BVC01 looking upstream at Transect 2, April 15, 2008.

Photo 3. Site BVC01 looking upstream at Transect 3, April 15, 2008.

Photo 4. Site BVC01 looking upstream at Transect 4, April 15, 2008.

Photo 5. Site BVC01 looking upstream at Transect 5, April 15, 2008.

Photo 6. Site BVC01 f looking upstream at Transect 6, April 15, 2008.

Photo 7. Site BVC01 looking upstream at Transect 7, April 15, 2008.

Photo 8. Site BVC01 looking upstream at Transect 8, April 15, 2008.

Photo 9. Site BVC01 looking upstream at Transect 9, April 15, 2008.

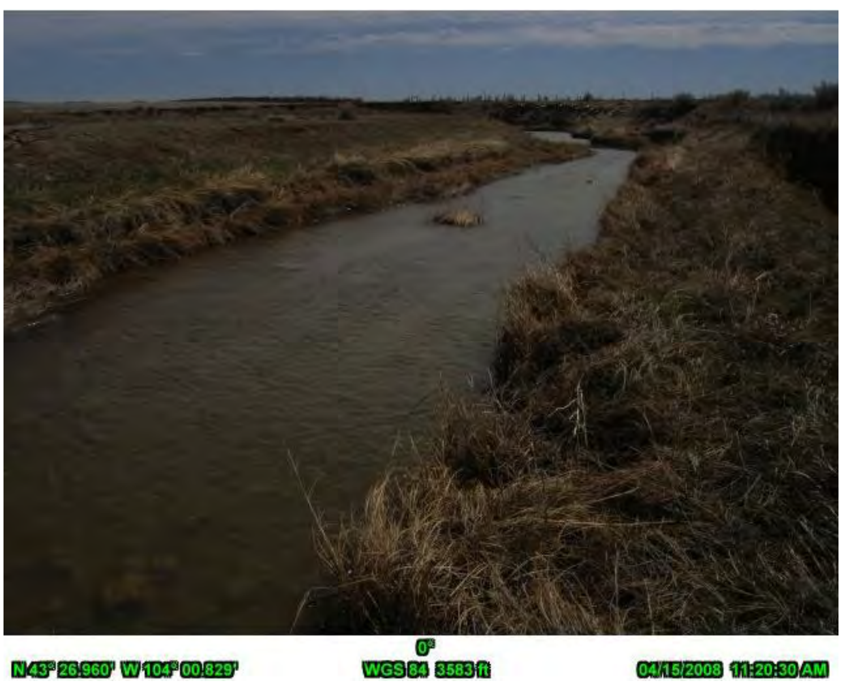


Photo 10. Site BVC01 looking upstream at Transect 10, April 15, 2008.

Photo 11. Site BVC01 looking upstream at Transect 11 April 15, 2008.

Photo 12. Site BVC01 looking upstream from Transect 11 April 15, 2008.

Photo 13. Site BVC04 looking upstream from Transect 1 April 16, 2008.

Photo 14. Site BVC04 looking upstream from Transect 2 April 16, 2008.

Photo 15. Site BVC04 looking upstream from Transect 3 April 16, 2008.

Photo 16. Site BVC04 looking upstream from Transect 4 April 16, 2008.

Photo 17. Site BVC04 looking upstream from Transect 5 April 16, 2008.

Photo 18. Site BVC04 looking upstream from Transect 6 April 16, 2008.

Photo 19. Site BVC04 looking upstream from Transect 7 April 16, 2008.

Photo 20. Site BVC04 looking upstream from Transect 8 April 16, 2008.

Photo 21. Site BVC04 looking upstream from Transect 9 April 16, 2008.

Photo 22. Site BVC04 looking upstream from Transect 10 April 16, 2008.

Photo 23. Site BVC04 looking upstream from Transect 11 April 16, 2008.

Photo 24. Site BVC01 looking upstream at Transect 1, July 9, 2008.

Photo 25. Site BVC01 looking upstream at Transect 2, July 9, 2008.

Photo 26. Site BVC01 looking upstream at Transect 3, July 9, 2008.

Photo 27. Site BVC01 looking upstream at Transect 4, July 9, 2008.

Photo 28. Site BVC01 looking upstream at Transect 5, July 9, 2008.

Photo 29. Site BVC01 f looking upstream at Transect 6, July 9, 2008.

Photo 30. Site BVC01 looking upstream at Transect 7, July 9, 2008.

Photo 31. Site BVC01 looking upstream at Transect 8, July 9, 2008.

Photo 32. Site BVC01 looking upstream at Transect 9, July 9, 2008.

Photo 33. Site BVC01 looking upstream at Transect 10, July 9, 2008.

Photo 34. Site BVC01 looking upstream at Transect 11, July 9, 2008.

Photo 35. Site BVC04 looking upstream at Transect 1, July 8, 2008.

Photo 36. Site BVC04 looking upstream from Transect 1 July 8, 2008.

Photo 37. Site BVC04 looking upstream from Transect 2 July 8, 2008.

Photo 38. Site BVC04 looking upstream from Transect 3 July 8, 2008.

Photo 39. Site BVC04 looking upstream from Transect 4 July 8, 2008.

Photo 40. Site BVC04 looking upstream from Transect 5 July 8, 2008.

Photo 41. Site BVC04 looking upstream from Transect 6 July 8, 2008.

Photo 42. Site BVC04 looking upstream from Transect 7 July 8, 2008.

Photo 43. Site BVC04 looking upstream from Transect 8 July 8, 2008.

Photo 44. Site BVC04 looking upstream from Transect 9 July 8, 2008.

Photo 45. Site BVC04 looking upstream from Transect 10 July 8, 2008.

Photo 46. Site BVC04 looking upstream from Transect 11 July 8, 2008.

Photo 47. Site BVC04 looking downstream from Transect 11 July 8, 2008.

POWERTECH (USA) INC.

APPENDIX 5.4-K

FISH COLLECTION DATA FORMS

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Beaver Creek

Site Number: [ ][ ]

DATE (d d m m m y y): 1 6 A P R 0 8

Site Description: BVC01 - Beaver Creek downstream

Site Length (meters): 1 0 0 S 0 9 R 0 1 E T 0 7 S

pH: [ ][ ].[ ]

Cond. (umhos/cm): 7 1 8 6

Temp.(C) air: [ ][ ].[ ]

Water: 1 1 . 8

Dist. below top net (meters)	Stream Widths (meters)
0	0 7 . 4
1 0	0 7 . 5
2 0	0 7 . 6
3 0	0 7 . 1
4 0	0 6 . 6
5 0	0 5 . 7
6 0	0 4 . 8
7 0	0 5 . 6
8 0	0 6 . 5
9 0	0 6 . 4
1 0 0	0 6 . 3

Smith-Roots
Mode:
Volts:

Personnel: A. Wones, K. Shook

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): [ ] Percent: [ ] Amps: [ ].[ ] Pulse: [ ] [ ]

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)		to	(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	2	9	to	0	6	4	1	F	H	M	0	6	4	0	8	1
Size Range:	4	1	to	4	8		1	P	L	K	0	0	2	0	0	8
Size Range:			to	1	2	0	1	G	R	S	0	0	1	0	2	5
Size Range:	4	8	to	0	4	8	1	L	N	D	0	0	1	0	0	<1
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description
Top Blocking Net Looking Upstream 122
Top Blocking Net Looking Downstream
Bottom Blocking Net Looking Upstream 116
Bottom Blocking Net Looking Downstream
Upstream blocknet UTM: E 579651; N 4811171
Downstream blocknet UTM: E 579745; N 4811201

Video Camera
Tape #:
Begin:
End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, GRS = Green Sunfish, LND = Long-Nosed Dace.
PLK = Plains Killifish.

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

Field Q.C. by:

Batch Number:

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

REVISED 2JUL2008

Stream Name Beaver Creek

Site Number BVC01

DATE dd-mmm-yy: 16APR08

example 02MAY92

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	FHM	030					Fathead Minnow	51	1	FHM	053					
2	1	FHM	048						52	1	FHM	040					
3	1	FHM	060						53	1	FHM	056					
4	1	FHM	062						54	1	FHM	049					
5	1	FHM	046						55	1	FHM	050					
6	1	FHM	050						56	1	FHM	030					
7	1	FHM	061						57	1	FHM	061					
8	1	FHM	059						58	1	FHM	036					
9	1	FHM	048						59	1	FHM	049					
10	1	FHM	052						60	1	FHM	053					
11	1	FHM	058						61	1	FHM	059					
12	1	FHM	043						62	1	FHM	038					
13	1	FHM	043						63	1	FHM	036					
14	1	FHM	059						64	1	FHM	042	0081				Combined Wt. For all FHM
15	1	FHM	059						65	1	PLK	041					Plains Killifish
16	1	FHM	062						66	1	PLK	048	0008				Combined Wt. For all PLK
17	1	FHM	041						67	1	GRS	120	0025				Green Sunfish
18	1	FHM	048						68	1	LND	048	000<1				Long-Nosed Dace
19	1	FHM	056						69	1							
20	1	FHM	060						70	1							
21	1	FHM	050						71	1							
22	1	FHM	044						72	1							
23	1	FHM	045						73	1							
24	1	FHM	061						74	1							
25	1	FHM	054						75	1							
26	1	FHM	030						76	1							
27	1	FHM	059						77	1							
28	1	FHM	030						78	1							
29	1	FHM	055						79	1							
30	1	FHM	046						80	1							
31	1	FHM	050						81	1							
32	1	FHM	031						82	1							
33	1	FHM	052						83	1							
34	1	FHM	066						84	1							
35	1	FHM	056						85	1							
36	1	FHM	030						86	1							
37	1	FHM	032						87	1							
38	1	FHM	035						88	1							
39	1	FHM	030						89	1							
40	1	FHM	034						90	1							
41	1	FHM	059						91	1							
42	1	FHM	052						92	1							
43	1	FHM	057						93	1							
44	1	FHM	064						94	1							
45	1	FHM	058						95	1							
46	1	FHM	037						96	1							
47	1	FHM	029						97	1							
48	1	FHM	046						98	1							
49	1	FHM	035						99	1							
50	1	FHM	064						_00	1							

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Beaver Creek

Site Number:

DATE (d d m m m y y): 1 6 A P R 0 8

Site Description: BVC04 - Upstream Site

Site Length (meters): 1 0 0 S R T

pH: .

Cond. (umhos/cm): 5 1 0 9

Temp.(C) air: .

Water: 7 . 0

Smith-Roots

Mode:

Volts:

Dist. below top net (meters)	Stream Widths (meters)	Dist. below top net (meters)	Stream Widths (meters)
0	.	50	.
10	10 . 4	60	4 . 2
20	.	70	.
30	6 . 5	80	4 . 7
40	6 . 9	90	.
		100	6 . 0

Personnel:

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	4	9	to	1	1	2	1	G	R	S	0	0	4	0	3	0
Size Range:		0	to	2	1	5	1	C	H	C	0	0	1	0	7	2
Size Range:			to				1	C	A	P			3		2	8
Size Range:	4	2	to	0	6	6	1	P	L	K	0	1	0	0	1	4
Size Range:	2	1	to	0	6	6	1	F	H	M		8	4	0	9	2
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description
Top Blocking Net Looking Upstream ______
Top Blocking Net Looking Downstream ______
Bottom Blocking Net Looking Upstream ______
Bottom Blocking Net Looking Downstream ______
Upstream Blocknet E 571380 N 4820615
Downstream blocknet E 571444 N4820551

Video Camera
Tape #:
Begin:
End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: GRS=Green Sunfish, CHC= Channel Catfish, PLK= Plains Killifish, FHM= Fathead Minnow CAP= CARP
Water temp 7.0 C at 11:28 and 16.03 at 18:43; Turbidity 11.8, DO 9.20

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

REVISED 2JULY, 2008

Stream Name Beaver Creek

Site Number BVC04

DATE
dd-mmm-yy
1 6 A P R 0 8
example 0 2 M A Y 9 2

Page __1__ of_2__

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	GRS	112	0025				Green Sunfish	51	1	FHM	045					
2	1	GRS	050						52	1	FHM	047					
3	1	GRS	049						53	1	FHM	031					
4	1	GRS	053	0030				Comb. Wt	54	1	FHM	048					
5	1	CHC	215	0072				Channel Catfish	55	1	FHM	055					
6	1	PLK	04					Plains Killifish	56	1	FHM	040					
7	1	PLK	06						57	1	FHM	045					
8	1	PLK	04					Comb. Wt	58	1	FHM	046					
9	1	PLK	05						59	1	FHM	035					
10	1	PLK	04						60	1	FHM	045					
11	1	PLK	04						61	1	FHM	054					
12	1	PLK	04						62	1	FHM	039					
13	1	PLK	05						63	1	FHM	043					
14	1	PLK	04						64	1	FHM	031					
15	1	PLK	04						65	1	FHM	058					
16	1	CAP	111	0021				Carp	66	1	FHM	056					
17	1	CAP	062					Comb. Wt of #17,18=7g	67	1	FHM	047					
18	1	CAP	053	7				Comb. Wt	68	1	FHM	053					
19	1	FHM	052					Fathead Minnow	69	1	FHM	032					
20	1	FHM	041	92				Comb. Wt .	70	1	FHM	038					
21	1	FHM	042						71	1	FHM	041					
22	1	FHM	054						72	1	FHM	039					
23	1	FHM	035						73	1	FHM	051					
24	1	FHM	037						74	1	FHM	044					
25	1	FHM	041						75	1	FHM	038					
26	1	FHM	043						76	1	FHM	057					
27	1	FHM	036						77	1	FHM	050					
28	1	FHM	033						78	1	FHM	041					
29	1	FHM	044						79	1	FHM	044					
30	1	FHM	046						80	1	FHM	057					
31	1	FHM	052						81	1	FHM	045					
32	1	FHM	036						82	1	FHM	047					
33	1	FHM	050						83	1	FHM	043					
34	1	FHM	039						84	1	FHM	045					
35	1	FHM	057						85	1	FHM	046					
36	1	FHM	036						86	1	FHM	052					
37	1	FHM	033						87	1	FHM	047					
38	1	FHM	039						88	1	FHM	040					
39	1	FHM	065						89	1	FHM	048					
40	1	FHM	043						90	1	FHM	045					
41	1	FHM	060						91	1	FHM	047					
42	1	FHM	021						92	1	FHM	041					
43	1	FHM	040						93	1	FHM	045					
44	1	FHM	030						94	1	FHM	035					
45	1	FHM	039						95	1	FHM	039					
46	1	FHM	056						96	1	FHM	047					
47	1	FHM	054						97	1	FHM	058					
48	1	FHM	063						98	1	FHM	047					
49	1	FHM	049						99	1	FHM	031					
50	1	FHM	066						_00	1	FHM	027					

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Cheyenne River

Site Number:

DATE (d d m m m y y): 1 5 A P R 0 8

Site Description: Site CHR05 - Cheyenne River at Marietta

Site Length (meters): 1 0 0 S 0 6 R 0 2 E T 3 9 N

pH: .

Cond. (umhos/cm):

Temp.(C) air: .

Water: 1 5 . 0

Dist. below top net (meters) | Stream Widths (meters)

Dist.	Width	Dist.	Width
0	.	50	.
10	.	60	.
20	.	70	.
30	.	80	.
40	.	90	.
		100	.

Smith-Roots

Mode:

Volts:

Personnel:

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

REVISED 2JUL2008

Stream Name: Cheyenne River

Bulk Weights - (Record #5)

	(m m)		to	(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	9	7	to	0	9	7		R	I	C	0	0	1	0	1	3
Size Range:	9	8	to	0	9	8		G	R	S	0	0	1	0	2	0
Size Range:	3	2	to	0	7	4		P	L	K	0	4	8	0	6	9
Size Range:	8	2	to	2	2	0		S	R	S	0	1	4	6	1	2
Size Range:	5	1	to	0	5	1		P	T	M	0	0	1	0	0	<1
Size Range:	3	1	to	0	6	7		S	A	S	0	3	8	0	5	3
Size Range:	2	5	to	0	8	8		C	R	C	1	0	0	0	9	1
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream ______

Top Blocking Net Looking Downstream ______

Bottom Blocking Net Looking Upstream ______

Bottom Blocking Net Looking Downstream ______

Upstream blocknet at UTM E0587455 N4804678

Downstream blocknet at UTM E0587538 N4804736

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: RIC= River Carpsucker; GRS = Green Sunfish; PLK = Plains kilifish;
SRS = Shorthead Redhorse Sucker; PTM = Plains Topminnow; SAS = Sand Shiner;
CRC = Creek Chub.

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 08JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE dd-mmm-yy: 15APR08

example 02MAY92

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	CRC	039					Creek Chu	51	1	CRC	044					
2	1	CRC	068	091				Combined wt =	52	1	CRC	042					
3	1	CRC	049						53	1	CRC	045					
4	1	CRC	050						54	1	CRC	077					
5	1	CRC	061						55	1	CRC	037					
6	1	CRC	045						56	1	CRC	048					
7	1	CRC	075						57	1	CRC	041					
8	1	CRC	039						58	1	CRC	074					
9	1	CRC	046						59	1	CRC	037					
10	1	CRC	038						60	1	CRC	038					
11	1	CRC	041						61	1	CRC	039					
12	1	CRC	035						62	1	CRC	040					
13	1	CRC	035						63	1	CRC	025					
14	1	CRC	058						64	1	CRC	042					
15	1	CRC	043						65	1	CRC	030					
16	1	CRC	040						66	1	CRC	052					
17	1	CRC	040						67	1	CRC	030					
18	1	CRC	060						68	1	CRC	058					
19	1	CRC	049						69	1	CRC	043					
20	1	CRC	037						70	1	CRC	060					
21	1	CRC	041						71	1	CRC	062					
22	1	CRC	033						72	1	CRC	052					
23	1	CRC	032						73	1	CRC	041					
24	1	CRC	052						74	1	CRC	058					
25	1	CRC	031						75	1	CRC	044					
26	1	CRC	026						76	1	CRC	041					
27	1	CRC	050						77	1	CRC	040					
28	1	CRC	046						78	1	CRC	042					
29	1	CRC	054						79	1	CRC	060					
30	1	CRC	045						80	1	CRC	038					
31	1	CRC	052						81	1	CRC	070					
32	1	CRC	033						82	1	CRC	057					
33	1	CRC	030						83	1	CRC	049					
34	1	CRC	050						84	1	CRC	047					
35	1	CRC	035						85	1	CRC	059					
36	1	CRC	071						86	1	CRC	059					
37	1	CRC	048						87	1	CRC	038					
38	1	CRC	066						88	1	CRC	058					
39	1	CRC	044						89	1	CRC	040					
40	1	CRC	041						90	1	CRC	032					
41	1	CRC	040						91	1	CRC	037					
42	1	CRC	039						92	1	CRC	036					
43	1	CRC	036						93	1	CRC	047					
44	1	CRC	070						94	1	CRC	041					
45	1	CRC	051						95	1	CRC	056					
46	1	CRC	042						96	1	CRC	048					
47	1	CRC	088						97	1	CRC	050					
48	1	CRC	036						98	1	CRC	040					
49	1	CRC	077						99	1	CRC	040					
50	1	CRC	075						_00	1	CRC	045					

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 2JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE						
dd-mmm-yy						
1	5	A	P	R	0	8

example 0 2 M A Y 9 2

Fish ID #	Pass #	Species Code			Total Length (mm)			Weight (grams)				Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code			Total Length (mm)			Weight (grams)				Sca.	Mor.	Sex	Comments
1	1	R	I	C	0	9	7	0	0	1	3				likely River carpsucker	51	1	S	R	S	1	7	4	0	0	7	2				Shorthead redhorse sucker
2	1	G	R	S	0	9	8	0	0	2	0				Green sunfish	52	1	S	R	S	2	2	0	0	1	2	2				
3	1	P	L	K	0	5	8								Plains killifish.	53	1	S	R	S	2	0	1	1	0	0	0				
4	1	P	L	K	0	6	5	0	0	6	9				Combined wt	54	1	S	R	S	1	9	7	0	0	9	4				
5	1	P	L	K	0	3	5									55	1	S	R	S	1	7	8	0	0	8	0				
6	1	P	L	K	0	5	7									56	1	S	R	S	1	6	9	0	0	5	4				
7	1	P	L	K	0	3	9									57	1	S	R	S	1	1	0	0	0	0	7				
8	1	P	L	K	0	7	0									58	1	S	R	S	0	8	4	0	0	0	5				
9	1	P	L	K	0	4	2									59	1	S	R	S	0	8	5	0	0	0	3				
10	1	P	L	K	0	7	2									60	1	S	R	S	1	9	5	0	0	9	8				
11	1	P	L	K	0	4	6									61	1	S	R	S	1	7	3	0	0	6	8				
12	1	P	L	K	0	3	6									62	1	S	R	S	0	8	2	0	0	0	3				
13	1	P	L	K	0	4	4									63	1	S	R	S	0	8	3	0	0	0	3				
14	1	P	L	K	0	5	2									64	1	S	R	S	0	8	8	0	0	0	3				
15	1	P	L	K	0	6	5									65	1	P	T	M	0	5	1	0	0	0	<1				Plains Topminnow
16	1	P	L	K	0	4	0									66	1	S	A	S	0	6	7								Sand Shiner.
17	1	P	L	K	0	6	7									67	1	S	A	S	0	3	8		0	5	3				Combined Wt
18	1	P	L	K	0	6	8									68	1	S	A	S	0	6	2								
19	1	P	L	K	0	5	2									69	1	S	A	S	0	5	8								
20	1	P	L	K	0	6	0									70	1	S	A	S	0	5	9								
21	1	P	L	K	0	6	0									71	1	S	A	S	0	6	0								
22	1	P	L	K	0	7	4									72	1	S	A	S	0	4	9								
23	1	P	L	K	0	4	8									73	1	S	A	S	0	4	7								
24	1	P	L	K	0	4	1									74	1	S	A	S	0	5	8								
25	1	P	L	K	0	4	0									75	1	S	A	S	0	5	9								
26	1	P	L	K	0	3	2									76	1	S	A	S	0	4	4								
27	1	P	L	K	0	6	4									77	1	S	A	S	0	4	7								
28	1	P	L	K	0	5	7									78	1	S	A	S	0	4	0								
29	1	P	L	K	0	4	0									79	1	S	A	S	0	5	5								
30	1	P	L	K	0	4	3									80	1	S	A	S	0	6	2								
31	1	P	L	K	0	5	3									81	1	S	A	S	0	5	1								
32	1	P	L	K	0	6	8									82	1	S	A	S	0	6	3								
33	1	P	L	K	0	3	7									83	1	S	A	S	0	4	4								
34	1	P	L	K	0	4	2									84	1	S	A	S	0	3	1								
35	1	P	L	K	0	3	4									85	1	S	A	S	0	4	5								
36	1	P	L	K	0	4	6									86	1	S	A	S	0	3	9								
37	1	P	L	K	0	3	6									87	1	S	A	S	0	5	7								
38	1	P	L	K	0	4	0									88	1	S	A	S	0	5	7								
39	1	P	L	K	0	4	9									89	1	S	A	S	0	5	7								
40	1	P	L	K	0	4	8									90	1	S	A	S	0	3	5								
41	1	P	L	K	0	6	0									91	1	S	A	S	0	3	4								
42	1	P	L	K	0	4	1									92	1	S	A	S	0	4	3								
43	1	P	L	K	0	3	2									93	1	S	A	S	0	4	6								
44	1	P	L	K	0	5	1									94	1	S	A	S	0	5	7								
45	1	P	L	K	0	3	8									95	1	S	A	S	0	4	9								
46	1	P	L	K	0	4	0									96	1	S	A	S	0	3	3								
47	1	P	L	K	0	6	0									97	1	S	A	S	0	5	0								
48	1	P	L	K	0	4	5									98	1	S	A	S	0	2	9								
49	1	P	L	K	0	3	6									99	1	S	A	S	0	4	3								
50	1	P	L	K	0	4	4									_00	1	S	A	S	0	4	5								

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 2JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE dd-mmm-yy 1 5 A P R 0 8

example 0 2 M A Y 9 2

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	S A S	0 3 3					Sand Shiner	51	1							
2	1	S A S	0 3 2						52	1							
3	1	S A S	0 3 2						53	1							
4	1								54	1							
5	1								55	1							
6	1								56	1							
7	1								57	1							
8	1								58	1							
9	1								59	1							
10	1								60	1							
11	1								61	1							
12	1								62	1							
13	1								63	1							
14	1								64	1							
15	1								65	1							
16	1								66	1							
17	1								67	1							
18	1								68	1							
19	1								69	1							
20	1								70	1							
21	1								71	1							
22	1								72	1							
23	1								73	1							
24	1								74	1							
25	1								75	1							
26	1								76	1							
27	1								77	1							
28	1								78	1							
29	1								79	1							
30	1								80	1							
31	1								81	1							
32	1								82	1							
33	1								83	1							
34	1								84	1							
35	1								85	1							
36	1								86	1							
37	1								87	1							
38	1								88	1							
39	1								89	1							
40	1								90	1							
41	1								91	1							
42	1								92	1							
43	1								93	1							
44	1								94	1							
45	1								95	1							
46	1								96	1							
47	1								97	1							
48	1								98	1							
49	1								99	1							
50	1								_00	1							

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

Stream Name: Beaver Creek

Site Number:

DATE (d d m m m y y): 1 0 J U L 0 8

Site Description: BVC01 - Beaver Creek downstream

Site Length (meters): 1 0 0 S 0 9 R 0 1 E T 0 7 S

pH: 7 . 9

Cond. (umhos/cm): 2 1 4 1

Temp.(C) air: 2 5 . 5

Water: 2 3 . 4

Smith-Roots Mode: Volts:

Dist. below top net (meters)	Stream Widths (meters)
0	0 .
1 0	0 .
2 0	0 .
3 0	0 .
4 0	0 .
5 0	0 .
6 0	0 .
7 0	0 .
8 0	0 .
9 0	0 .
1 0 0	0 .

Personnel: A. Wones, K. Shook, M. Winland

#1 #5 Data | #2 #6 Scales | #3 #7 Lengths | #4 #8 Weights

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)	to	(m m)	Pass#	Species	Total Number	Total Weight
Size Range:		to	171	1	CAP	1	73
Size Range:	48	to	63	1	PTM	6	12
Size Range:		to	73	1	PLM	1	3
Size Range:		to	59	1	LND	1	2
Size Range:	44	to	56	1	SAS	10	10
Size Range:	50	to	71	1	PLK	5	9
Size Range:	41	to	67	1	FHM	33	52
Size Range:		to					
Size Range:		to					
Size Range:		to					

Digital Photos - Description

Top Blocking Net Looking Upstream 107

Top Blocking Net Looking Downstream 108

Bottom Blocking Net Looking Upstream 103

Bottom Blocking Net Looking Downstream 104

Upstream blocknet UTM: N 579656; E 4811179

Downstream blocknet UTM: E 579641; N 4811209

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, LND = Long-Nosed Dace, SAS = Sand Shiner.
PLK = Plains Killifish, CAP = Carp, PTM = Plains Topminnow.
Mid reach looking upstream = 107, looking downstream 108.

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Stream Name Beaver Creek
Site Number BVC01

DATE dd-mmm-yy: 10JUL08 (example 02MAY92)

Page 1 OF 1

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	CAP	171	73				R
2	1	PTM	61	12				R,C(#2-7)
3	1	PTM	52					R
4	1	PTM	48					R
5	1	PTM	63					R
6	1	PTM	62					V
7	1	PTM	50					R
8	1	PLM	73	3				V
9	1	LND	59	2				V
10	1	SAS	62	7				R,(C#10-14)
11	1	SAS	53					R
12	1	SAS	53					R
13	1	SAS	46					R
14	1	SAS	56					R
15	1	SAS	49	3				V,C(#15-18)
16	1	SAS	58					V
17	1	SAS	40					V
18	1	SAS	43					V
19	1	PLK	71	9				R,(C#19-23)
20	1	PLK	60					R
21	1	PLK	62					R
22	1	PLK	57					R
23	1	PLK	50					R
24	1	FHM	48	52				C(#24-56)
25	1	FHM	50					
26	1	FHM	48					
27	1	FHM	42					
28	1	FHM	43					
29	1	FHM	42					
30	1	FHM	59					
31	1	FHM	50					
32	1	FHM	48					
33	1	FHM	46					
34	1	FHM	58					
35	1	FHM	49					
36	1	FHM	54					
37	1	FHM	49					
38	1	FHM	60					
39	1	FHM	67					
40	1	FHM	57					
41	1	FHM	45					
42	1	FHM	53					
43	1	FHM	46					
44	1	FHM	44					
45	1	FHM	41					
46	1	FHM	58					
47	1	FHM	46					
48	1	FHM	56					
49	1	FHM	55					
50	1	FHM	50					

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
51	1	FHM	57					
52	1	FHM	48					
53	1	FHM	47					
54	1	FHM	44					
55	1	FHM	47					
56	1	FHM	42					
57	1	SAS	44	<1				
58	1							
59	1							
60	1							
61	1							
62	1							
63	1							
64	1							
65	1							
66	1							
67	1							
68	1							
69	1							
70	1							
71	1							
72	1							
73	1							
74	1							
75	1							
76	1							
77	1							
78	1							
79	1							
80	1							
81	1							
82	1							
83	1							
84	1							
85	1							
86	1							
87	1							
88	1							
89	1							
90	1							
91	1							
92	1							
93	1							
94	1							
95	1							
96	1							
97	1							
98	1							
99	1							
_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight

5 voucher and 5 radiological samples taken from # 24-56

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

Stream Name: Beaver Creek

Site Number:

DATE (d d m m m y y): 1 0 J U L 0 8

Site Description: BVC04 - Beaver Creek upstream

Site Length (meters): 1 0 0 S R T

pH: .

Cond. (umhos/cm):

Temp.(C) air: 3 5 . 0

Water: 2 8 . 0

Smith-Roots

Mode:

Volts:

Dist. below top net (meters)	Stream Widths (meters)	Dist. below top net (meters)	Stream Widths (meters)
0	0 .	5 0	0 .
1 0	0 .	6 0	0 .
2 0	0 .	7 0	0 .
3 0	0 .	8 0	0 .
4 0	0 .	9 0	0 .
		1 0 0	0 .

Personnel: A. Wones, K. Shook, M. Winland

#1 #5 Data

#2 #6 Scales

#3 #7 Lengths

#4 #8 Weights

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:			to	1	3	6	1	S	H	R			1	1	3	0
Size Range:			to	2	6	0	1	C	A	P			1	2	3	7
Size Range:	4	8	to		6	8	1	P	L	K			9		1	3
Size Range:	4	3	to		6	1	1	F	H	M		4	7		6	4
Size Range:	6	3	to		6	4	1	L	N	D			2			5
Size Range:	4	5	to		5	8	1	S	A	S		2	6		3	5
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream 122

Top Blocking Net Looking Downstream 123

Bottom Blocking Net Looking Upstream 118

Bottom Blocking Net Looking Downstream 119

Upstream blocknet WGS84 UTM: E 5791444; N 4820573

Downstream blocknet WGS84 UTM: E 571373; N 4820623

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, LND = Long-Nosed Dace, SAS = Sand Shiner.
SHR = Shorthead Redhorse Sucker, CAP = Carp, PLK = Plains Killifish.
Photo of the middle of reach looking upstream: 120, looking downstream: 121

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

DATE
dd-mmm-yy
10JUL08
example 02MAY92

Stream Name Beaver Creek
Site Number BVC04

Page 1 OF 1

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	SHR	136	130				R	51	1	FHM	45					
2	1	CAP	260	237				R	52	1	FHM	51					
3	1	PLK	56	13				C	53	1	FHM	57					
4	1	PLK	68						54	1	FHM	55					
5	1	PLK	58						55	1	FHM	47					
6	1	PLK	48						56	1	FHM	53					
7	1	PLK	48						57	1	FHM	42					
8	1	PLK	62						58	1	FHM	49					
9	1	PLK	54						59	1	LND	63	3				V
10	1	PLK	52						60	1	LND	64	2				V
11	1	PLK	50						61	1	SAS	45	35				C
12	1	FHM	50	64				c	62	1	SAS	50					
13	1	FHM	49						63	1	SAS	47					
14	1	FHM	47						64	1	SAS	48					
15	1	FHM	55						65	1	SAS	51					
16	1	FHM	47						66	1	SAS	56					
17	1	FHM	55						67	1	SAS	55					
18	1	FHM	57						68	1	SAS	52					
19	1	FHM	49						69	1	SAS	55					
20	1	FHM	43						70	1	SAS	58					
21	1	FHM	60						71	1	SAS	57					
22	1	FHM	50						72	1	SAS	52					
23	1	FHM	55						73	1	SAS	51					
24	1	FHM	46						74	1	SAS	54					
25	1	FHM	51						75	1	SAS	48					
26	1	FHM	50						76	1	SAS	51					
27	1	FHM	51						77	1	SAS	53					
28	1	FHM	51						78	1	SAS	48					
29	1	FHM	50						79	1	SAS	52					
30	1	FHM	47						80	1	SAS	54					
31	1	FHM	44						81	1	SAS	54					
32	1	FHM	54						82	1	SAS	57					
33	1	FHM	50						83	1	SAS	51					
34	1	FHM	46						84	1	SAS	52					
35	1	FHM	45						85	1	SAS	52					
36	1	FHM	49						86	1	SAS	52					
37	1	FHM	55						87	1							
38	1	FHM	49						88	1							
39	1	FHM	47						89	1							
40	1	FHM	49						90	1							
41	1	FHM	52						91	1							
42	1	FHM	49						92	1							
43	1	FHM	55						93	1							
44	1	FHM	53						94	1							
45	1	FHM	49						95	1							
46	1	FHM	50						96	1							
47	1	FHM	61						97	1							
48	1	FHM	45						98	1							
49	1	FHM	46						99	1							
50	1	FHM	49						_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight
5 voucher and 5 radiological samples taken from # 12-58 (FHM), and from #61-86(SAS)

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Cheyenne River

Site Number:

DATE (d d m m m y y): 1 5 A P R 0 8

Site Description: Site CHR05 - Cheyenne River at Marietta

Site Length (meters): 1 0 0 S 0 6 R 0 2 E T 3 9 N

pH: .

Cond. (umhos/cm):

Temp.(C) air: .

Water: 1 5 . 0

Dist. below top net (meters) / Stream Widths (meters)

Dist.	Width	Dist.	Width
0	.	50	.
10	.	60	.
20	.	70	.
30	.	80	.
40	.	90	.
		100	.

Smith-Roots

Mode:

Volts:

Personnel:

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

REVISED 2JUL2008

Stream Name: Cheyenne River

Bulk Weights - (Record #5)

	(m m)	to	(m m)	Pass#	Species	Total Number	Total Weight
Size Range:	9 7	to	0 9 7		R I C	0 0 1	0 1 3
Size Range:	9 8	to	0 9 8		G R S	0 0 1	0 2 0
Size Range:	3 2	to	0 7 4		P L K	0 4 8	0 6 9
Size Range:	8 2	to	2 2 0		S R S	0 1 4	6 1 2
Size Range:	5 1	to	0 5 1		P T M	0 0 1	0 0 <1
Size Range:	3 1	to	0 6 7		S A S	0 3 8	0 5 3
Size Range:	2 5	to	0 8 8		C R C	1 0 0	0 9 1
Size Range:		to					
Size Range:		to					
Size Range:		to					

Digital Photos - Description

Top Blocking Net Looking Upstream

Top Blocking Net Looking Downstream

Bottom Blocking Net Looking Upstream

Bottom Blocking Net Looking Downstream

Upstream blocknet at UTM E0587455 N4804678

Downstream blocknet at UTM E0587538 N4804736

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: RIC= River Carpsucker; GRS = Green Sunfish; PLK = Plains kilifish; SRS = Shorthead Redhorse Sucker; PTM = Plains Topminnow; SAS = Sand Shiner; CRC = Creek Chub.

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Stream Name Cheyenne River

Site Number CHR05

DATE
dd-mmm-yy
0 9 J U L 0 8

example 0 2 M A Y 9 2

Page 1 OF 1

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	RIC	415	1150				R	51	1	SAS	51					
2	1	RIC	426	1200				R	52	1	SAS	45					
3	1	RIC	405	980				R	53	1	SAS	50					
4	1	RIC	381	820				R	54	1	SAS	44					
5	1	SRS	160	46				R	55	1	SAS	60					
6	1	SRS	146	32				R	56	1	SAS	47					
7	1	CAP	135	31				R	57	1	SAS	54					
8	1	CHC	290	166				R	58	1	SAS	46					
9	1	CHC	196	50				R	59	1	SAS	52					
10	1	CHC	181	49				R	60	1	SAS	46	6				V,C(60-64)
11	1	LND	74	4				V	61	1	SAS	45					V
12	1	PLK	72	10				R,C (#12-16)	62	1	SAS	50					V
13	1	PLK	59					R	63	1	SAS	46					V
14	1	PLK	51					R	64	1	SAS	50					V
15	1	PLK	68					R	65	1	FHM	46	7				R,C(65-74)
16	1	PLK	46					R	66	1	FHM	38					R
17	1	PLK	54	3			3	V,C(#17-18)	67	1	FHM	60					R
18	1	PLK	53					V	68	1	FHM	44					R
19	1	SAS	49	7				R,C(#19-23)	69	1	FHM	51					R
20	1	SAS	50					R	70	1	FHM	48					V
21	1	SAS	53					R	71	1	FHM	46					V
22	1	SAS	46					R	72	1	FHM	46					V
23	1	SAS	48					R	73	1	FHM	47					V
24	1	SAS	50	54				C	74	1	FHM	47					V
25	1	SAS	46						75	1							
26	1	SAS	49						76	1							
27	1	SAS	43						77	1							
28	1	SAS	47						78	1							
29	1	SAS	46						79	1							
30	1	SAS	50						80	1							
31	1	SAS	47						81	1							
32	1	SAS	45						82	1							
33	1	SAS	53						83	1							
34	1	SAS	46						84	1							
35	1	SAS	52						85	1							
36	1	SAS	52						86	1							
37	1	SAS	42						87	1							
38	1	SAS	47						88	1							
39	1	SAS	51						89	1							
40	1	SAS	49						90	1							
41	1	SAS	46						91	1							
42	1	SAS	54						92	1							
43	1	SAS	52						93	1							
44	1	SAS	46						94	1							
45	1	SAS	48						95	1							
46	1	SAS	53						96	1							
47	1	SAS	52						97	1							
48	1	SAS	54						98	1							
49	1	SAS	47						99	1							
50	1	SAS	46						_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight

Powertech (USA) Inc.

APPENDIX 5.4-K

FISH COLLECTION DATA FORMS

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Beaver Creek

Site Number: [ ][ ]

DATE (d d m m m y y): 1 6 A P R 0 8

Site Description: BVC01 - Beaver Creek downstream

Site Length (meters): 1 0 0 S 0 9 R 0 1 E T 0 7 S

pH: [ ][ ].[ ]

Cond. (umhos/cm): 7 1 8 6

Temp.(C) air: [ ][ ].[ ]

Water: 1 1 . 8

Dist. below top net (meters)	Stream Widths (meters)
0	07.4
10	07.5
20	07.6
30	07.1
40	06.6
50	05.7
60	04.8
70	05.6
80	06.5
90	06.4
100	06.3

Smith-Roots

Mode:

Volts:

Personnel: A. Wones, K. Shook

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): [ ] Percent: [ ][ ][ ] Amps: [ ].[ ] Pulse: [ ][ ][ ] [ ][ ]

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

REVISED 2JUL2008

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	2	9	to	0	6	4	1	F	H	M	0	6	4	0	8	1
Size Range:	4	1	to	4	8		1	P	L	K	0	0	2	0	0	8
Size Range:			to	1	2	0	1	G	R	S	0	0	1	0	2	5
Size Range:	4	8	to	0	4	8	1	L	N	D	0	0	1	0	0	<1
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream 122

Top Blocking Net Looking Downstream

Bottom Blocking Net Looking Upstream 116

Bottom Blocking Net Looking Downstream

Upstream blocknet UTM: E 579651; N 4811171

Downstream blocknet UTM: E 579745; N 4811201

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, GRS = Green Sunfish, LND = Long-Nosed Dace.
PLK = Plains Killifish.

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

Field Q.C. by:

Batch Number:

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

REVISED 2JUL2008

Stream Name Beaver Creek

Site Number BVC01

DATE dd-mmm-yy: 1 6 A P R 0 8

example 0 2 M A Y 9 2

Page __1__ of_1__

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	FHM	030					Fathead Minnow	51	1	FHM	053					
2	1	FHM	048						52	1	FHM	040					
3	1	FHM	060						53	1	FHM	056					
4	1	FHM	062						54	1	FHM	049					
5	1	FHM	046						55	1	FHM	050					
6	1	FHM	050						56	1	FHM	030					
7	1	FHM	061						57	1	FHM	061					
8	1	FHM	059						58	1	FHM	036					
9	1	FHM	048						59	1	FHM	049					
10	1	FHM	052						60	1	FHM	053					
11	1	FHM	058						61	1	FHM	059					
12	1	FHM	043						62	1	FHM	038					
13	1	FHM	043						63	1	FHM	036					
14	1	FHM	059						64	1	FHM	042	0081				Combined Wt. For all FHM
15	1	FHM	059						65	1	PLK	041					Plains Killifish
16	1	FHM	062						66	1	PLK	048	0008				Combined Wt. For all PLK
17	1	FHM	041						67	1	GRS	120	0025				Green Sunfish
18	1	FHM	048						68	1	LND	048	000<1				Long-Nosed Dace
19	1	FHM	056						69	1							
20	1	FHM	060						70	1							
21	1	FHM	050						71	1							
22	1	FHM	044						72	1							
23	1	FHM	045						73	1							
24	1	FHM	061						74	1							
25	1	FHM	054						75	1							
26	1	FHM	030						76	1							
27	1	FHM	059						77	1							
28	1	FHM	030						78	1							
29	1	FHM	055						79	1							
30	1	FHM	046						80	1							
31	1	FHM	050						81	1							
32	1	FHM	031						82	1							
33	1	FHM	052						83	1							
34	1	FHM	066						84	1							
35	1	FHM	056						85	1							
36	1	FHM	030						86	1							
37	1	FHM	032						87	1							
38	1	FHM	035						88	1							
39	1	FHM	030						89	1							
40	1	FHM	034						90	1							
41	1	FHM	059						91	1							
42	1	FHM	052						92	1							
43	1	FHM	057						93	1							
44	1	FHM	064						94	1							
45	1	FHM	058						95	1							
46	1	FHM	037						96	1							
47	1	FHM	029						97	1							
48	1	FHM	046						98	1							
49	1	FHM	035						99	1							
50	1	FHM	064						_00	1							

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET
REVISED 2JUL2008

Stream Name: Beaver Creek

Site Number: [ ][ ]

DATE (d d m m m y y): 1 6 A P R 0 8

Site Description: BVC04 - Upstream Site

Site Length (meters): 1 0 0 S [ ][ ] R [ ][ ][ ] T [ ][ ][ ]

pH: [ ][ ].[ ]
Cond. (umhos/cm): 5 1 0 9
Temp.(C) air: [ ][ ].[ ]
Water: 7.0

Stream Widths (meters)

Dist. below top net (meters)	Width	Dist. below top net (meters)	Width
0	.	50	.
10	10.4	60	4.2
20	.	70	.
30	6.5	80	4.7
40	6.9	90	.
		100	6.0

Smith-Roots
Mode: [ ][ ][ ]
Volts: [ ][ ][ ]

Personnel:

#1	[ ][ ][ ]	#2	[ ][ ][ ]	#3	[ ][ ][ ]	#4	[ ][ ][ ]
#5	[ ][ ][ ]	#6	[ ][ ][ ]	#7	[ ][ ][ ]	#8	[ ][ ][ ]
Data	[ ][ ][ ]	Scales	[ ][ ][ ]	Lengths	[ ][ ][ ]	Weights	[ ][ ][ ]

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:
Range (H/L): [ ] Percent: [ ][ ][ ] Amps: [ ].[ ] Pulse: [ ][ ][ ] [ ][ ]

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	4	9	to	1	1	2	1	G	R	S	0	0	4	0	3	0
Size Range:		0	to	2	1	5	1	C	H	C	0	0	1	0	7	2
Size Range:			to				1	C	A	P			3		2	8
Size Range:	4	2	to	0	6	6	1	P	L	K	0	1	0	0	1	4
Size Range:	2	1	to	0	6	6	1	F	H	M		8	4	0	9	2
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream

Top Blocking Net Looking Downstream

Bottom Blocking Net Looking Upstream

Bottom Blocking Net Looking Downstream

Upstream Blocknet E 571380 N 4820615

Downstream blocknet E 571444 N4820551

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: GRS=Green Sunfish, CHC= Channel Catfish, PLK= Plains Killifish, FHM= Fathead Minnow CAP= CARP

Water temp 7.0 C at 11:28 and 16.03 at 18:43; Turbidity 11.8, DO 9.20

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

REVISED 2JULY, 2008

Stream Name Beaver Creek

Site Number BVC04

DATE						
dd-mmm-yy						
1	6	A	P	R	0	8

example 0 2 M A Y 9 2

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	GRS	112	0025				Green Sunfish	51	1	FHM	045					
2	1	GRS	050						52	1	FHM	047					
3	1	GRS	049						53	1	FHM	031					
4	1	GRS	053	0030				Comb. Wt	54	1	FHM	048					
5	1	CHC	215	0072				Channel Catfish	55	1	FHM	055					
6	1	PLK	04					Plains Killifish	56	1	FHM	040					
7	1	PLK	06						57	1	FHM	045					
8	1	PLK	04					Comb. Wt	58	1	FHM	046					
9	1	PLK	05						59	1	FHM	035					
10	1	PLK	04						60	1	FHM	045					
11	1	PLK	04						61	1	FHM	054					
12	1	PLK	04						62	1	FHM	039					
13	1	PLK	05						63	1	FHM	043					
14	1	PLK	04						64	1	FHM	031					
15	1	PLK	04						65	1	FHM	058					
16	1	CAP	111	0021				Carp	66	1	FHM	056					
17	1	CAP	062					Comb. Wt of #17,18=7g	67	1	FHM	047					
18	1	CAP	053	7				Comb. Wt	68	1	FHM	053					
19	1	FHM	052					Fathead Minnow	69	1	FHM	032					
20	1	FHM	041	92				Comb. Wt .	70	1	FHM	038					
21	1	FHM	042						71	1	FHM	041					
22	1	FHM	054						72	1	FHM	039					
23	1	FHM	035						73	1	FHM	051					
24	1	FHM	037						74	1	FHM	044					
25	1	FHM	041						75	1	FHM	038					
26	1	FHM	043						76	1	FHM	057					
27	1	FHM	036						77	1	FHM	050					
28	1	FHM	033						78	1	FHM	041					
29	1	FHM	044						79	1	FHM	044					
30	1	FHM	046						80	1	FHM	057					
31	1	FHM	052						81	1	FHM	045					
32	1	FHM	036						82	1	FHM	047					
33	1	FHM	050						83	1	FHM	043					
34	1	FHM	039						84	1	FHM	045					
35	1	FHM	057						85	1	FHM	046					
36	1	FHM	036						86	1	FHM	052					
37	1	FHM	033						87	1	FHM	047					
38	1	FHM	039						88	1	FHM	040					
39	1	FHM	065						89	1	FHM	048					
40	1	FHM	043						90	1	FHM	045					
41	1	FHM	060						91	1	FHM	047					
42	1	FHM	021						92	1	FHM	041					
43	1	FHM	040						93	1	FHM	045					
44	1	FHM	030						94	1	FHM	035					
45	1	FHM	039						95	1	FHM	039					
46	1	FHM	056						96	1	FHM	047					
47	1	FHM	054						97	1	FHM	058					
48	1	FHM	063						98	1	FHM	047					
49	1	FHM	049						99	1	FHM	031					
50	1	FHM	066						_00	1	FHM	027					

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Cheyenne River

Site Number: | | |

DATE (d d m m m y y): 1 5 A P R 0 8

Site Description: Site CHR05 - Cheyenne River at Marietta

Site Length (meters): 1 0 0   S 0 6   R 0 2 E   T 3 9 N

pH: .

Cond. (umhos/cm):

Temp.(C) air: .

Water: 1 5 . 0

Dist. below top net (meters)	Stream Widths (meters)	Dist. below top net (meters)	Stream Widths (meters)
0	.	50	.
10	.	60	.
20	.	70	.
30	.	80	.
40	.	90	.
		100	.

Smith-Roots
Mode:
Volts:

Personnel:

#1 | #2 | #3 | #4
#5 | #6 | #7 | #8
Data | Scales | Lengths | Weights

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): Percent: Amps: . Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

REVISED 2JUL2008

Stream Name: Cheyenne River

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	9	7	to	0	9	7		R	I	C	0	0	1	0	1	3
Size Range:	9	8	to	0	9	8		G	R	S	0	0	1	0	2	0
Size Range:	3	2	to	0	7	4		P	L	K	0	4	8	0	6	9
Size Range:	8	2	to	2	2	0		S	R	S	0	1	4	6	1	2
Size Range:	5	1	to	0	5	1		P	T	M	0	0	1	0	0	<1
Size Range:	3	1	to	0	6	7		S	A	S	0	3	8	0	5	3
Size Range:	2	5	to	0	8	8		C	R	C	1	0	0	0	9	1
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream ________

Top Blocking Net Looking Downstream ________

Bottom Blocking Net Looking Upstream ________

Bottom Blocking Net Looking Downstream ________

Upstream blocknet at UTM E0587455 N4804678

Downstream blocknet at UTM E0587538 N4804736

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: RIC= River Carpsucker; GRS = Green Sunfish; PLK = Plains kilifish;
SRS = Shorthead Redhorse Sucker; PTM = Plains Topminnow; SAS = Sand Shiner;
CRC = Creek Chub.

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 08JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE
dd-mmm-yy
15APR08

example 02MAY92

Page 1 of 3

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	CRC	039					Creek Chu	51	1	CRC	044					
2	1	CRC	068	091				Combined wt =	52	1	CRC	042					
3	1	CRC	049						53	1	CRC	045					
4	1	CRC	050						54	1	CRC	077					
5	1	CRC	061						55	1	CRC	037					
6	1	CRC	045						56	1	CRC	048					
7	1	CRC	075						57	1	CRC	041					
8	1	CRC	039						58	1	CRC	074					
9	1	CRC	046						59	1	CRC	037					
10	1	CRC	038						60	1	CRC	038					
11	1	CRC	041						61	1	CRC	039					
12	1	CRC	035						62	1	CRC	040					
13	1	CRC	035						63	1	CRC	025					
14	1	CRC	058						64	1	CRC	042					
15	1	CRC	043						65	1	CRC	030					
16	1	CRC	040						66	1	CRC	052					
17	1	CRC	040						67	1	CRC	030					
18	1	CRC	060						68	1	CRC	058					
19	1	CRC	049						69	1	CRC	043					
20	1	CRC	037						70	1	CRC	060					
21	1	CRC	041						71	1	CRC	062					
22	1	CRC	033						72	1	CRC	052					
23	1	CRC	032						73	1	CRC	041					
24	1	CRC	052						74	1	CRC	058					
25	1	CRC	031						75	1	CRC	044					
26	1	CRC	026						76	1	CRC	041					
27	1	CRC	050						77	1	CRC	040					
28	1	CRC	046						78	1	CRC	042					
29	1	CRC	054						79	1	CRC	060					
30	1	CRC	045						80	1	CRC	038					
31	1	CRC	052						81	1	CRC	070					
32	1	CRC	033						82	1	CRC	057					
33	1	CRC	030						83	1	CRC	049					
34	1	CRC	050						84	1	CRC	047					
35	1	CRC	035						85	1	CRC	059					
36	1	CRC	071						86	1	CRC	059					
37	1	CRC	048						87	1	CRC	038					
38	1	CRC	066						88	1	CRC	058					
39	1	CRC	044						89	1	CRC	040					
40	1	CRC	041						90	1	CRC	032					
41	1	CRC	040						91	1	CRC	037					
42	1	CRC	039						92	1	CRC	036					
43	1	CRC	036						93	1	CRC	047					
44	1	CRC	070						94	1	CRC	041					
45	1	CRC	051						95	1	CRC	056					
46	1	CRC	042						96	1	CRC	048					
47	1	CRC	088						97	1	CRC	050					
48	1	CRC	036						98	1	CRC	040					
49	1	CRC	077						99	1	CRC	040					
50	1	CRC	075						_00	1	CRC	045					

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 2JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE dd-mmm-yy: 1 5 A P R 0 8

example 0 2 M A Y 9 2

Page 2 of 3

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	RIC	097	0013				likely River carpsucker	51	1	SRS	174	0072				Shorthead redhorse sucker
2	1	GRS	098	0020				Green sunfish	52	1	SRS	220	0122				
3	1	PLK	058					Plains killifish.	53	1	SRS	201	1000				
4	1	PLK	065	0069				Combined wt	54	1	SRS	197	0094				
5	1	PLK	035						55	1	SRS	178	0080				
6	1	PLK	057						56	1	SRS	169	0054				
7	1	PLK	039						57	1	SRS	110	0007				
8	1	PLK	070						58	1	SRS	084	0005				
9	1	PLK	042						59	1	SRS	085	0003				
10	1	PLK	072						60	1	SRS	195	0098				
11	1	PLK	046						61	1	SRS	173	0068				
12	1	PLK	036						62	1	SRS	082	0003				
13	1	PLK	044						63	1	SRS	083	0003				
14	1	PLK	052						64	1	SRS	088	0003				
15	1	PLK	065						65	1	PTM	051	000<1				Plains Topminnow
16	1	PLK	040						66	1	SAS	067					Sand Shiner.
17	1	PLK	067						67	1	SAS	038	053				Combined Wt
18	1	PLK	068						68	1	SAS	062					
19	1	PLK	052						69	1	SAS	058					
20	1	PLK	060						70	1	SAS	059					
21	1	PLK	060						71	1	SAS	060					
22	1	PLK	074						72	1	SAS	049					
23	1	PLK	048						73	1	SAS	047					
24	1	PLK	041						74	1	SAS	058					
25	1	PLK	040						75	1	SAS	059					
26	1	PLK	032						76	1	SAS	044					
27	1	PLK	064						77	1	SAS	047					
28	1	PLK	057						78	1	SAS	040					
29	1	PLK	040						79	1	SAS	055					
30	1	PLK	043						80	1	SAS	062					
31	1	PLK	053						81	1	SAS	051					
32	1	PLK	068						82	1	SAS	063					
33	1	PLK	037						83	1	SAS	044					
34	1	PLK	042						84	1	SAS	031					
35	1	PLK	034						85	1	SAS	045					
36	1	PLK	046						86	1	SAS	039					
37	1	PLK	036						87	1	SAS	057					
38	1	PLK	040						88	1	SAS	057					
39	1	PLK	049						89	1	SAS	057					
40	1	PLK	048						90	1	SAS	035					
41	1	PLK	060						91	1	SAS	034					
42	1	PLK	041						92	1	SAS	043					
43	1	PLK	032						93	1	SAS	046					
44	1	PLK	051						94	1	SAS	057					
45	1	PLK	038						95	1	SAS	049					
46	1	PLK	040						96	1	SAS	033					
47	1	PLK	060						97	1	SAS	050					
48	1	PLK	045						98	1	SAS	029					
49	1	PLK	036						99	1	SAS	043					
50	1	PLK	044						_00	1	SAS	045					

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Revised: 2JUL08

Stream Name Cheyenne River

Site Number CHR05

DATE
dd-mmm-yy
1 5 A P R 0 8

example 0 2 M A Y 9 2

Page 3 of 3

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	S A S	0 3 3					Sand Shiner	51	1							
2	1	S A S	0 3 2						52	1							
3	1	S A S	0 3 2						53	1							
4	1								54	1							
5	1								55	1							
6	1								56	1							
7	1								57	1							
8	1								58	1							
9	1								59	1							
10	1								60	1							
11	1								61	1							
12	1								62	1							
13	1								63	1							
14	1								64	1							
15	1								65	1							
16	1								66	1							
17	1								67	1							
18	1								68	1							
19	1								69	1							
20	1								70	1							
21	1								71	1							
22	1								72	1							
23	1								73	1							
24	1								74	1							
25	1								75	1							
26	1								76	1							
27	1								77	1							
28	1								78	1							
29	1								79	1							
30	1								80	1							
31	1								81	1							
32	1								82	1							
33	1								83	1							
34	1								84	1							
35	1								85	1							
36	1								86	1							
37	1								87	1							
38	1								88	1							
39	1								89	1							
40	1								90	1							
41	1								91	1							
42	1								92	1							
43	1								93	1							
44	1								94	1							
45	1								95	1							
46	1								96	1							
47	1								97	1							
48	1								98	1							
49	1								99	1							
50	1								_00	1							

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

Stream Name: Beaver Creek

Site Number: [ ][ ]

DATE (d d m m m y y): 1 0 J U L 0 8

Site Description: BVC01 - Beaver Creek downstream

Site Length (meters): 1 0 0 S 0 9 R 0 1 E T 0 7 S

pH: 7 . 9

Cond. (umhos/cm): 2 1 4 1

Temp.(C) air: 2 5 . 5

Water: 2 3 . 4

Smith-Roots
Mode:
Volts:

Dist. below top net (meters)	Stream Widths (meters)
0	0 .
10	0 .
20	0 .
30	0 .
40	0 .
50	0 .
60	0 .
70	0 .
80	0 .
90	0 .
100	0 .

Personnel: A. Wones, K. Shook, M. Winland

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): [ ] Percent: [ ] Amps: [ ] . [ ] Pulse: [ ] [ ]

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)		(m m)	Pass#	Species	Total Number	Total Weight
Size Range:		to	1 7 1	1	C A P	1	7 3
Size Range:	4 8	to	6 3	1	P T M	6	1 2
Size Range:		to	7 3	1	P L M	1	3
Size Range:		to	5 9	1	L N D	1	2
Size Range:	4 4	to	5 6	1	S A S	1 0	1 0
Size Range:	5 0	to	7 1	1	P L K	5	9
Size Range:	4 1	to	6 7	1	F H M	3 3	5 2
Size Range:		to					
Size Range:		to					
Size Range:		to					

Digital Photos - Description

Top Blocking Net Looking Upstream 107

Top Blocking Net Looking Downstream 108

Bottom Blocking Net Looking Upstream 103

Bottom Blocking Net Looking Downstream 104

Upstream blocknet UTM: N 579656; E 4811179

Downstream blocknet UTM: E 579641; N 4811209

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, LND = Long-Nosed Dace, SAS = Sand Shiner.
PLK = Plains Killifish, CAP = Carp, PTM = Plains Topminnow.
Mid reach looking upstream = 107, looking downstream 108.

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Stream Name Beaver Creek

Site Number BVC01

DATE dd-mmm-yy: 10 JUL 08 (example 02 MAY 92)

Page 1 OF 1

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	CAP	171	73				R	51	1	FHM	57					
2	1	PTM	61	12				R,C(#2-7)	52	1	FHM	48					
3	1	PTM	52					R	53	1	FHM	47					
4	1	PTM	48					R	54	1	FHM	44					
5	1	PTM	63					R	55	1	FHM	47					
6	1	PTM	62					V	56	1	FHM	42					
7	1	PTM	50					R	57	1	SAS	44	<1				
8	1	PLM	73	3				V	58	1							
9	1	LND	59	2				V	59	1							
10	1	SAS	62	7				R,(C#10-14)	60	1							
11	1	SAS	53					R	61	1							
12	1	SAS	53					R	62	1							
13	1	SAS	46					R	63	1							
14	1	SAS	56					R	64	1							
15	1	SAS	49	3				V,C(#15-18)	65	1							
16	1	SAS	58					V	66	1							
17	1	SAS	40					V	67	1							
18	1	SAS	43					V	68	1							
19	1	PLK	71	9				R,(C#19-23)	69	1							
20	1	PLK	60					R	70	1							
21	1	PLK	62					R	71	1							
22	1	PLK	57					R	72	1							
23	1	PLK	50					R	73	1							
24	1	FHM	48	52				C(#24-56)	74	1							
25	1	FHM	50						75	1							
26	1	FHM	48						76	1							
27	1	FHM	42						77	1							
28	1	FHM	43						78	1							
29	1	FHM	42						79	1							
30	1	FHM	59						80	1							
31	1	FHM	50						81	1							
32	1	FHM	48						82	1							
33	1	FHM	46						83	1							
34	1	FHM	58						84	1							
35	1	FHM	49						85	1							
36	1	FHM	54						86	1							
37	1	FHM	49						87	1							
38	1	FHM	60						88	1							
39	1	FHM	67						89	1							
40	1	FHM	57						90	1							
41	1	FHM	45						91	1							
42	1	FHM	53						92	1							
43	1	FHM	46						93	1							
44	1	FHM	44						94	1							
45	1	FHM	41						95	1							
46	1	FHM	58						96	1							
47	1	FHM	46						97	1							
48	1	FHM	56						98	1							
49	1	FHM	55						99	1							
50	1	FHM	50						_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight

5 voucher and 5 radiological samples taken from # 24-56

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

Stream Name: Beaver Creek

Site Number: | | |

DATE (d d m m m y y): 1 0 J U L 0 8

Site Description: BVC04 - Beaver Creek upstream

Site Length (meters): 1 0 0 S | | | R | | | | T | | | |

pH: | | . | |

Cond. (umhos/cm): | | | | |

Temp.(C) air: 3 5 . 0

Water: 2 8 . 0

Smith-Roots

Mode: | | | |

Volts: | | | |

Dist. below top net (meters)	Stream Widths (meters)	Dist. below top net (meters)	Stream Widths (meters)
0	0 .	5 0	0 .
1 0	0 .	6 0	0 .
2 0	0 .	7 0	0 .
3 0	0 .	8 0	0 .
4 0	0 .	9 0	0 .
		1 0 0	0 .

Personnel: A. Wones, K. Shook, M. Winland

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L): | | Percent: | | | | Amps: | | . | | Pulse: | | | | | | |

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

Stream Name: Beaver Creek

Bulk Weights - (Record #5)

	(m m)			(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:			to	1	3	6	1	S	H	R			1	1	3	0
Size Range:			to	2	6	0	1	C	A	P			1	2	3	7
Size Range:	4	8	to		6	8	1	P	L	K			9		1	3
Size Range:	4	3	to		6	1	1	F	H	M		4	7		6	4
Size Range:	6	3	to		6	4	1	L	N	D			2			5
Size Range:	4	5	to		5	8	1	S	A	S		2	6		3	5
Size Range:			to													
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream 122

Top Blocking Net Looking Downstream 123

Bottom Blocking Net Looking Upstream 118

Bottom Blocking Net Looking Downstream 119

Upstream blocknet WGS84 UTM: E 5791444; N 4820573

Downstream blocknet WGS84 UTM: E 571373; N 4820623

Video Camera

Tape #:				
Begin:				
End:				

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: FHM = fathead minnow, LND = Long-Nosed Dace, SAS = Sand Shiner.
SHR = Shorthead Redhorse Sucker, CAP = Carp, PLK = Plains Killifish.
Photo of the middle of reach looking upstream: 120, looking downstream: 121

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Stream Name Beaver Creek
Site Number BVC04

DATE dd-mmm-yy: 10JUL08 (example 02MAY92)

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	SHR	136	130				R	51	1	FHM	45					
2	1	CAP	260	237				R	52	1	FHM	51					
3	1	PLK	56	13				C	53	1	FHM	57					
4	1	PLK	68						54	1	FHM	55					
5	1	PLK	58						55	1	FHM	47					
6	1	PLK	48						56	1	FHM	53					
7	1	PLK	48						57	1	FHM	42					
8	1	PLK	62						58	1	FHM	49					
9	1	PLK	54						59	1	LND	63	3				V
10	1	PLK	52						60	1	LND	64	2				V
11	1	PLK	50						61	1	SAS	45	35				C
12	1	FHM	50	64				c	62	1	SAS	50					
13	1	FHM	49						63	1	SAS	47					
14	1	FHM	47						64	1	SAS	48					
15	1	FHM	55						65	1	SAS	51					
16	1	FHM	47						66	1	SAS	56					
17	1	FHM	55						67	1	SAS	55					
18	1	FHM	57						68	1	SAS	52					
19	1	FHM	49						69	1	SAS	55					
20	1	FHM	43						70	1	SAS	58					
21	1	FHM	60						71	1	SAS	57					
22	1	FHM	50						72	1	SAS	52					
23	1	FHM	55						73	1	SAS	51					
24	1	FHM	46						74	1	SAS	54					
25	1	FHM	51						75	1	SAS	48					
26	1	FHM	50						76	1	SAS	51					
27	1	FHM	51						77	1	SAS	53					
28	1	FHM	51						78	1	SAS	48					
29	1	FHM	50						79	1	SAS	52					
30	1	FHM	47						80	1	SAS	54					
31	1	FHM	44						81	1	SAS	54					
32	1	FHM	54						82	1	SAS	57					
33	1	FHM	50						83	1	SAS	51					
34	1	FHM	46						84	1	SAS	52					
35	1	FHM	45						85	1	SAS	52					
36	1	FHM	49						86	1	SAS	52					
37	1	FHM	55						87	1							
38	1	FHM	49						88	1							
39	1	FHM	47						89	1							
40	1	FHM	49						90	1							
41	1	FHM	52						91	1							
42	1	FHM	49						92	1							
43	1	FHM	55						93	1							
44	1	FHM	53						94	1							
45	1	FHM	49						95	1							
46	1	FHM	50						96	1							
47	1	FHM	61						97	1							
48	1	FHM	45						98	1							
49	1	FHM	46						99	1							
50	1	FHM	49						_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight
5 voucher and 5 radiological samples taken from # 12-58 (FHM), and from #61-86(SAS)

S. D. GAME FISH AND PARKS - STREAM SURVEY FIELD DATA SHEET

REVISED 2JUL2008

Stream Name: Cheyenne River

Site Number:

DATE (d d m m m y y): 1 5 A P R 0 8

Site Description: Site CHR05 - Cheyenne River at Marietta

Site Length (meters): 1 0 0   S 0 6   R 0 2 E   T 3 9 N

pH: .

Cond. (umhos/cm):

Temp.(C) air: .

Water: 1 5 . 0

Smith-Roots

Mode:

Volts:

Dist. below top net (meters)	Stream Widths (meters)
0	.
10	.
20	.
30	.
40	.
50	.
60	.
70	.
80	.
90	.
100	.

Personnel:

#1		#2		#3		#4	
#5		#6		#7		#8	
Data		Scales		Lengths		Weights	

	Pass #1	Pass #2	Pass #3	Pass #4	Pass #5
Start time: (hhmm)					
End time: (hhmm)					
Smith-Root (seconds)					
Shocker #1					
Smith-Root (seconds)					
Shocker #2					
Smith-Root (seconds)					
Shocker #3					

Barge Shocker:

Range (H/L):   Percent: Amps: .   Pulse:

Pass	Start time (h h m m)	End time (h h m m)	Duration (seconds)	Anode #1	Anode #2	Anode #3
1						
2						
3						
4						
5						

REVISED 2JUL2008

Stream Name: Cheyenne River

Bulk Weights - (Record #5)

	(m m)		to	(m m)			Pass#	Species			Total Number			Total Weight		
Size Range:	9	7	to	0	9	7		R	I	C	0	0	1	0	1	3
Size Range:	9	8	to	0	9	8		G	R	S	0	0	1	0	2	0
Size Range:	3	2	to	0	7	4		P	L	K	0	4	8	0	6	9
Size Range:	8	2	to	2	2	0		S	R	S	0	1	4	6	1	2
Size Range:	5	1	to	0	5	1		P	T	M	0	0	1	0	0	<1
Size Range:	3	1	to	0	6	7		S	A	S	0	3	8	0	5	3
Size Range:	2	5	to	0	8	8		C	R	C	1	0	0	0	9	1
Size Range:			to													
Size Range:			to													
Size Range:			to													

Digital Photos - Description

Top Blocking Net Looking Upstream ____

Top Blocking Net Looking Downstream ____

Bottom Blocking Net Looking Upstream ____

Bottom Blocking Net Looking Downstream ____

Upstream blocknet at UTM E0587455 N4804678

Downstream blocknet at UTM E0587538 N4804736

Video Camera

Tape #:

Begin:

End:

	(d d m m m y y)	Personnel
Photos labeled:		
Photos filed:		

Comments: RIC= River Carpsucker; GRS = Green Sunfish; PLK = Plains kilifish; SRS = Shorthead Redhorse Sucker; PTM = Plains Topminnow; SAS = Sand Shiner; CRC = Creek Chub.

Field Q.C. by: A. Wones

Batch Number:

DATA ENTRY - RECORD 2

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 3

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 4

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

DATA ENTRY - RECORD 5

	(d d m m m y y)	Personnel
Data Entry		
Verification:		

SOUTH DAKOTA GAME FISH AND PARKS 3305 WEST SOUTH STREET RAPID CITY, SD 57702

Stream Name Cheyenne River

Site Number CHR05

DATE dd-mmm-yy: 0 9 J U L 0 8

example 0 2 M A Y 9 2

Page 1 OF 1

Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments	Fish ID #	Pass #	Species Code	Total Length (mm)	Weight (grams)	Sca.	Mor.	Sex	Comments
1	1	RIC	415	1150				R	51	1	SAS	51					
2	1	RIC	426	1200				R	52	1	SAS	45					
3	1	RIC	405	980				R	53	1	SAS	50					
4	1	RIC	381	820				R	54	1	SAS	44					
5	1	SRS	160	46				R	55	1	SAS	60					
6	1	SRS	146	32				R	56	1	SAS	47					
7	1	CAP	135	31				R	57	1	SAS	54					
8	1	CHC	290	166				R	58	1	SAS	46					
9	1	CHC	196	50				R	59	1	SAS	52					
10	1	CHC	181	49				R	60	1	SAS	46	6				V,C(60-64)
11	1	LND	74	4				V	61	1	SAS	45					V
12	1	PLK	72	10				R,C (#12-16)	62	1	SAS	50					V
13	1	PLK	59					R	63	1	SAS	46					V
14	1	PLK	51					R	64	1	SAS	50					V
15	1	PLK	68					R	65	1	FHM	46	7				R,C(65-74)
16	1	PLK	46					R	66	1	FHM	38					R
17	1	PLK	54	3			3	V,C(#17-18)	67	1	FHM	60					R
18	1	PLK	53					V	68	1	FHM	44					R
19	1	SAS	49	7				R,C(#19-23)	69	1	FHM	51					R
20	1	SAS	50					R	70	1	FHM	48					V
21	1	SAS	53					R	71	1	FHM	46					V
22	1	SAS	46					R	72	1	FHM	46					V
23	1	SAS	48					R	73	1	FHM	47					V
24	1	SAS	50	54				C	74	1	FHM	47					V
25	1	SAS	46						75	1							
26	1	SAS	49						76	1							
27	1	SAS	43						77	1							
28	1	SAS	47						78	1							
29	1	SAS	46						79	1							
30	1	SAS	50						80	1							
31	1	SAS	47						81	1							
32	1	SAS	45						82	1							
33	1	SAS	53						83	1							
34	1	SAS	46						84	1							
35	1	SAS	52						85	1							
36	1	SAS	52						86	1							
37	1	SAS	42						87	1							
38	1	SAS	47						88	1							
39	1	SAS	51						89	1							
40	1	SAS	49						90	1							
41	1	SAS	46						91	1							
42	1	SAS	54						92	1							
43	1	SAS	52						93	1							
44	1	SAS	46						94	1							
45	1	SAS	48						95	1							
46	1	SAS	53						96	1							
47	1	SAS	52						97	1							
48	1	SAS	54						98	1							
49	1	SAS	47						99	1							
50	1	SAS	46						_00	1							

Comments: R = sample collected for radiological testing, V = voucher specimen, C = combined weight

POWERTECH (USA) INC.

APPENDIX 5.5-A

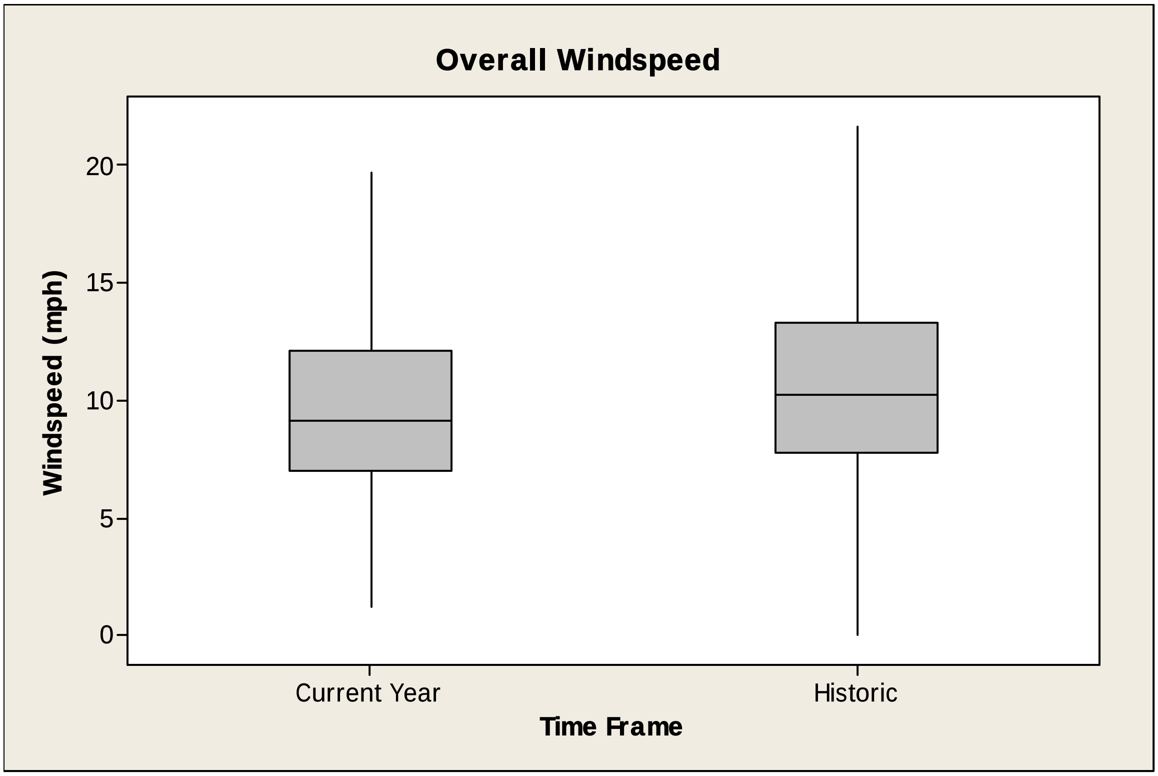
STATISTICAL REPORTS FOR CHADRON, NEBRASKA, METEOROLOGICAL SITE

STATISTICAL REPORTS FOR CHADRON, NEBRASKA, METEOROLOGICAL SITE

WIND SPEED ANALYSIS

Descriptive Statistics: Average

Variable	Time Frame	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	363	0	9.766	3.901	1.202	7.003	9.097	12.062	24.197
	Historic	9323	0	10.834	4.380	0.0000	7.705	10.251	13.276	36.090



Descriptive Statistics: Average

Results for Month = 1

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	10.039	4.094	2.628	7.401	9.351	11.741	22.461
	Historic	805	9.969	4.400	0.000	6.872	9.351	12.545	33.099

Results for Month = 2

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	28	9.265	3.874	1.202	6.539	9.456	12.080	16.662
	Historic	734	10.475	4.672	1.727	7.250	9.768	13.160	33.239

POWERTECH (USA) INC.

Results for Month = 3

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	10.404	3.879	5.155	7.690	9.111	12.706	24.197
	Historic	806	11.572	4.854	2.488	7.990	10.971	14.349	32.986

Results for Month = 4

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	11.210	4.791	3.812	6.482	11.637	15.219	20.545
	Historic	779	12.533	4.954	2.187	8.901	11.800	15.525	36.090

Results for Month = 5

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	11.037	4.779	3.040	7.314	10.209	13.414	21.464
	Historic	803	11.847	4.651	2.614	8.515	11.193	14.401	29.690

Results for Month = 6

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	9.173	2.852	5.124	6.830	8.768	11.103	16.576
	Historic	779	11.213	3.746	2.507	8.571	10.725	13.566	24.299

Results for Month = 7

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	9.991	3.371	4.327	7.597	9.627	12.062	19.401
	Historic	792	10.542	3.369	0.000	8.053	10.094	12.467	24.818

Results for Month = 8

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	9.421	3.151	2.865	7.624	9.205	10.766	18.912
	Historic	775	10.472	3.429	2.064	7.844	10.132	12.514	24.324

Results for Month = 9

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	10.667	4.215	5.220	7.115	10.023	13.396	19.880
	Historic	750	10.526	4.003	1.749	7.420	9.984	13.051	25.404

Results for Month = 10

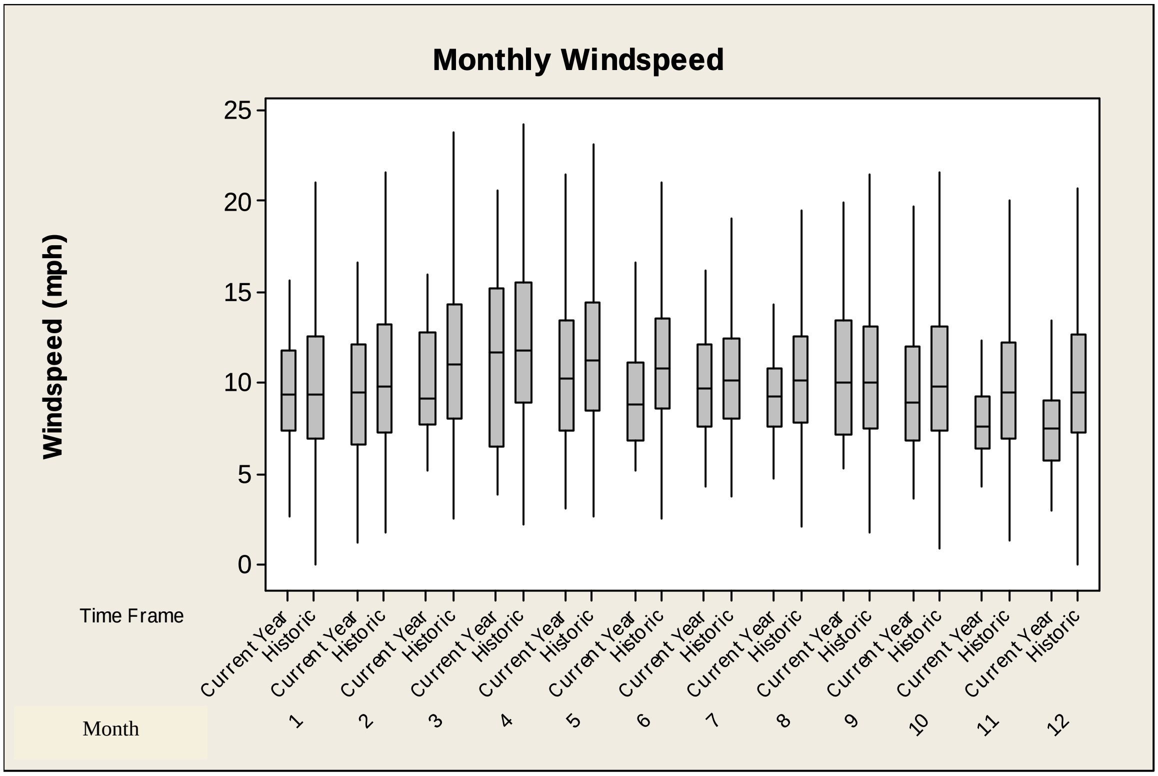
Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	9.678	3.770	3.607	6.814	8.911	12.034	19.648
	Historic	775	10.565	4.585	0.895	7.322	9.743	13.080	29.291

Results for Month = 11

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	8.398	3.250	4.316	6.382	7.567	9.261	18.245
	Historic	750	10.062	4.299	1.263	6.878	9.442	12.215	30.728

Results for Month = 12

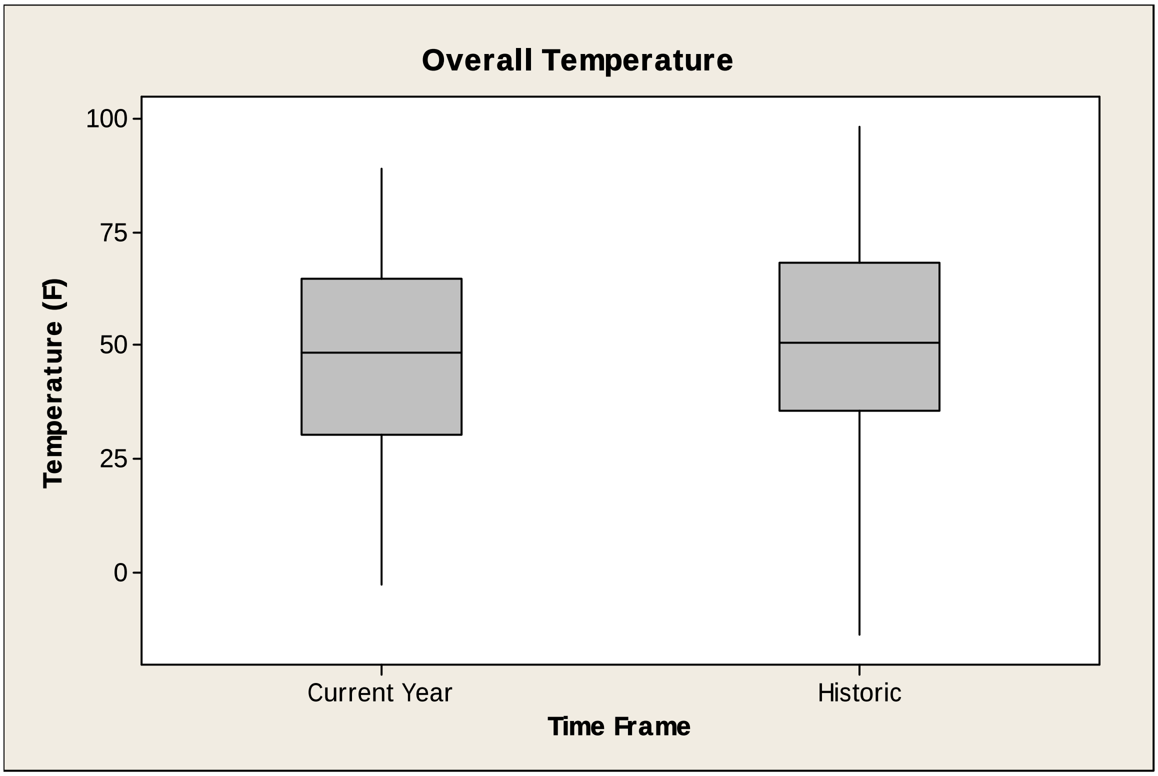
Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	7.899	3.515	2.945	5.676	7.419	8.985	18.620
	Historic	775	10.139	4.447	0.000	7.200	9.405	12.690	28.052



TEMPERATURE ANALYSIS

Descriptive Statistics: Average

Variable	Time Frame	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	360	0	47.81	21.42	-3.06	30.29	48.15	64.48	89.00
	Historic	9323	0	50.520	21.204	-22.804	35.285	50.470	68.277	98.060



Descriptive Statistics: Average

Results for Month = 1

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	20.10	11.15	-3.06	11.02	20.90	30.05	41.75
	Historic	805	25.444	13.243	-13.206	16.486	28.325	35.735	52.363

Results for Month = 2

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	25	26.63	8.83	6.80	22.10	25.57	30.77	44.60
	Historic	734	29.789	14.064	-19.400	21.961	32.404	40.138	56.264

Results for Month = 3

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	35.66	6.83	19.68	31.56	35.21	39.92	49.40
	Historic	806	39.270	11.838	-5.766	32.195	39.824	47.376	67.179

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Results for Month = 4

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	44.52	10.23	25.51	37.89	42.09	50.58	66.80
	Historic	779	48.966	10.533	17.825	41.879	48.650	56.150	78.016

Results for Month = 5

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	53.27	8.48	32.77	48.52	54.41	59.74	65.38
	Historic	803	59.470	9.313	32.300	52.925	59.942	66.412	82.085

Results for Month = 6

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	64.19	5.76	53.76	59.61	63.96	68.17	74.60
	Historic	779	70.139	8.401	42.271	64.510	70.600	76.087	90.100

Results for Month = 7

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	77.43	6.60	66.13	73.28	77.70	82.25	89.00
	Historic	792	77.463	7.490	55.772	72.369	77.528	82.714	98.060

Results for Month = 8

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	76.66	7.91	56.86	74.04	78.56	81.44	88.91
	Historic	775	75.797	7.493	49.964	71.150	76.175	81.170	96.080

Results for Month = 9

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	65.18	10.71	47.98	56.67	66.24	74.34	83.08
	Historic	750	65.205	10.569	30.920	57.805	65.806	72.905	92.104

Results for Month = 10

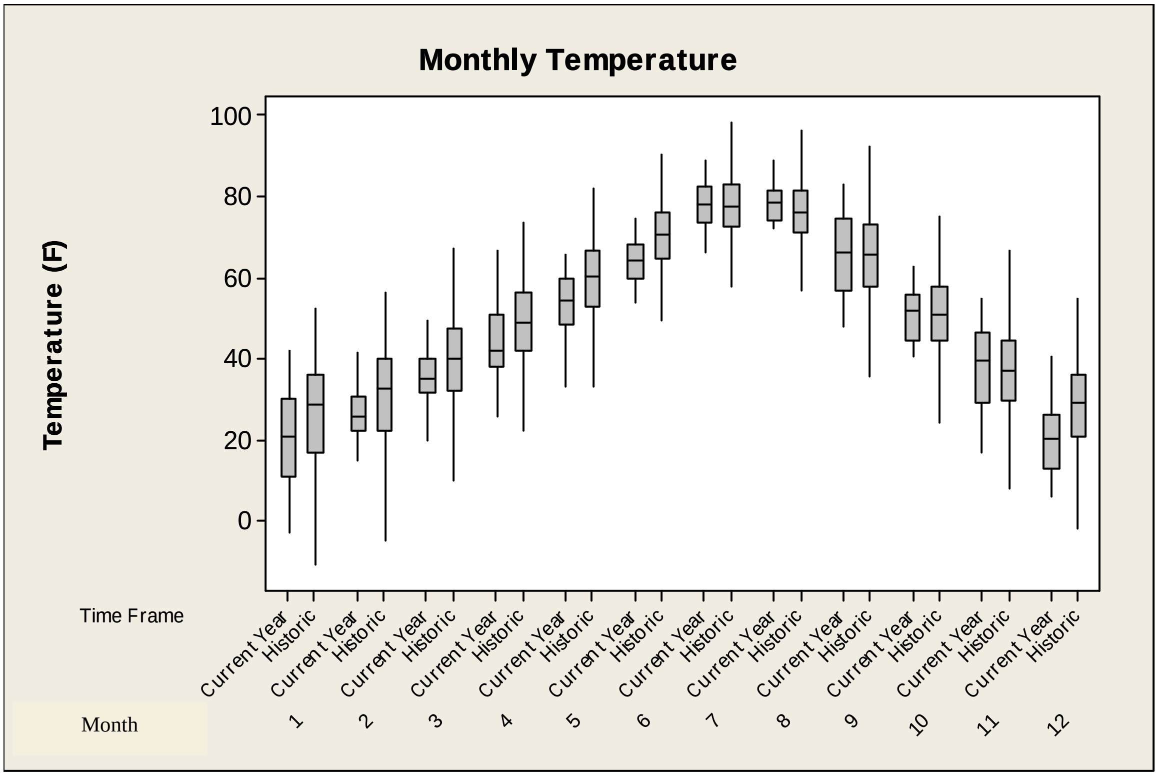
Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	50.72	6.48	40.40	44.46	51.80	55.79	62.83
	Historic	775	50.781	9.958	6.935	44.293	51.013	57.740	75.094

Results for Month = 11

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	30	37.37	10.94	16.48	28.94	39.33	46.27	54.82
	Historic	750	36.365	11.494	-1.710	29.576	37.075	44.349	66.358

Results for Month = 12

Variable	Time Frame	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Average	Current Year	31	19.62	8.59	5.98	12.78	20.24	26.15	40.45
	Historic	775	26.888	12.946	-22.804	20.427	28.811	35.960	54.950



Monthly Temperature
Temperature (F)
100
80
60
40
20
0
Time Frame
Current Year
Historic
Month
1
2
3
4
5
6
7
8
9
10
11
12

POWERTECH (USA) INC.

APPENDIX 5.5-B

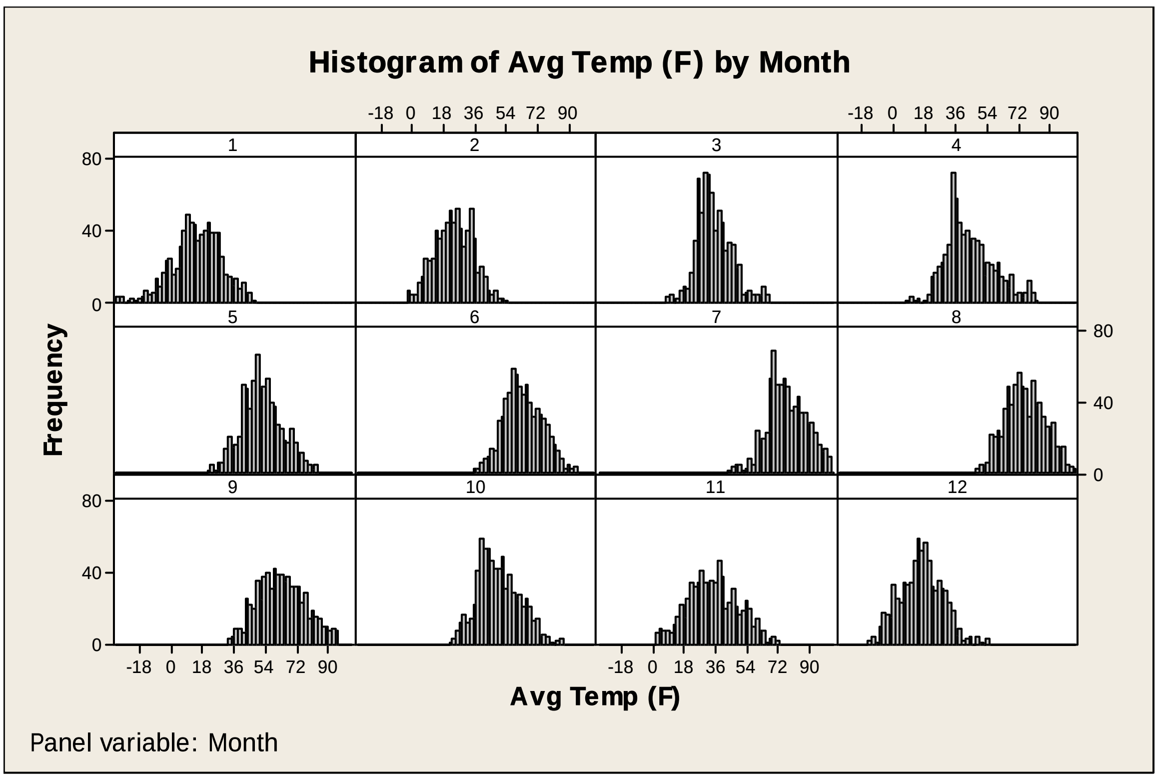
STATISTICAL REPORTS FOR DEWEY-BURDOCK METEOROLOGICAL SITE

POWERTECH (USA) INC.

STATISTICAL REPORTS FOR DEWEY-BURDOCK METEOROLOGICAL SITE

Descriptive Statistics: Avg Temp (F)

Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Avg Temp (F)	1	744	0	14.792	13.859	-30.000	7.000	15.000	25.000	48.000
	2	696	0	23.520	10.861	-2.000	16.000	24.000	32.000	53.000
	3	720	0	34.550	10.040	7.000	28.000	33.000	40.000	66.000
	4	720	0	43.082	13.914	7.000	34.000	41.000	51.000	81.000
	5	744	0	52.173	11.654	22.000	44.000	51.000	59.000	84.000
	6	720	0	63.306	10.914	35.000	56.000	62.000	71.000	94.000
	7	744	0	76.858	11.231	44.000	69.000	76.000	85.000	102.000
	8	744	0	75.160	11.226	48.000	67.000	74.000	83.000	103.000
	9	720	0	63.747	13.787	34.000	54.000	63.000	73.000	96.000
	10	744	0	49.210	12.055	22.000	40.000	48.000	57.000	86.000
	11	720	0	34.061	14.761	1.000	23.000	34.000	45.000	72.000
	12	744	0	15.073	12.085	-14.000	7.000	15.000	23.000	53.000



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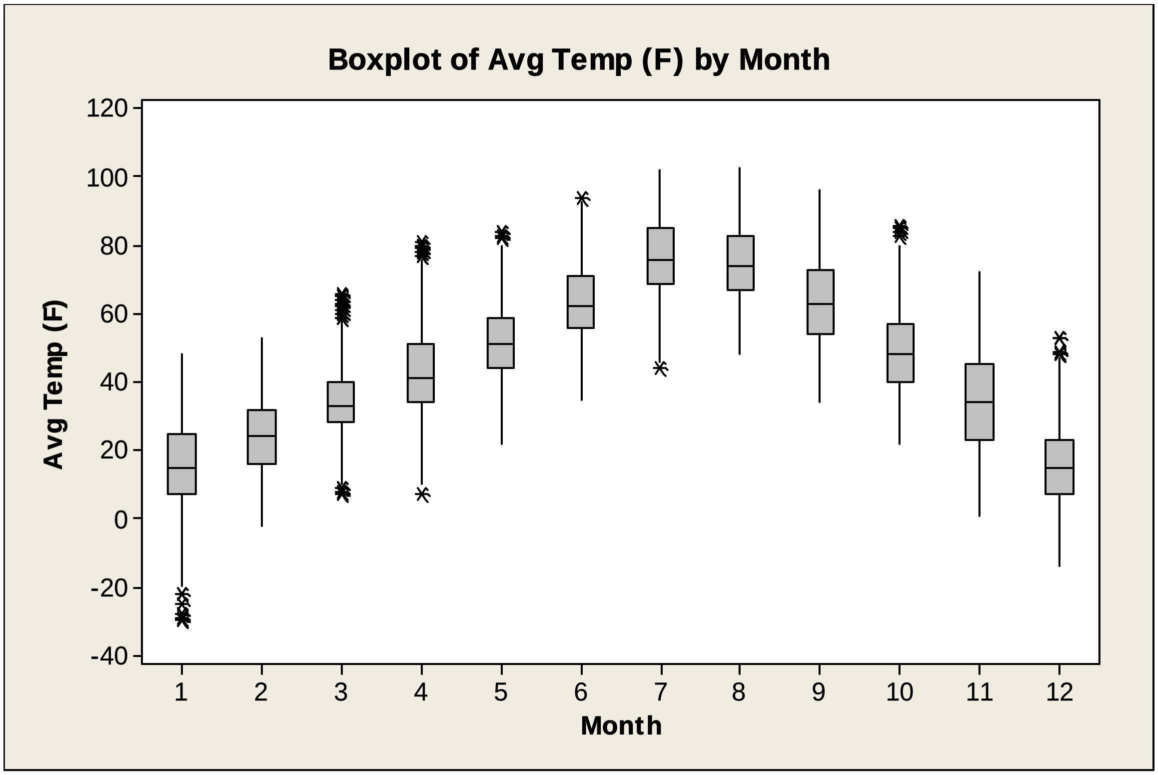
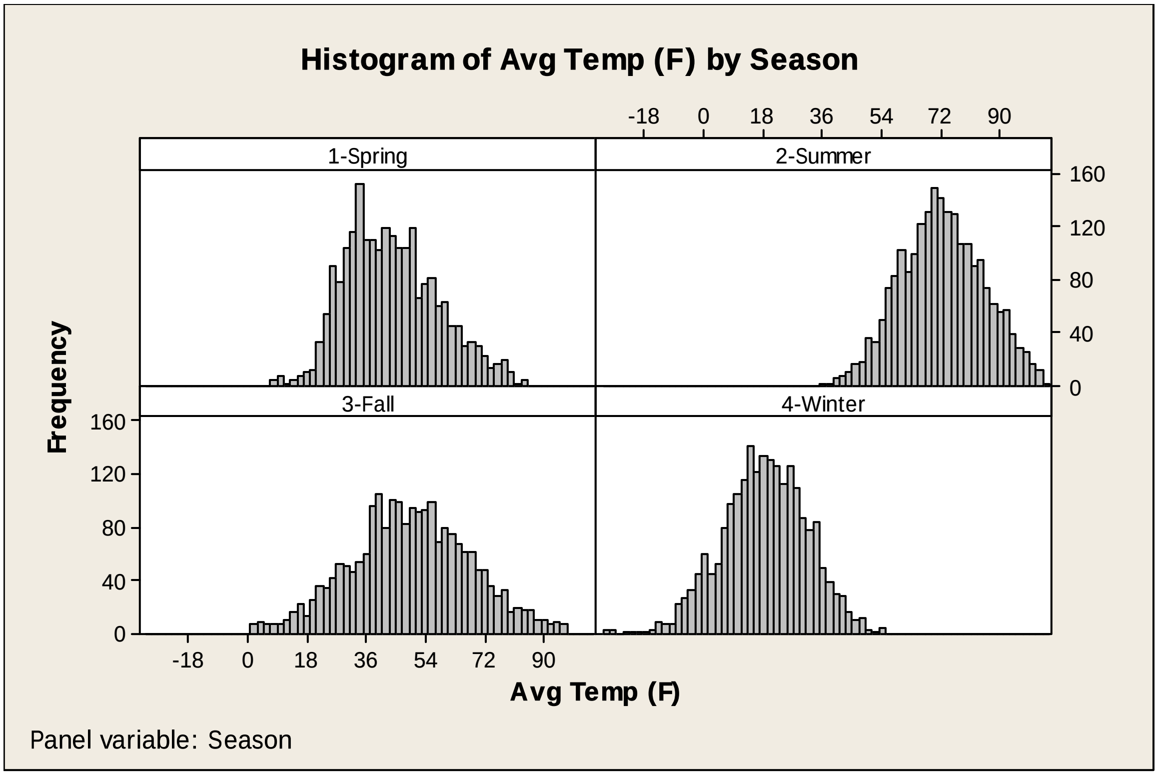
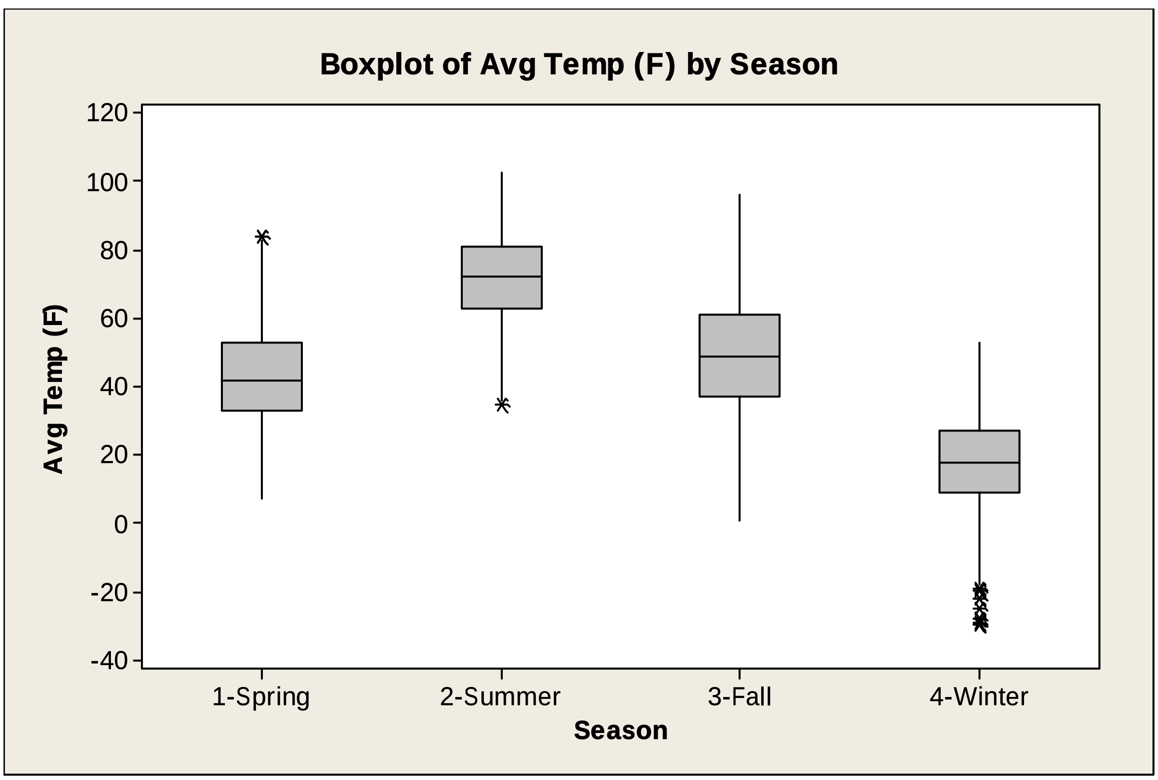


Descriptive Statistics: Avg Temp (F)

Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Avg Temp (F)	1-Spring	2184	0	43.366	13.975	7.000	33.000	42.000	53.000	84.000
	2-Summer	2208	0	71.866	12.636	35.000	63.000	72.000	81.000	103.000
	3-Fall	2184	0	49.008	18.144	1.000	37.000	49.000	61.000	96.000
	4-Winter	2184	0	17.669	12.987	-30.000	9.000	18.000	27.000	53.000



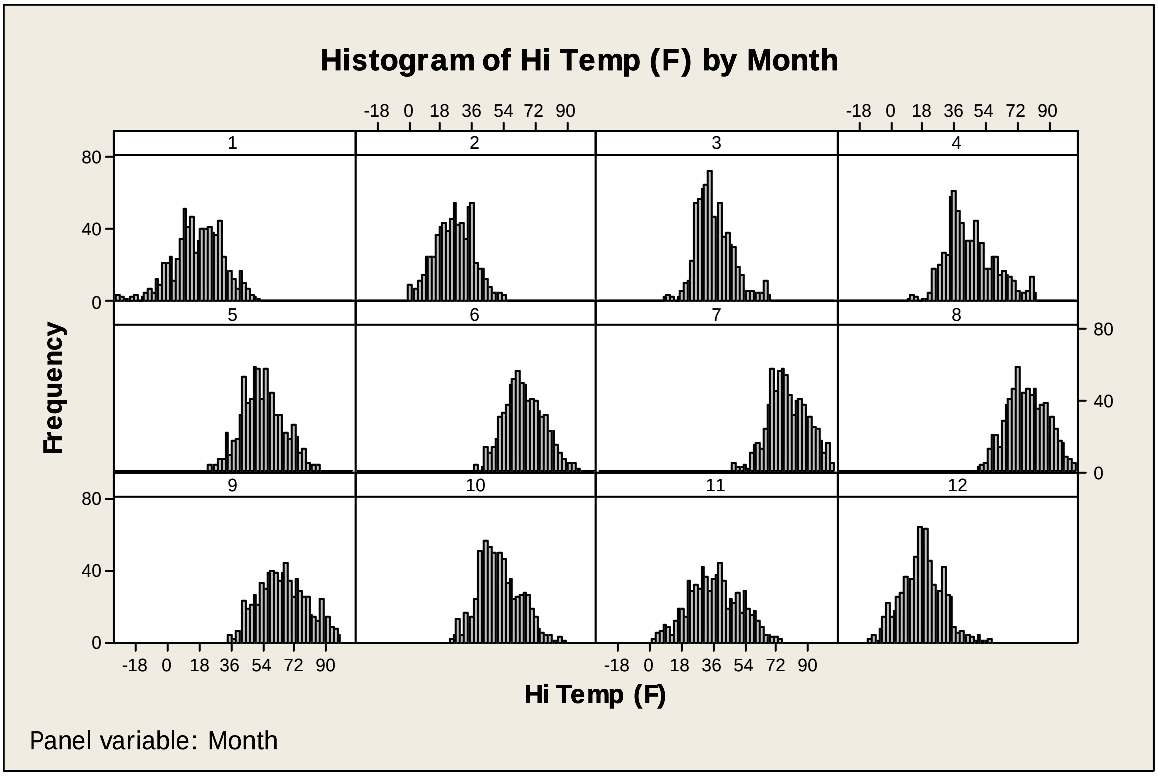
Histogram of Avg Temp (F) by Season
1-Spring
2-Summer
3-Fall
4-Winter
-18
0
18
36
54
72
90
0
40
80
120
160
Frequency
Avg Temp (F)
Panel variable: Season

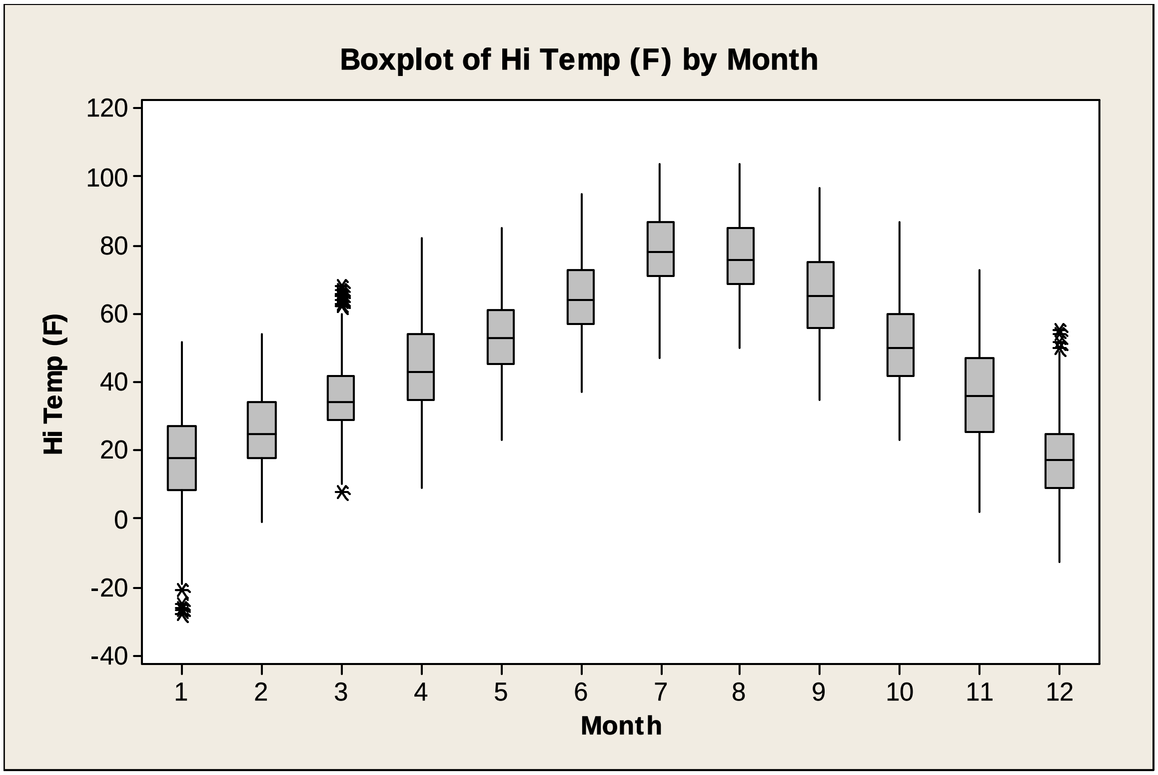


Boxplot of Avg Temp (F) by Season
120
100
80
60
40
20
0
-20
-40
Avg Temp (F)
1-Spring
2-Summer
3-Fall
4-Winter
Season

Descriptive Statistics: Hi Temp (F)

Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Hi Temp (F)	1	744	0	17.176	14.043	-28.000	8.250	18.000	27.000	52.000
	2	696	0	25.307	10.827	-1.000	18.000	25.000	34.000	54.000
	3	720	0	36.100	10.286	8.000	29.000	34.000	42.000	68.000
	4	720	0	44.954	14.008	9.000	35.000	43.000	54.000	82.000
	5	744	0	53.663	11.834	23.000	45.000	53.000	61.000	85.000
	6	720	0	65.026	10.932	37.000	57.000	64.000	73.000	95.000
	7	744	0	78.593	11.209	47.000	71.000	78.000	87.000	104.000
	8	744	0	76.902	11.387	50.000	69.000	76.000	85.000	104.000
	9	720	0	65.635	13.798	35.000	56.000	65.000	75.000	97.000
	10	744	0	51.003	12.020	23.000	42.000	50.000	60.000	87.000
	11	720	0	36.133	14.917	2.000	25.250	36.000	47.000	73.000
	12	744	0	17.262	11.831	-13.000	9.000	17.000	25.000	55.000





Descriptive Statistics: Hi Temp (F)

Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Hi Temp (F)	1-Spring	2184	0	45.002	14.101	8.000	34.000	44.000	55.000	85.000
	2-Summer	2208	0	73.599	12.686	37.000	65.000	73.000	82.000	104.000
	3-Fall	2184	0	50.924	18.130	2.000	39.000	51.000	63.000	97.000
	4-Winter	2184	0	19.797	12.896	-28.000	11.000	20.000	29.000	55.000

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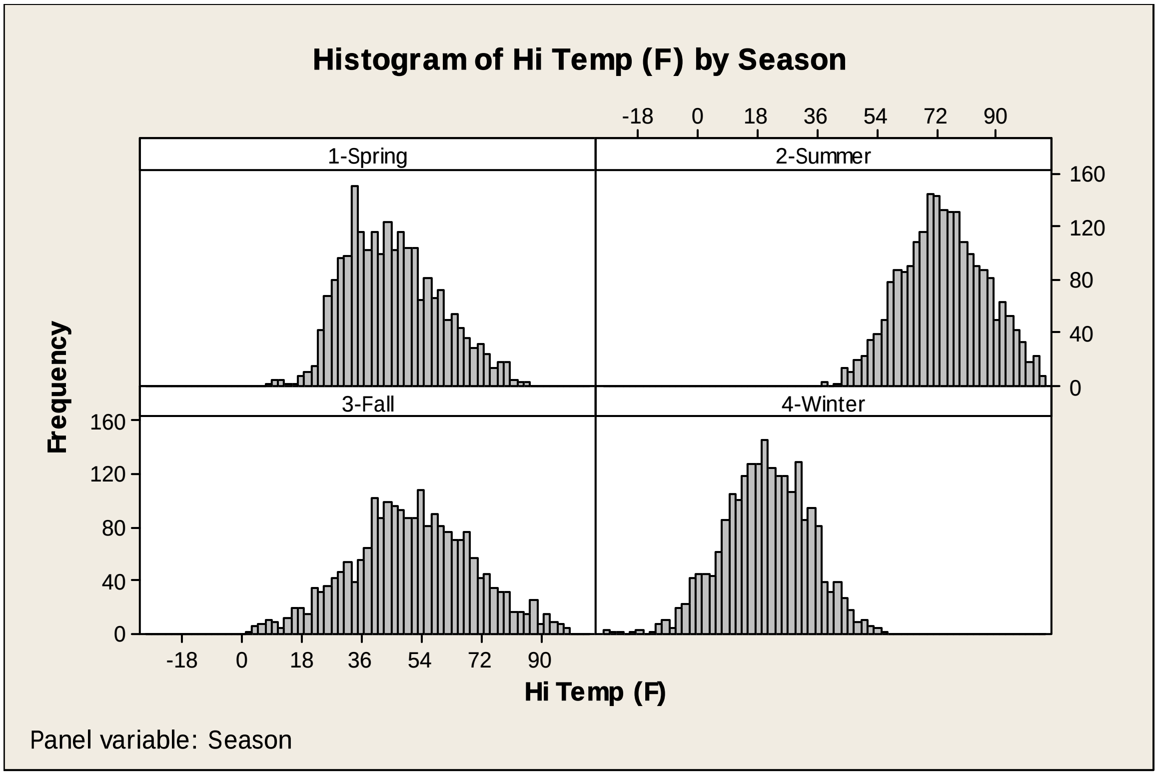
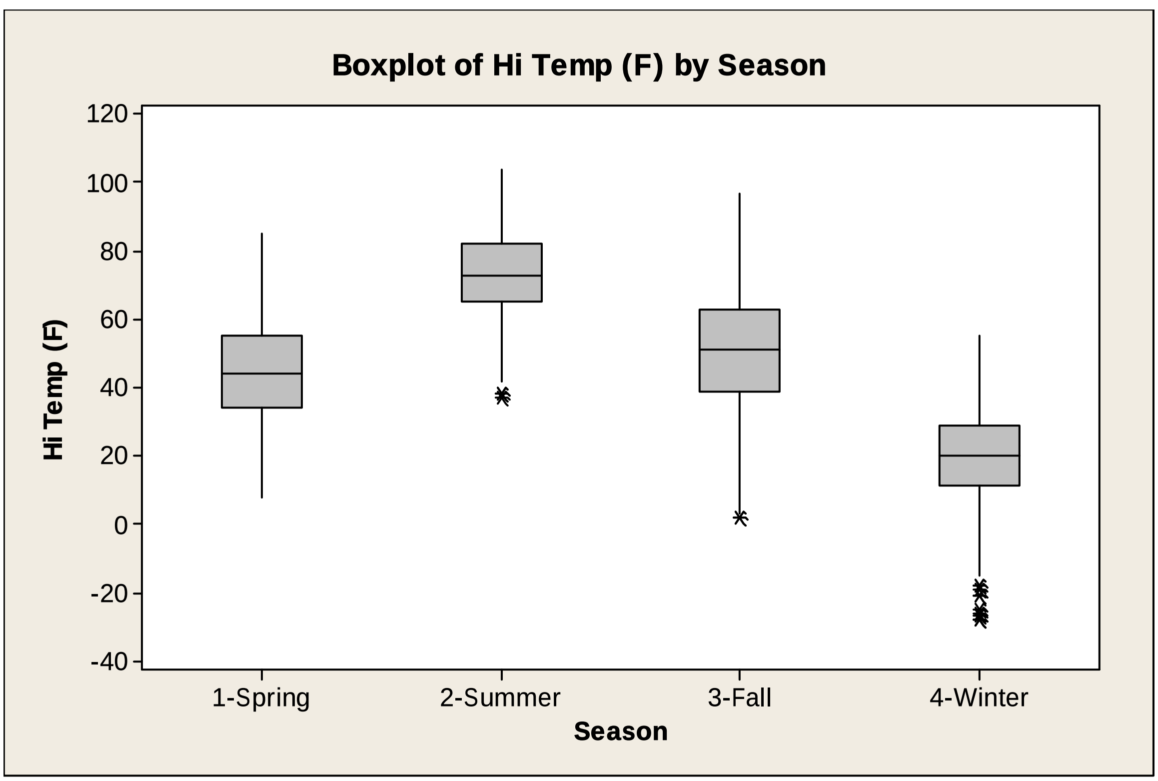
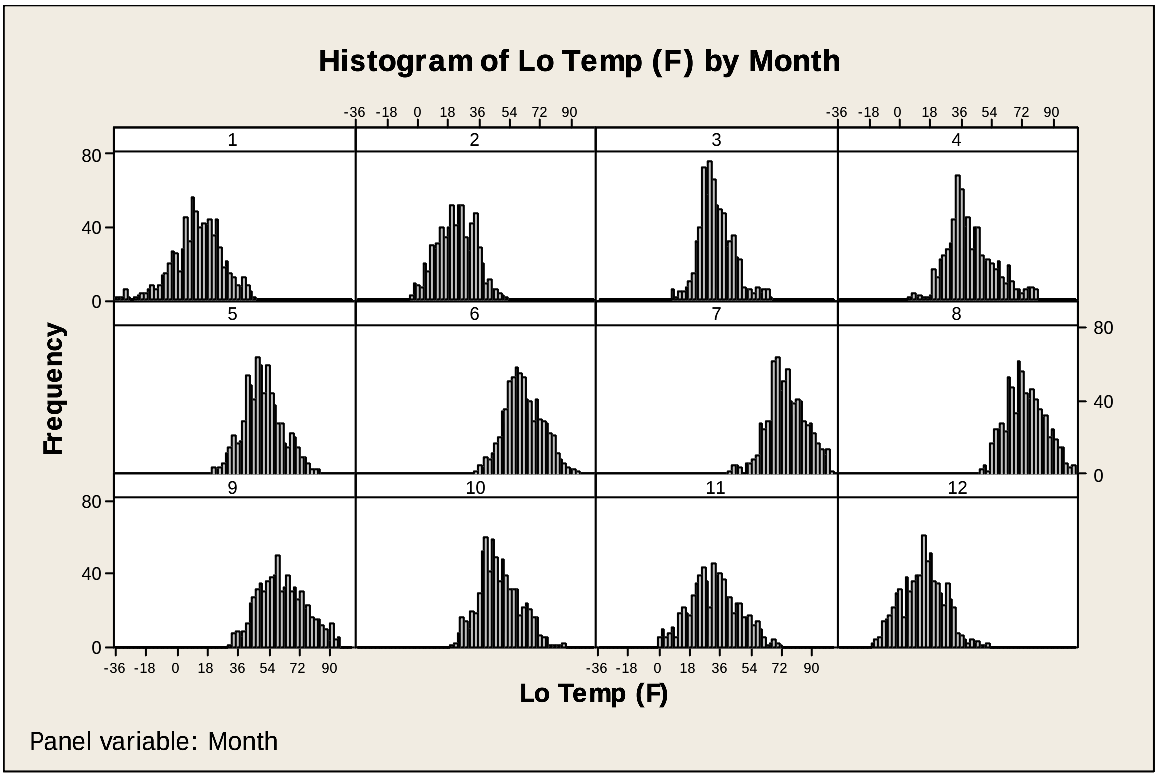
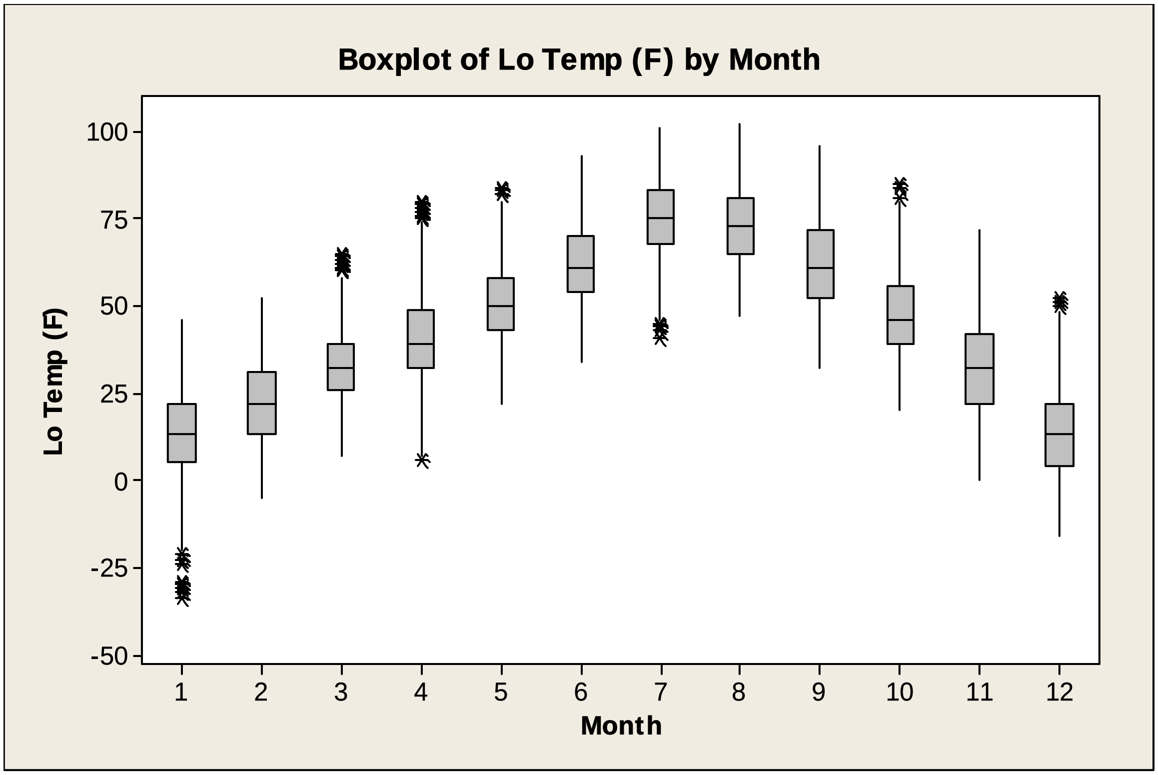




Descriptive Statistics: Lo Temp (F)

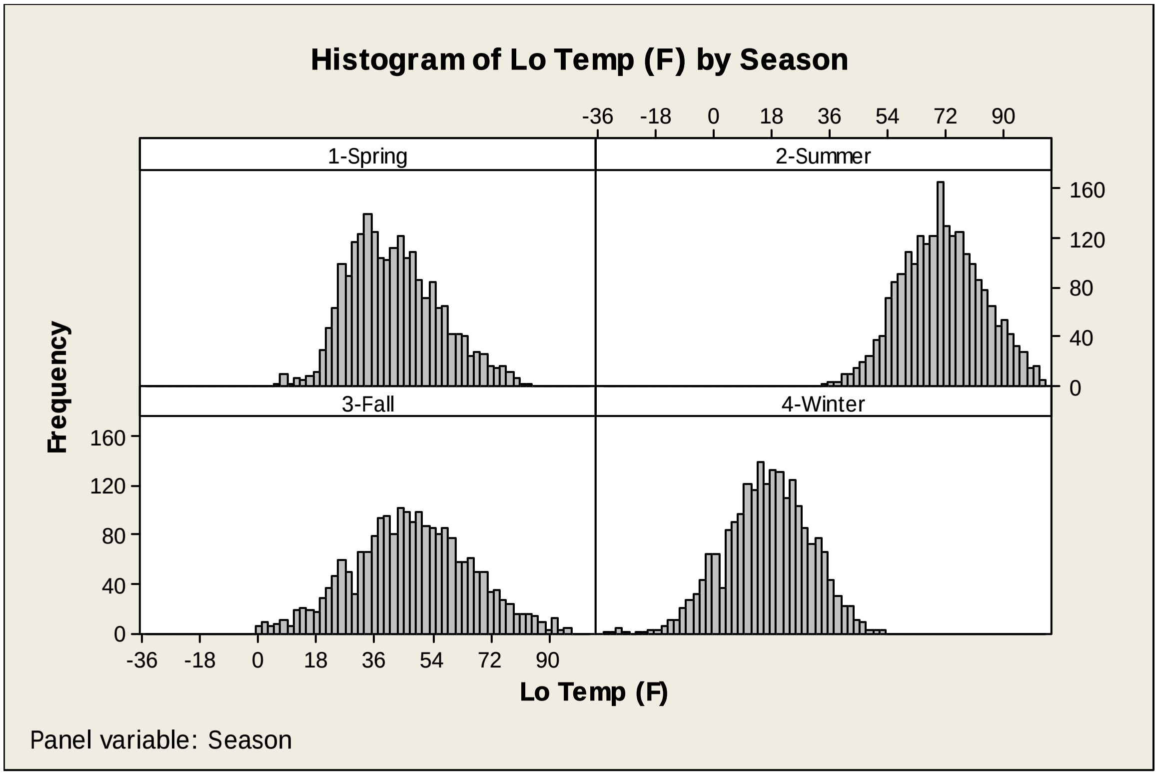
Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Lo Temp (F)	1	744	0	12.538	13.869	-34.000	5.000	13.000	22.000	46.000
	2	696	0	21.797	11.032	-5.000	13.250	22.000	31.000	52.000
	3	720	0	32.993	9.890	7.000	26.000	32.000	39.000	65.000
	4	720	0	41.326	13.840	6.000	32.000	39.000	49.000	80.000
	5	744	0	50.719	11.503	22.000	43.000	50.000	58.000	84.000
	6	720	0	61.635	10.928	34.000	54.000	61.000	70.000	93.000
	7	744	0	75.144	11.330	41.000	68.000	75.000	83.000	101.000
	8	744	0	73.449	11.173	47.000	65.000	73.000	81.000	102.000
	9	720	0	61.931	13.775	32.000	52.000	61.000	72.000	96.000
	10	744	0	47.539	12.074	20.000	39.000	46.000	55.750	85.000
	11	720	0	32.004	14.599	0.000	22.000	32.000	42.000	72.000
	12	744	0	12.957	12.541	-16.000	4.000	13.000	22.000	52.000

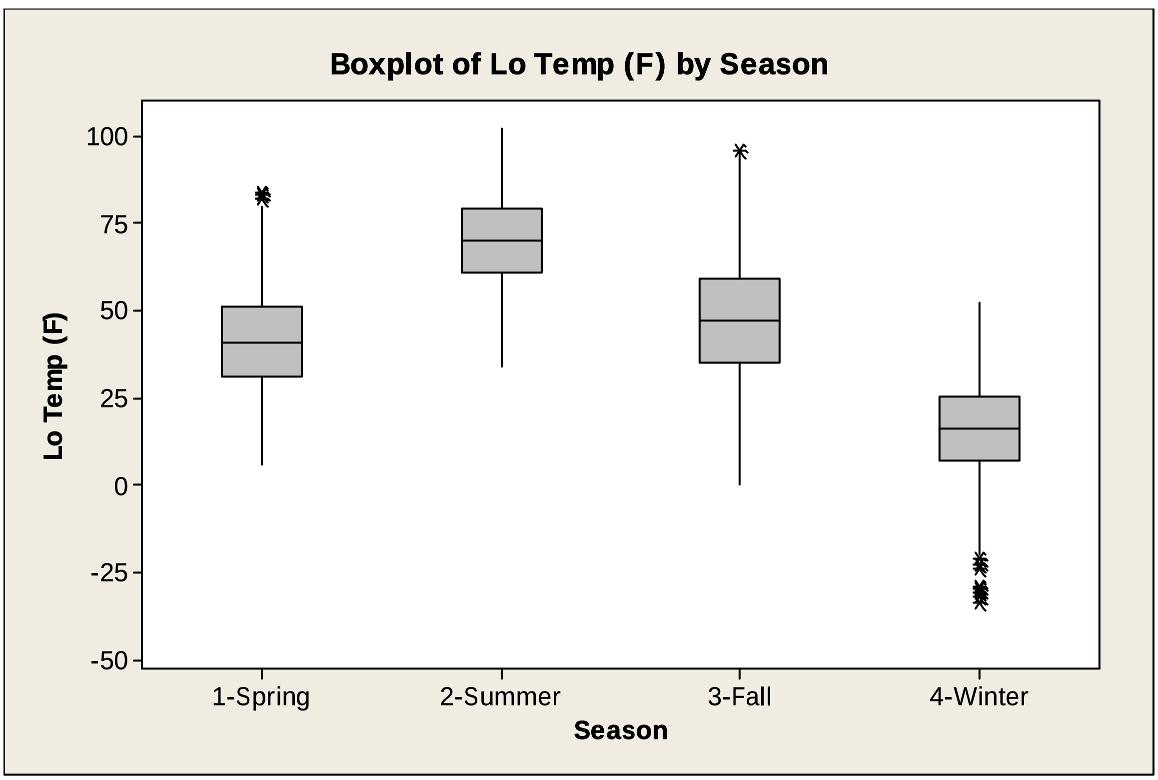




Descriptive Statistics: Lo Temp (F)

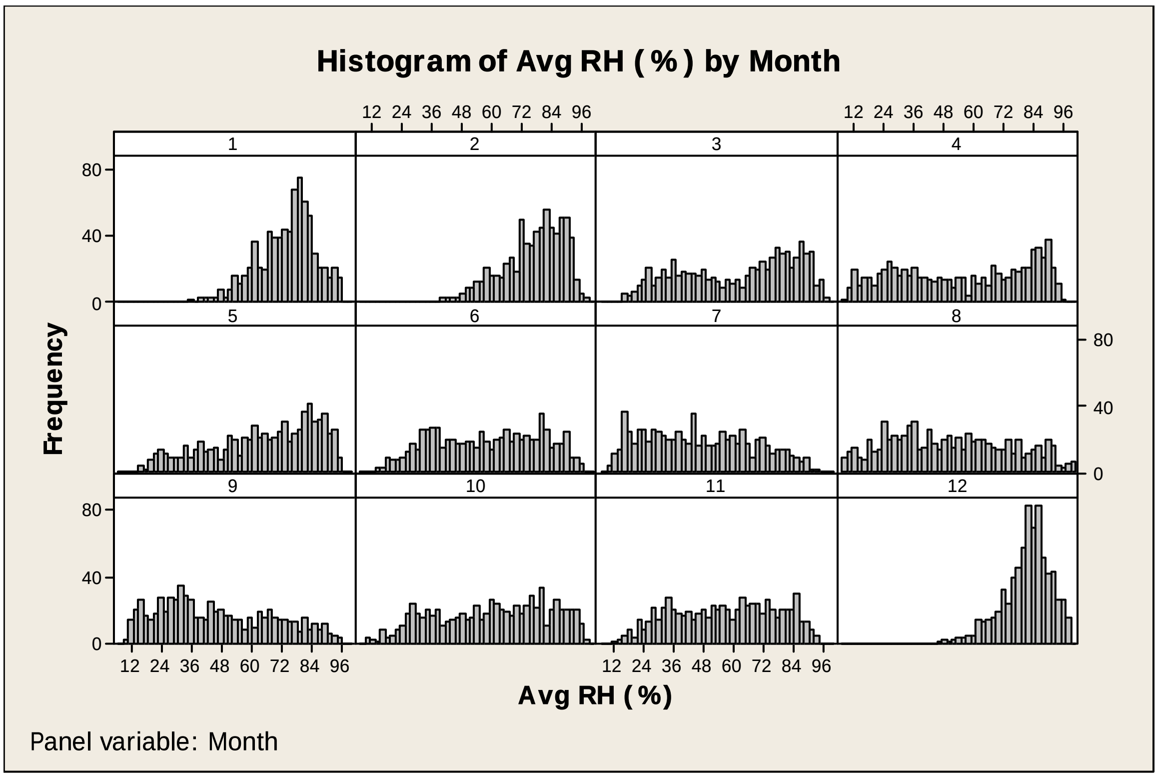
Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Lo Temp (F)	1-Spring	2184	0	41.779	13.896	6.000	31.000	41.000	51.000	84.000
	2-Summer	2208	0	70.168	12.644	34.000	61.000	70.000	79.000	102.000
	3-Fall	2184	0	47.162	18.168	0.000	35.000	47.000	59.000	96.000
	4-Winter	2184	0	15.631	13.250	-34.000	7.000	16.000	25.000	52.000

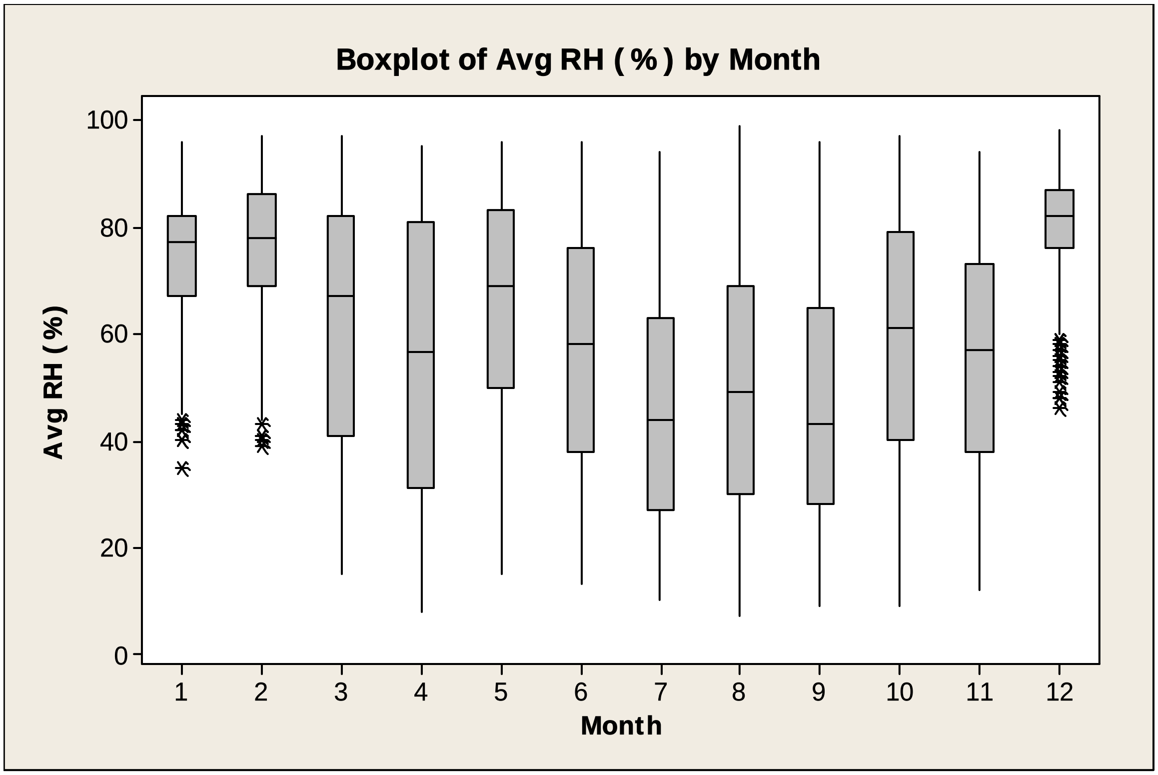

Histogram of Lo Temp (F) by Season
1-Spring
2-Summer
3-Fall
4-Winter
Frequency
Lo Temp (F)
-36
-18
0
18
36
54
72
90
0
40
80
120
160
Panel variable: Season


Boxplot of Lo Temp (F) by Season
Lo Temp (F)
100
75
50
25
0
-25
-50
1-Spring
2-Summer
3-Fall
4-Winter
Season

Descriptive Statistics: Avg RH (%)

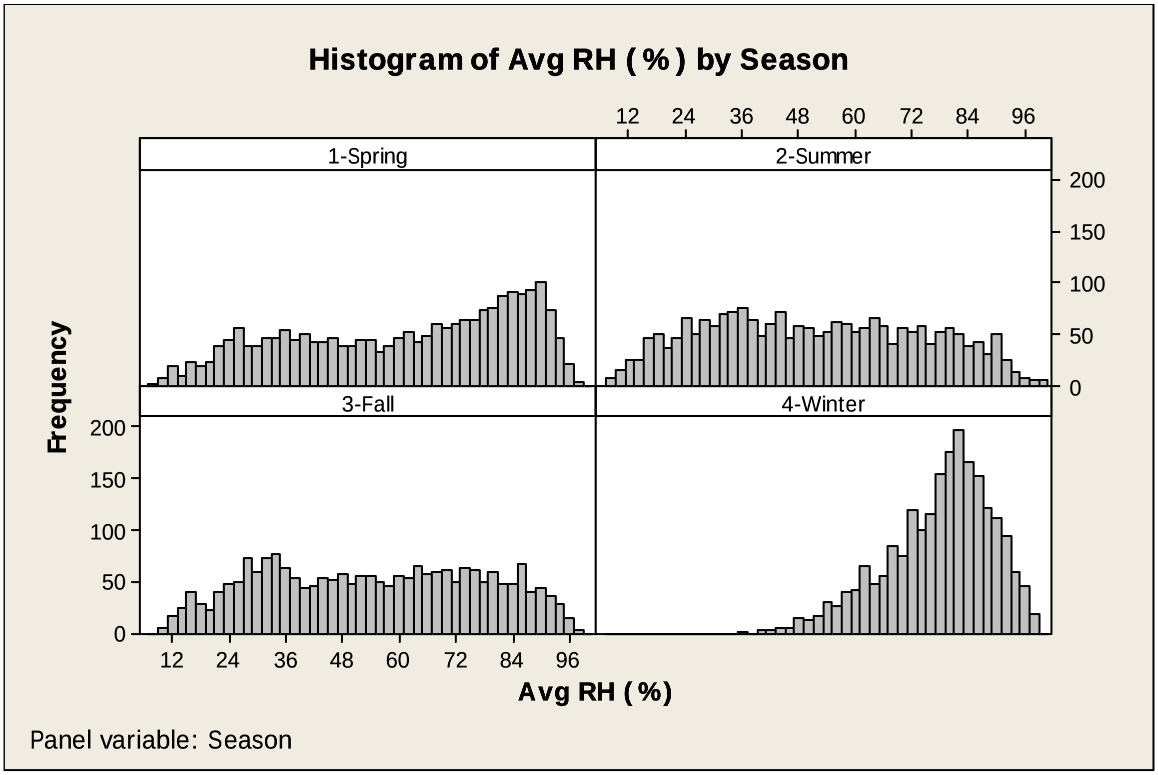
Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Avg RH (%)	1	744	0	74.401	11.316	35.000	67.000	77.000	82.000	96.000
	2	696	0	76.204	12.055	39.000	69.000	78.000	86.000	97.000
	3	720	0	61.858	22.846	15.000	41.000	67.000	82.000	97.000
	4	720	0	55.276	26.033	8.000	31.250	56.500	80.750	95.000
	5	744	0	64.849	21.121	15.000	50.000	69.000	83.000	96.000
	6	720	0	57.286	21.158	13.000	38.000	58.000	76.000	96.000
	7	744	0	45.902	21.533	10.000	27.000	44.000	63.000	94.000
	8	744	0	49.981	23.951	7.000	30.000	49.000	69.000	99.000
	9	720	0	46.239	22.786	9.000	28.000	43.000	65.000	96.000
	10	744	0	59.480	22.502	9.000	40.000	61.000	79.000	97.000
	11	720	0	56.265	20.717	12.000	38.000	57.000	73.000	94.000
	12	744	0	80.942	9.595	46.000	76.000	82.000	87.000	98.000

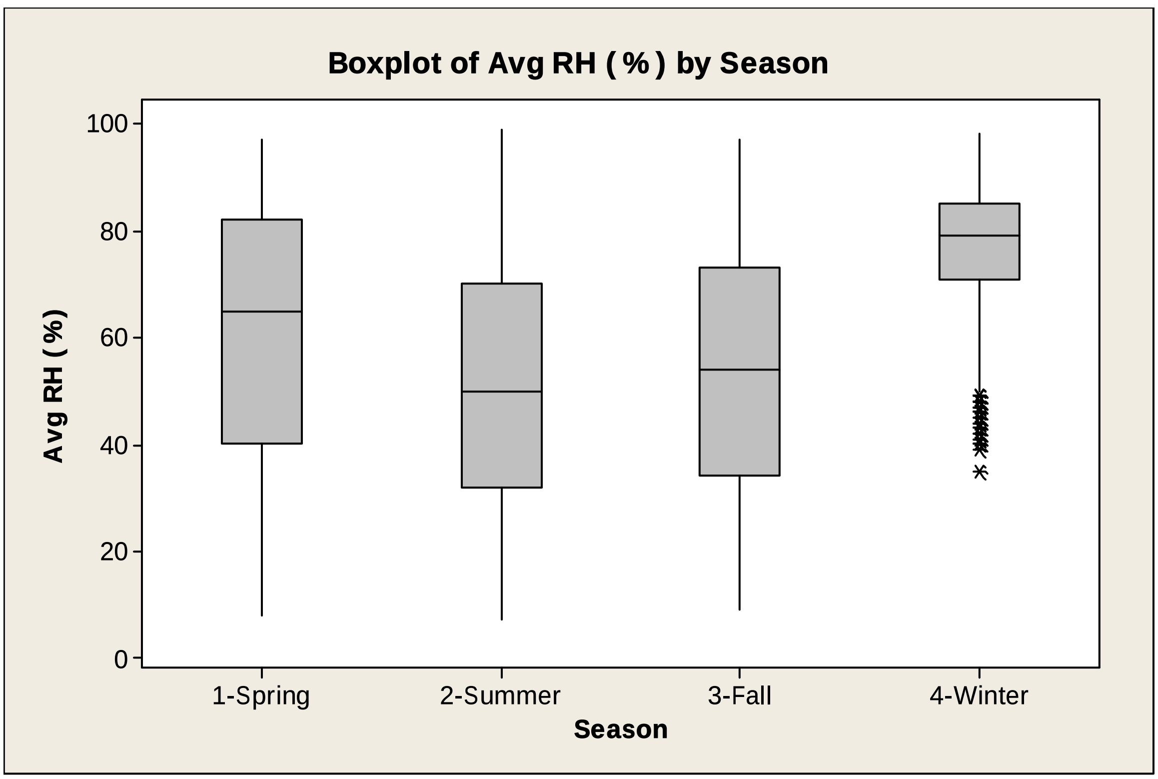




Descriptive Statistics: Avg RH (%)

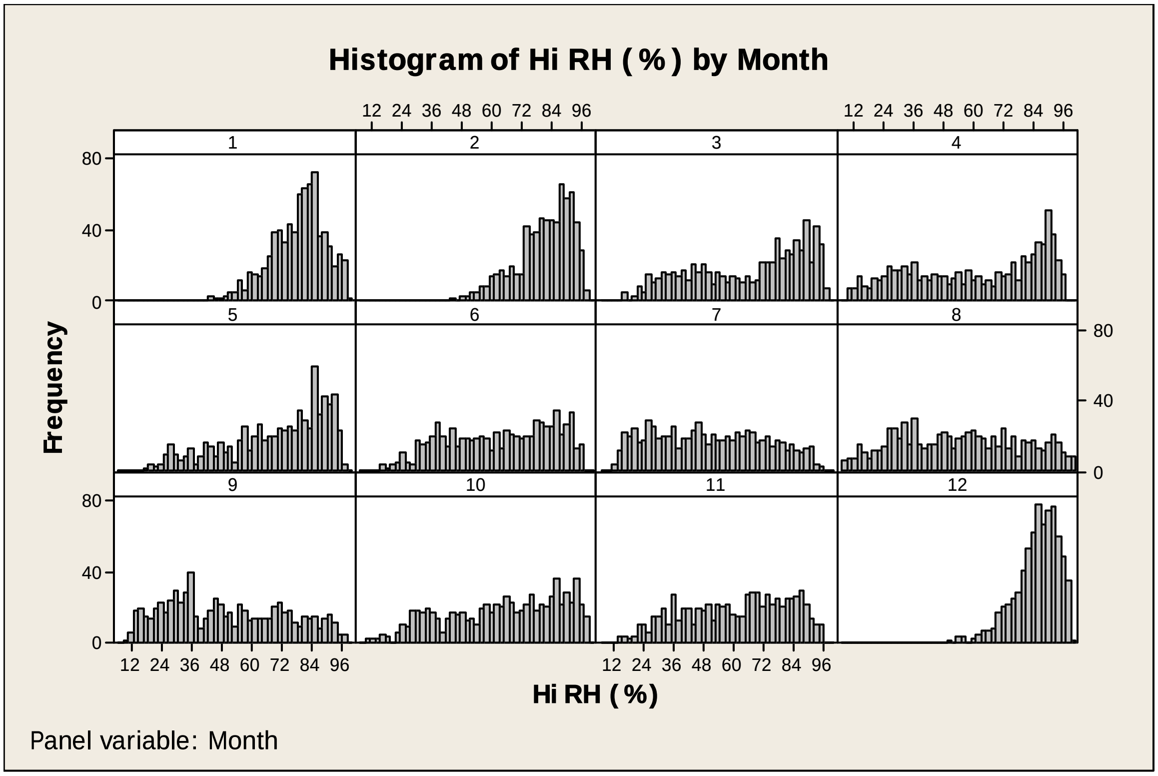
Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Avg RH (%)	1-Spring	2184	0	60.707	23.727	8.000	40.000	65.000	82.000	97.000
	2-Summer	2208	0	50.989	22.739	7.000	32.000	50.000	70.000	99.000
	3-Fall	2184	0	54.055	22.726	9.000	34.000	54.000	73.000	97.000
	4-Winter	2184	0	77.204	11.355	35.000	71.000	79.000	85.000	98.000

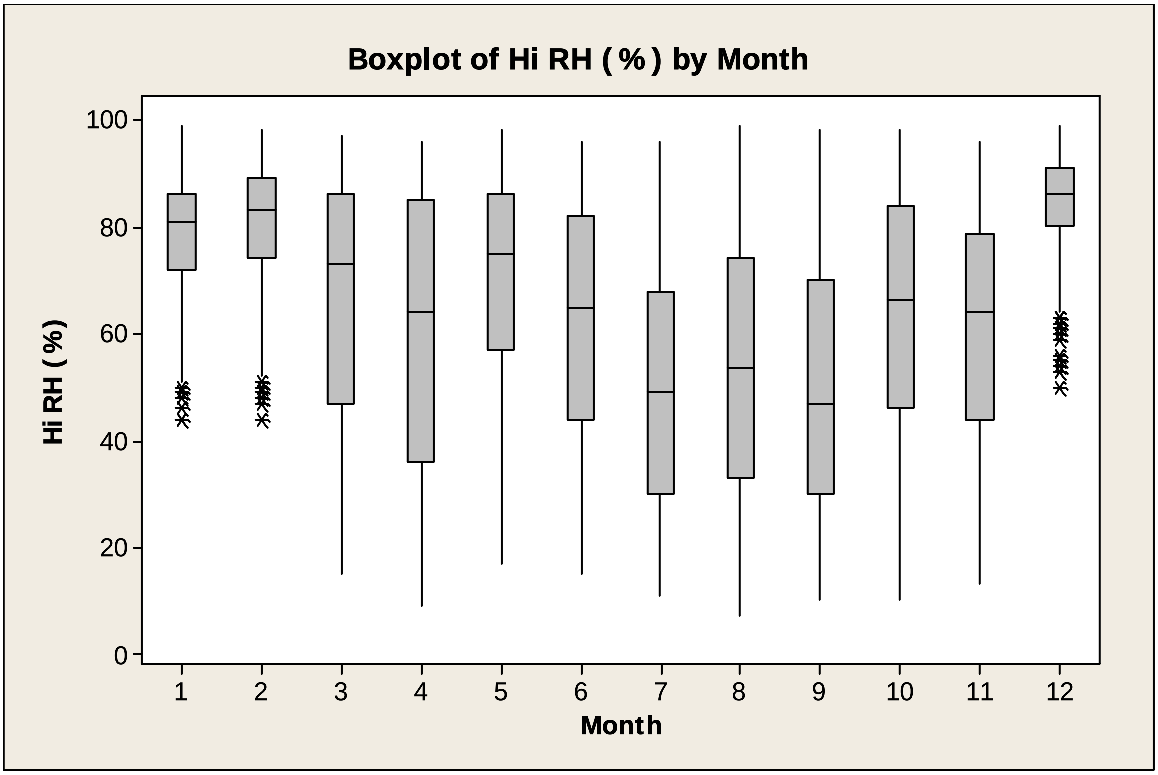

Histogram of Avg RH (%) by Season
1-Spring
2-Summer
3-Fall
4-Winter
Frequency
Avg RH (%)
12 24 36 48 60 72 84 96
0 50 100 150 200
Panel variable: Season


Boxplot of Avg RH (%) by Season
Avg RH (%)
0 20 40 60 80 100
1-Spring
2-Summer
3-Fall
4-Winter
Season

Descriptive Statistics: Hi RH (%)

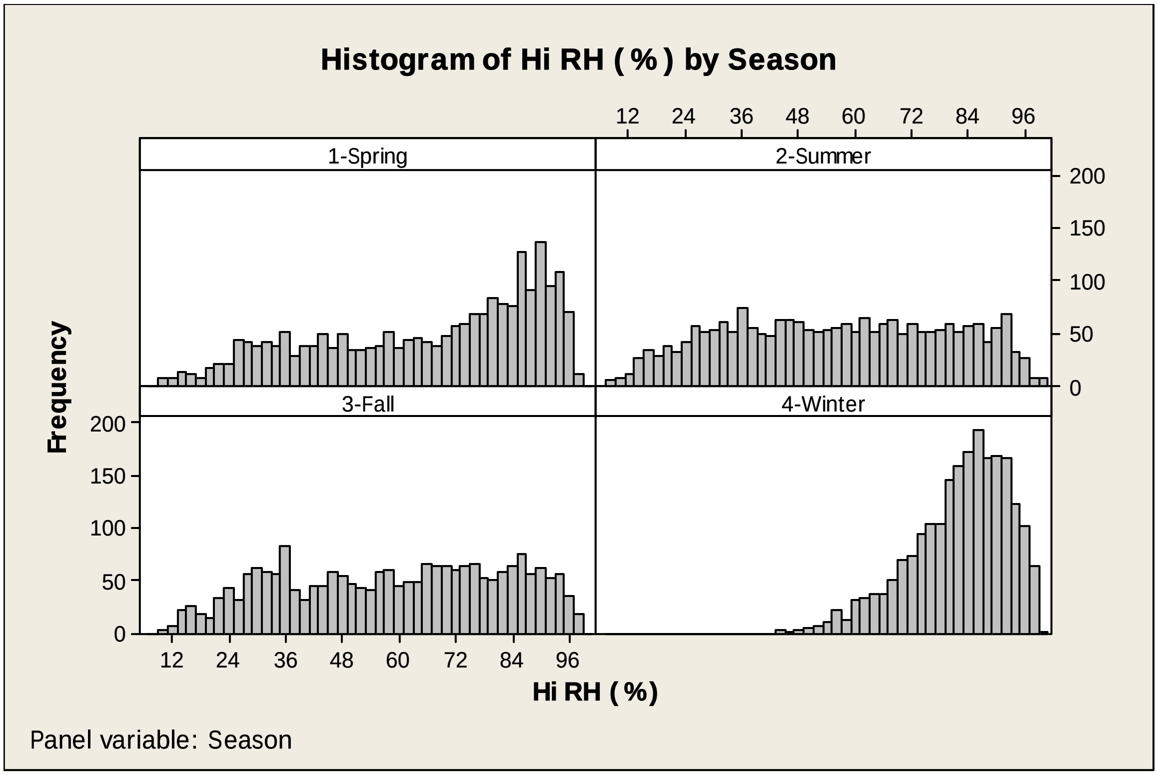
Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Hi RH (%)	1	744	0	79.089	10.652	44.000	72.000	81.000	86.000	99.000
	2	696	0	80.704	10.902	44.000	74.000	83.000	89.000	98.000
	3	720	0	66.451	22.568	15.000	47.000	73.000	86.000	97.000
	4	720	0	60.206	26.101	9.000	36.000	64.000	85.000	96.000
	5	744	0	69.940	20.135	17.000	57.000	75.000	86.000	98.000
	6	720	0	62.814	21.013	15.000	44.000	65.000	82.000	96.000
	7	744	0	49.991	22.415	11.000	30.000	49.000	68.000	96.000
	8	744	0	53.909	24.419	7.000	33.000	53.500	74.000	99.000
	9	720	0	50.150	23.648	10.000	30.000	47.000	70.000	98.000
	10	744	0	63.888	22.670	10.000	46.000	66.500	84.000	98.000
	11	720	0	60.954	20.860	13.000	44.000	64.000	78.750	96.000
	12	744	0	84.997	8.711	50.000	80.000	86.000	91.000	99.000

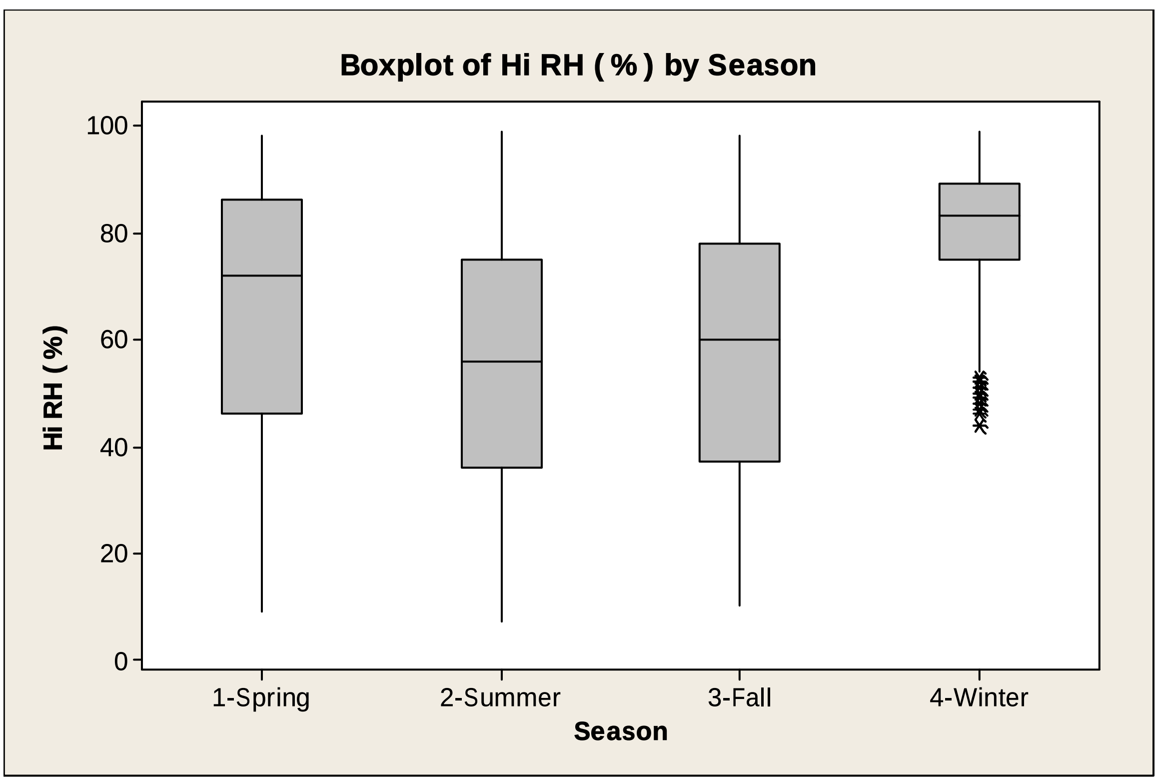




Descriptive Statistics: Hi RH (%)

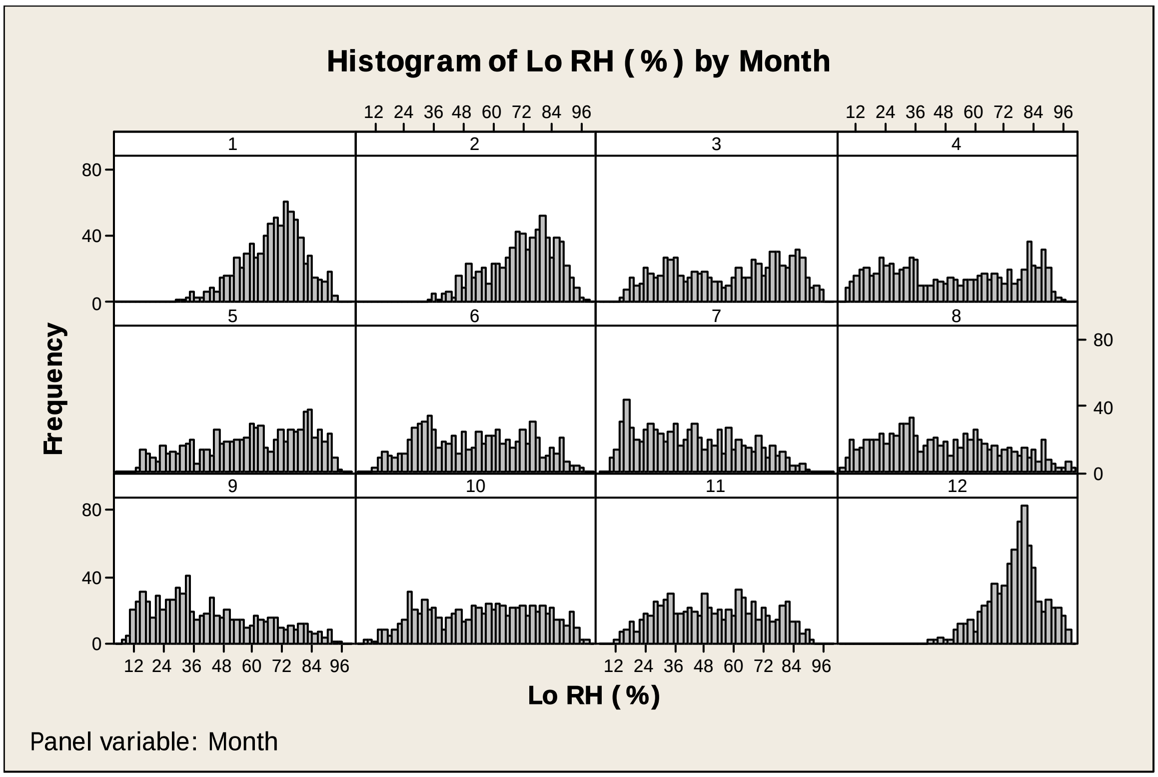
Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Hi RH (%)	1-Spring	2184	0	65.581	23.375	9.000	46.000	72.000	86.000	98.000
	2-Summer	2208	0	55.492	23.286	7.000	36.000	56.000	75.000	99.000
	3-Fall	2184	0	58.392	23.180	10.000	37.000	60.000	78.000	98.000
	4-Winter	2184	0	81.616	10.422	44.000	75.000	83.000	89.000	99.000

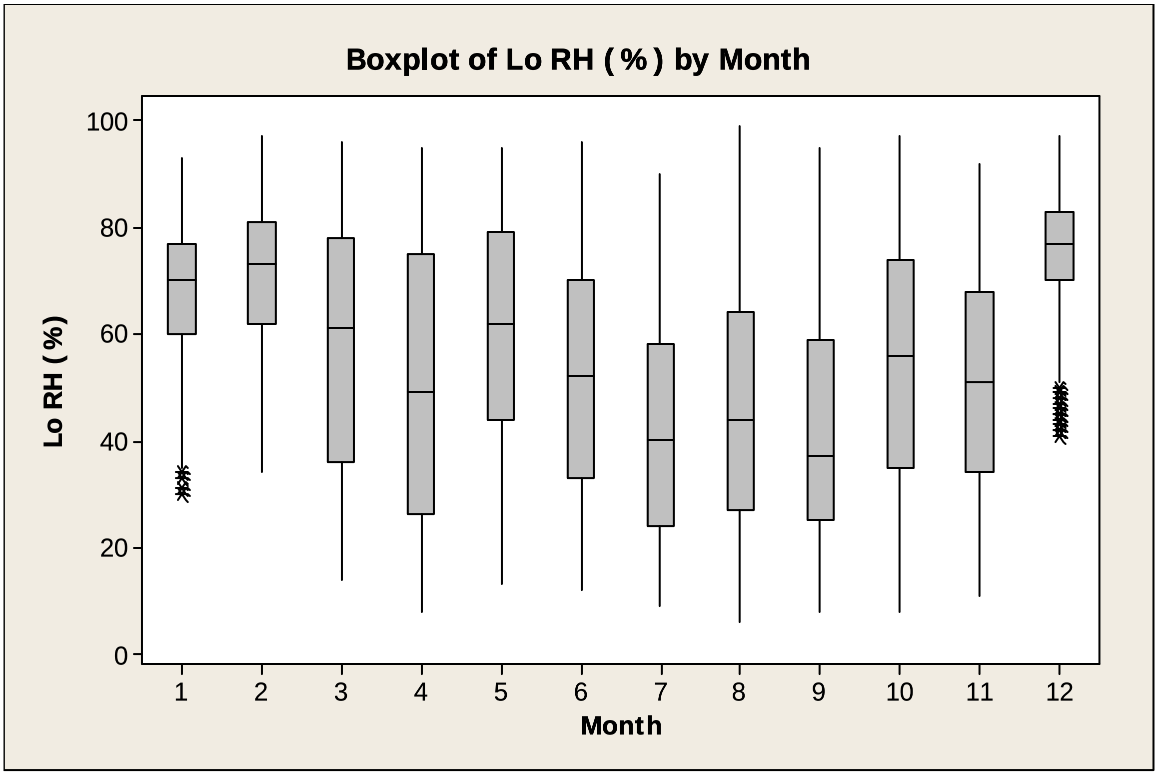

Histogram of Hi RH (%) by Season
1-Spring
2-Summer
3-Fall
4-Winter
Frequency
Hi RH (%)
12 24 36 48 60 72 84 96
0 50 100 150 200
Panel variable: Season


Boxplot of Hi RH (%) by Season
Hi RH (%)
0 20 40 60 80 100
1-Spring
2-Summer
3-Fall
4-Winter
Season

Descriptive Statistics: Lo RH (%)

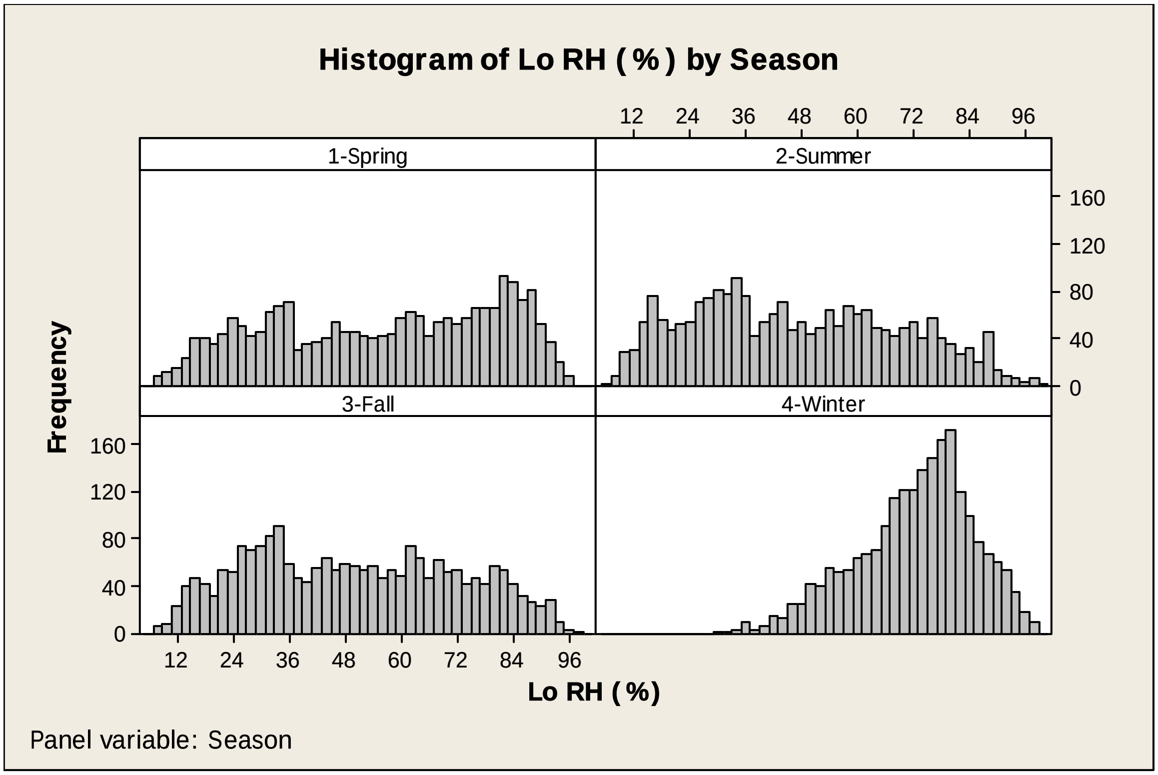
Variable	Month	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Lo RH (%)	1	744	0	68.601	12.330	30.000	60.000	70.000	77.000	93.000
	2	696	0	71.119	13.476	34.000	62.000	73.000	81.000	97.000
	3	720	0	57.353	22.974	14.000	36.000	61.000	78.000	96.000
	4	720	0	50.326	25.874	8.000	26.250	49.000	75.000	95.000
	5	744	0	59.954	21.723	13.000	44.000	62.000	79.000	95.000
	6	720	0	51.854	21.077	12.000	33.000	52.000	70.000	96.000
	7	744	0	42.000	20.728	9.000	24.000	40.000	58.000	90.000
	8	744	0	45.991	23.599	6.000	27.000	44.000	64.000	99.000
	9	720	0	42.293	21.856	8.000	25.000	37.000	59.000	95.000
	10	744	0	54.921	22.251	8.000	35.000	56.000	74.000	97.000
	11	720	0	51.574	20.250	11.000	34.000	51.000	68.000	92.000
	12	744	0	75.931	11.041	41.000	70.000	77.000	83.000	97.000

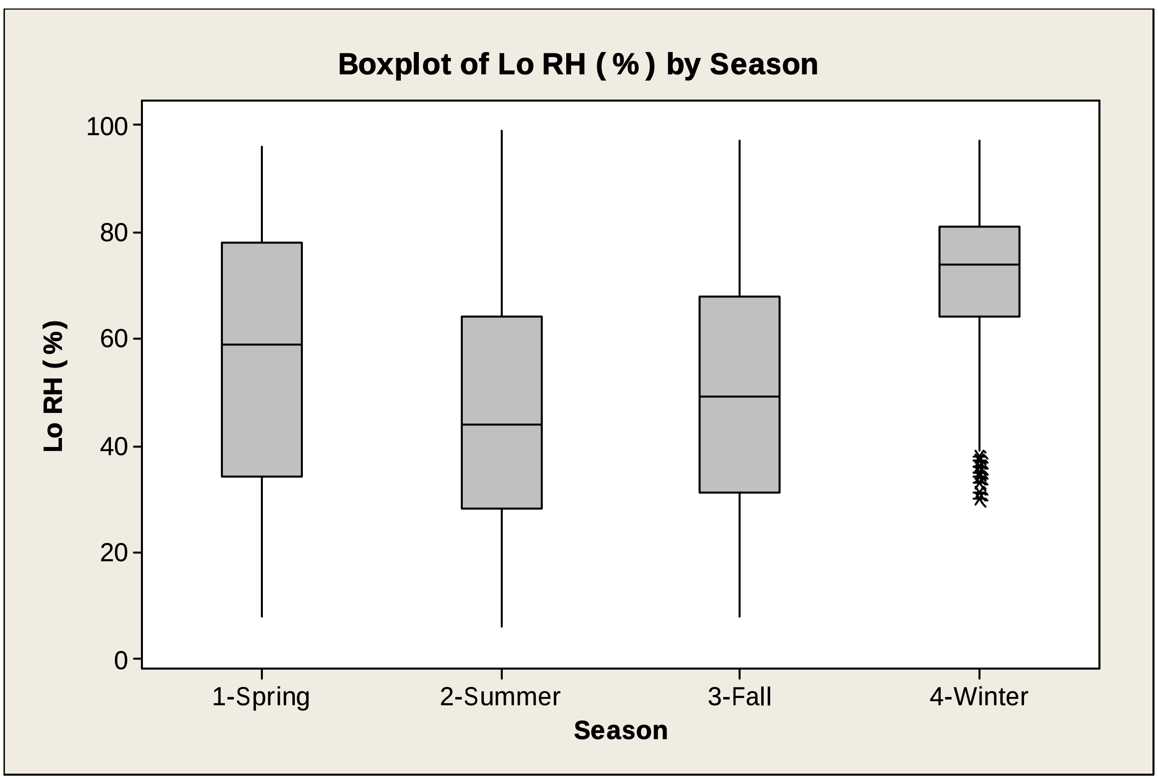




Descriptive Statistics: Lo RH (%)

Variable	Season	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Lo RH (%)	1-Spring	2184	0	55.923	23.906	8.000	34.000	59.000	78.000	96.000
	2-Summer	2208	0	46.558	22.206	6.000	28.000	44.000	64.000	99.000
	3-Fall	2184	0	49.654	22.123	8.000	31.000	49.000	68.000	97.000
	4-Winter	2184	0	71.901	12.669	30.000	64.000	74.000	81.000	97.000


Histogram of Lo RH (%) by Season
1-Spring
2-Summer
3-Fall
4-Winter
Frequency
Lo RH (%)
0
40
80
120
160
12
24
36
48
60
72
84
96
Panel variable: Season


Boxplot of Lo RH (%) by Season
Lo RH (%)
0
20
40
60
80
100
1-Spring
2-Summer
3-Fall
4-Winter
Season

Descriptive Statistics: Precip (Inches)

Variable	Month	N	N*	Sum	Maximum
Precip (Inches)	1	744	0	0.130000	0.050000
	2	696	0	0.210000	0.040000
	3	720	0	0.400000	0.130000
	4	720	0	0.980000	0.330000
	5	744	0	3.80000	0.71000
	6	720	0	1.770000	0.420000
	7	744	0	1.870000	0.460000
	8	744	0	0.870000	0.160000
	9	720	0	0.790000	0.140000
	10	744	0	1.230000	0.220000
	11	720	0	0.100000	0.050000
	12	744	0	0.270000	0.040000

Powertech (USA) Inc.

APPENDIX 5.5-C

SITE-SPECIFIC WIND ANALYSIS

POWERTECH (USA) INC.

SITE-SPECIFIC WIND ANALYSIS

Station ID: 1 Run ID:
Year: 2007 2008
Date Range: July 2007–July 2008
Time Range: 00:00 - 23:00

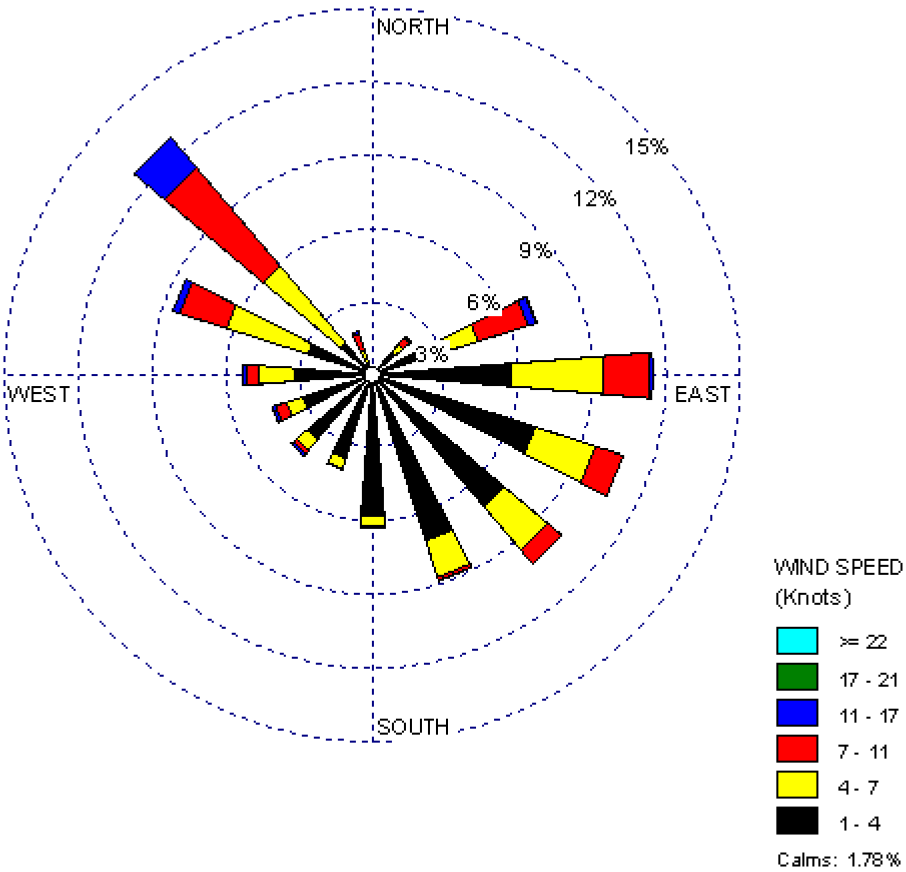
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000345	0.000115	0.000000	0.000000	0.000000	0.000000	0.000459
11.25 - 33.75	0.002526	0.000804	0.000459	0.000115	0.000000	0.000000	0.003904
33.75 - 56.25	0.012517	0.003790	0.003790	0.000804	0.000230	0.000230	0.021360
56.25 - 78.75	0.028250	0.016996	0.021475	0.003330	0.000459	0.000000	0.070510
78.75 - 101.25	0.057074	0.037322	0.018489	0.001263	0.000000	0.000000	0.114148
101.25 - 123.75	0.069936	0.025609	0.011713	0.000000	0.000000	0.000000	0.107258
123.75 - 146.25	0.070740	0.022738	0.007350	0.000115	0.000115	0.000000	0.101056
146.25 - 168.75	0.071199	0.015618	0.001378	0.000345	0.000000	0.000000	0.088539
168.75 - 191.25	0.057533	0.004364	0.000459	0.000230	0.000000	0.000000	0.062586
191.25 - 213.75	0.035829	0.004364	0.000345	0.000115	0.000000	0.000000	0.040652
213.75 - 236.25	0.035140	0.005397	0.002182	0.001034	0.000000	0.000000	0.043753
236.25 - 258.75	0.030202	0.006890	0.004593	0.001493	0.000115	0.000000	0.043294
258.75 - 281.25	0.032269	0.014469	0.004364	0.001952	0.000000	0.000000	0.053055
281.25 - 303.75	0.027905	0.034566	0.019982	0.002986	0.000000	0.000000	0.085439
303.75 - 326.25	0.017570	0.040652	0.052710	0.015962	0.000230	0.000000	0.127124
326.25 - 348.75	0.004364	0.006546	0.006775	0.001263	0.000115	0.000000	0.019063
Sub-Total:	0.553399	0.240239	0.156063	0.031006	0.001263	0.000230	0.973702
Calms:							0.017646
Missing/Incomplete:							0.008652
Total:							1.000000

Frequency of Calm Winds: 1.78%

Average Wind Speed: 4.38 Knots



POWERTECH (USA) INC.

JANUARY

Station ID: 1 Run ID:
Year: 2008
Date Range: Jan 1 - Jan 31
Time Range: 00:00 - 23:00

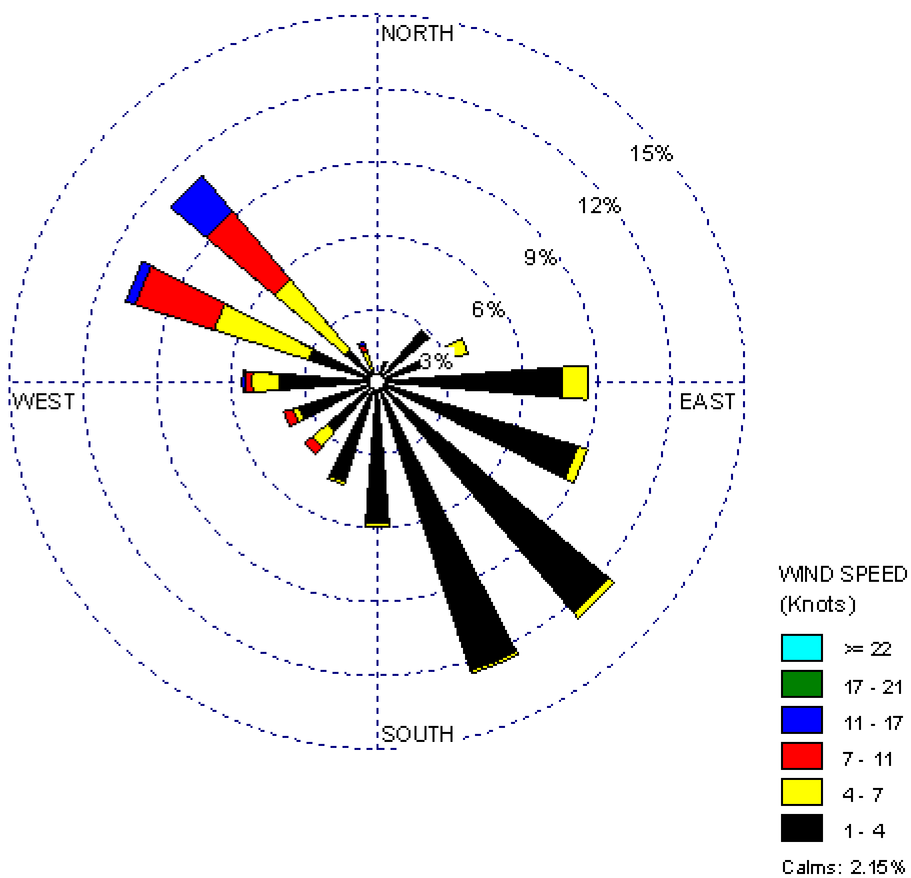
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.001344	0.000000	0.000000	0.000000	0.000000	0.000000	0.001344
11.25 - 33.75	0.009409	0.000000	0.000000	0.000000	0.000000	0.000000	0.009409
33.75 - 56.25	0.028226	0.000000	0.000000	0.000000	0.000000	0.000000	0.028226
56.25 - 78.75	0.032258	0.006720	0.000000	0.000000	0.000000	0.000000	0.038978
78.75 - 101.25	0.075269	0.010753	0.000000	0.000000	0.000000	0.000000	0.086022
101.25 - 123.75	0.086022	0.004032	0.000000	0.000000	0.000000	0.000000	0.090054
123.75 - 146.25	0.123656	0.002688	0.000000	0.000000	0.000000	0.000000	0.126344
146.25 - 168.75	0.123656	0.001344	0.000000	0.000000	0.000000	0.000000	0.125000
168.75 - 191.25	0.057796	0.001344	0.000000	0.000000	0.000000	0.000000	0.059140
191.25 - 213.75	0.043011	0.001344	0.000000	0.000000	0.000000	0.000000	0.044355
213.75 - 236.25	0.026882	0.008065	0.004032	0.000000	0.000000	0.000000	0.038978
236.25 - 258.75	0.033602	0.002688	0.004032	0.000000	0.000000	0.000000	0.040323
258.75 - 281.25	0.040323	0.010753	0.002688	0.001344	0.000000	0.000000	0.055108

281.25 - 303.75	0.029570	0.040323	0.033602	0.004032	0.000000	0.000000	0.107527
303.75 - 326.25	0.017473	0.037634	0.036290	0.018817	0.000000	0.000000	0.110215
326.25 - 348.75	0.004032	0.009409	0.002688	0.001344	0.000000	0.000000	0.017473
Sub-Total:	0.732527	0.137097	0.083333	0.025538	0.000000	0.000000	0.887805
Calms:							0.019512
Missing/Incomplete:							0.092683
Total:							1.000000

Frequency of Calm Winds: 2.15%
Average Wind Speed: 3.38 Knots



POWERTECH (USA) INC.

FEBRUARY

Station ID: 1 Run ID:
Year: 2008
Date Range: Feb 1 - Feb 28
Time Range: 00:00 - 23:00

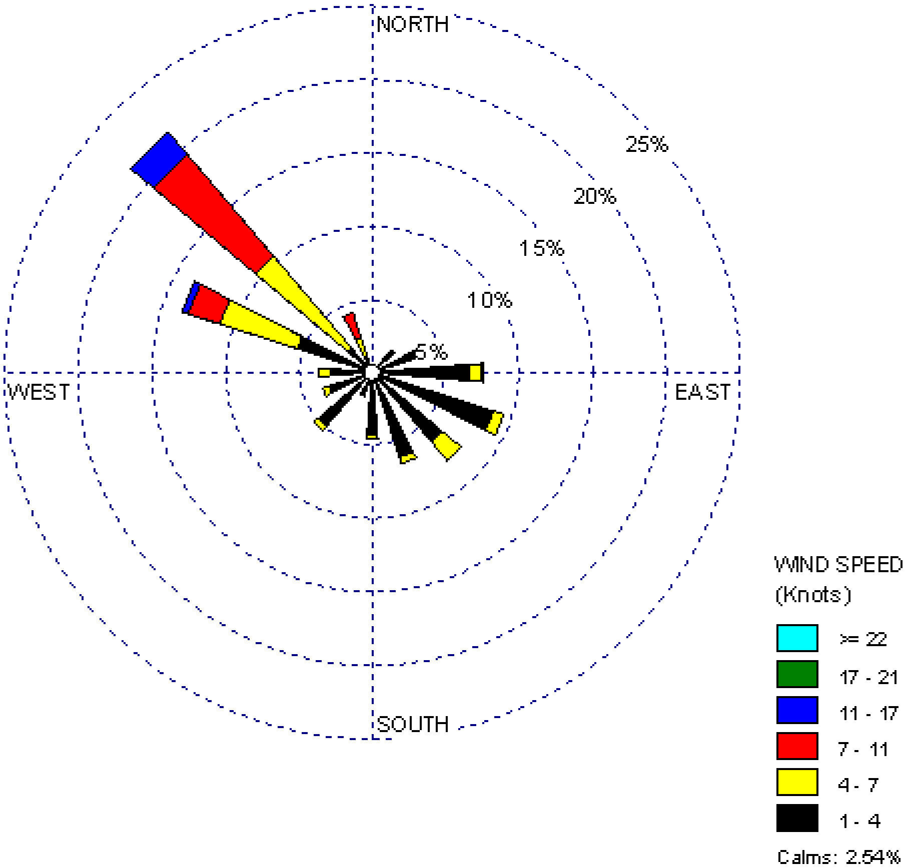
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.001493	0.000000	0.000000	0.000000	0.000000	0.000000	0.001493
11.25 - 33.75	0.001493	0.000000	0.000000	0.000000	0.000000	0.000000	0.001493
33.75 - 56.25	0.020896	0.000000	0.000000	0.000000	0.000000	0.000000	0.020896
56.25 - 78.75	0.044776	0.007463	0.000000	0.000000	0.000000	0.000000	0.052239
78.75 - 101.25	0.065672	0.008955	0.001493	0.000000	0.000000	0.000000	0.076119
101.25 - 123.75	0.086567	0.007463	0.000000	0.000000	0.000000	0.000000	0.094030
123.75 - 146.25	0.062687	0.016418	0.000000	0.000000	0.000000	0.000000	0.079104
146.25 - 168.75	0.061194	0.004478	0.000000	0.000000	0.000000	0.000000	0.065672
168.75 - 191.25	0.043284	0.002985	0.000000	0.000000	0.000000	0.000000	0.046269
191.25 - 213.75	0.017910	0.000000	0.000000	0.000000	0.000000	0.000000	0.017910
213.75 - 236.25	0.049254	0.002985	0.000000	0.000000	0.000000	0.000000	0.052239
236.25 - 258.75	0.031343	0.004478	0.000000	0.000000	0.000000	0.000000	0.035821
258.75 - 281.25	0.028358	0.008955	0.000000	0.000000	0.000000	0.000000	0.037313
281.25 - 303.75	0.053731	0.055224	0.022388	0.004478	0.000000	0.000000	0.135821
303.75 - 326.25	0.022388	0.082090	0.089552	0.020896	0.000000	0.000000	0.214925
326.25 - 348.75	0.007463	0.017910	0.017910	0.000000	0.000000	0.000000	0.043284
Sub-Total:	0.598507	0.219403	0.131343	0.025373	0.000000	0.000000	0.875335

Calms:
0.022788
Missing/Incomplete:
0.101877
Total:
1.000000

Frequency of Calm Winds: 2.54%
Average Wind Speed: 3.91 Knots



NORTH
SOUTH
WEST
EAST
5%
10%
15%
20%
25%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 2.54%

POWERTECH (USA) INC.

MARCH

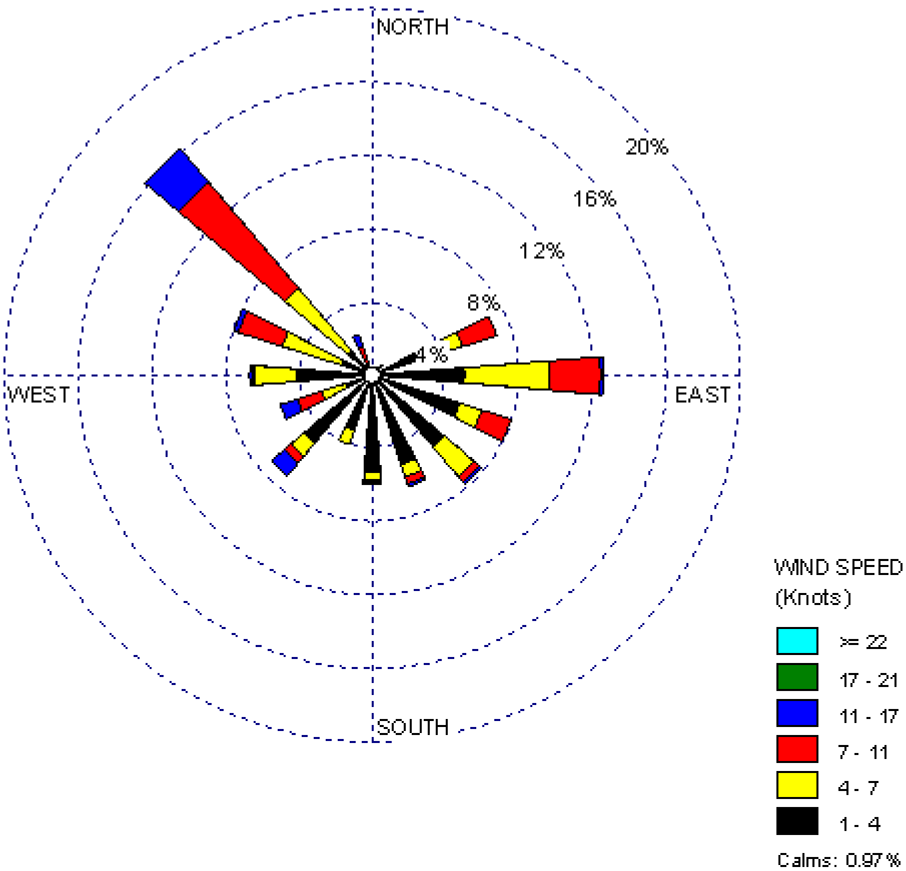
Station ID: 1 Run ID:
Year: 2008
Date Range: Mar 1 - Mar 31
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.000000	0.000000	0.001389	0.000000	0.000000	0.000000	0.001389
33.75 - 56.25	0.019444	0.000000	0.004167	0.000000	0.000000	0.000000	0.023611
56.25 - 78.75	0.023611	0.020833	0.016667	0.000000	0.000000	0.000000	0.061111
78.75 - 101.25	0.040278	0.047222	0.027778	0.000000	0.000000	0.000000	0.115278
101.25 - 123.75	0.061111	0.030556	0.002778	0.000000	0.000000	0.000000	0.094444
123.75 - 146.25	0.047222	0.022222	0.000000	0.000000	0.000000	0.000000	0.069444
146.25 - 168.75	0.048611	0.013889	0.002778	0.000000	0.000000	0.000000	0.065278
168.75 - 191.25	0.047222	0.006944	0.000000	0.000000	0.000000	0.000000	0.054167
191.25 - 213.75	0.025000	0.005556	0.000000	0.001389	0.000000	0.000000	0.031944
213.75 - 236.25	0.020833	0.002778	0.002778	0.000000	0.000000	0.000000	0.026389
236.25 - 258.75	0.026389	0.008333	0.008333	0.002778	0.001389	0.000000	0.047222
258.75 - 281.25	0.030556	0.022222	0.008333	0.009722	0.000000	0.000000	0.070833
281.25 - 303.75	0.026389	0.036111	0.030556	0.005556	0.000000	0.000000	0.098611
303.75 - 326.25	0.037500	0.056944	0.080556	0.027778	0.000000	0.000000	0.202778
326.25 - 348.75	0.004167	0.008333	0.015278	0.001389	0.000000	0.000000	0.029167
Sub-Total:	0.458333	0.281944	0.201389	0.048611	0.001389	0.000000	0.896985
Calms:							0.007538
Missing/Incomplete:							0.095477
Total:							1.000000

Frequency of Calm Winds: 0.83%
Average Wind Speed: 5.04 Knots


NORTH
SOUTH
EAST
WEST
4%
8%
12%
16%
20%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.97%

APRIL

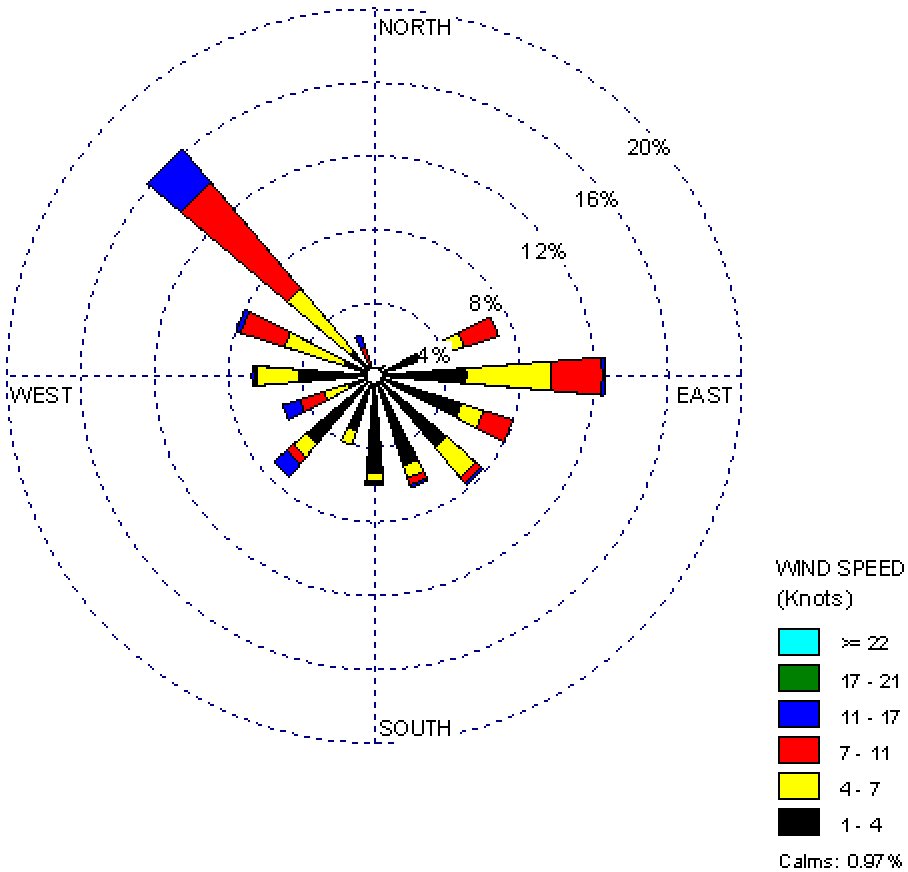
Station ID: 1 Run ID:
Year: 2008
Date Range: Apr 1 - Apr 30
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.001393	0.000000	0.000000	0.000000	0.000000	0.000000	0.001393
11.25 - 33.75	0.005571	0.000000	0.000000	0.000000	0.000000	0.000000	0.005571
33.75 - 56.25	0.005571	0.002786	0.000000	0.000000	0.000000	0.000000	0.008357
56.25 - 78.75	0.029248	0.022284	0.019499	0.000000	0.000000	0.000000	0.071031
78.75 - 101.25	0.050139	0.045961	0.027855	0.001393	0.000000	0.000000	0.125348
101.25 - 123.75	0.050139	0.012535	0.016713	0.000000	0.000000	0.000000	0.079387
123.75 - 146.25	0.051532	0.020891	0.004178	0.001393	0.000000	0.000000	0.077994
146.25 - 168.75	0.051532	0.006964	0.004178	0.001393	0.000000	0.000000	0.064067
168.75 - 191.25	0.052925	0.004178	0.001393	0.001393	0.000000	0.000000	0.059889
191.25 - 213.75	0.032033	0.008357	0.000000	0.000000	0.000000	0.000000	0.040390
213.75 - 236.25	0.048747	0.009749	0.004178	0.009749	0.000000	0.000000	0.072423
236.25 - 258.75	0.015320	0.013928	0.013928	0.009749	0.000000	0.000000	0.052925
258.75 - 281.25	0.041783	0.022284	0.001393	0.001393	0.000000	0.000000	0.066852
281.25 - 303.75	0.018106	0.033426	0.025070	0.002786	0.000000	0.000000	0.079387
303.75 - 326.25	0.018106	0.044568	0.075209	0.023677	0.000000	0.000000	0.161560
326.25 - 348.75	0.004178	0.002786	0.009749	0.006964	0.000000	0.000000	0.023677
Sub-Total:	0.476323	0.250696	0.203343	0.059889	0.000000	0.000000	0.895466
Calms:							0.008816
Missing/Incomplete:							0.095718
Total:							1.000000

Frequency of Calm Winds: 0.97%
Average Wind Speed: 5.17 Knots


NORTH
SOUTH
EAST
WEST
4%
8%
12%
16%
20%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.97%

MAY

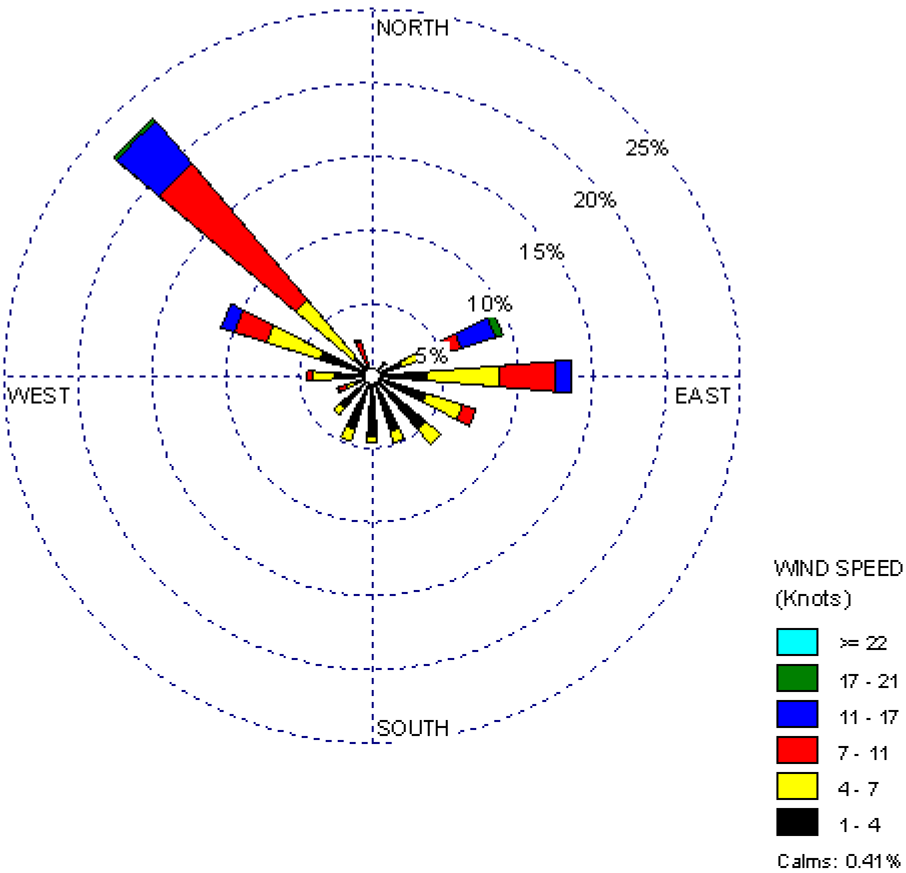
Station ID: 1 Run ID:
Year: 2008
Date Range: May 1 - May 31
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.002703	0.001351	0.001351	0.000000	0.000000	0.000000	0.005405
33.75 - 56.25	0.001351	0.001351	0.001351	0.004054	0.002703	0.002703	0.013514
56.25 - 78.75	0.021622	0.012162	0.029730	0.024324	0.005405	0.000000	0.093243
78.75 - 101.25	0.037838	0.048649	0.037838	0.010811	0.000000	0.000000	0.135135
101.25 - 123.75	0.039189	0.025676	0.009459	0.000000	0.000000	0.000000	0.074324
123.75 - 146.25	0.048649	0.013514	0.000000	0.000000	0.000000	0.000000	0.062162
146.25 - 168.75	0.040541	0.008108	0.000000	0.000000	0.000000	0.000000	0.048649
168.75 - 191.25	0.041892	0.004054	0.000000	0.000000	0.000000	0.000000	0.045946
191.25 - 213.75	0.039189	0.008108	0.000000	0.000000	0.000000	0.000000	0.047297
213.75 - 236.25	0.029730	0.005405	0.000000	0.000000	0.000000	0.000000	0.035135
236.25 - 258.75	0.012162	0.006757	0.005405	0.001351	0.000000	0.000000	0.025676
258.75 - 281.25	0.025676	0.014865	0.004054	0.000000	0.000000	0.000000	0.044595
281.25 - 303.75	0.037838	0.037838	0.022973	0.009459	0.000000	0.000000	0.108108
303.75 - 326.25	0.017568	0.051351	0.120270	0.037838	0.002703	0.000000	0.229730
326.25 - 348.75	0.005405	0.004054	0.016216	0.000000	0.001351	0.000000	0.027027
Sub-Total:	0.401351	0.243243	0.248649	0.087838	0.012162	0.002703	0.903186
Calms:							0.003676
Missing/Incomplete:							0.093137
Total:							1.000000

Frequency of Calm Winds: 0.41%
Average Wind Speed: 6.00 Knots


NORTH
SOUTH
EAST
WEST
5%
10%
15%
20%
25%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.41%

POWERTECH (USA) INC.

JUNE

Station ID: 1 Run ID:
Year: 2008
Date Range: Jun 1 - Jun 30
Time Range: 00:00 - 23:00

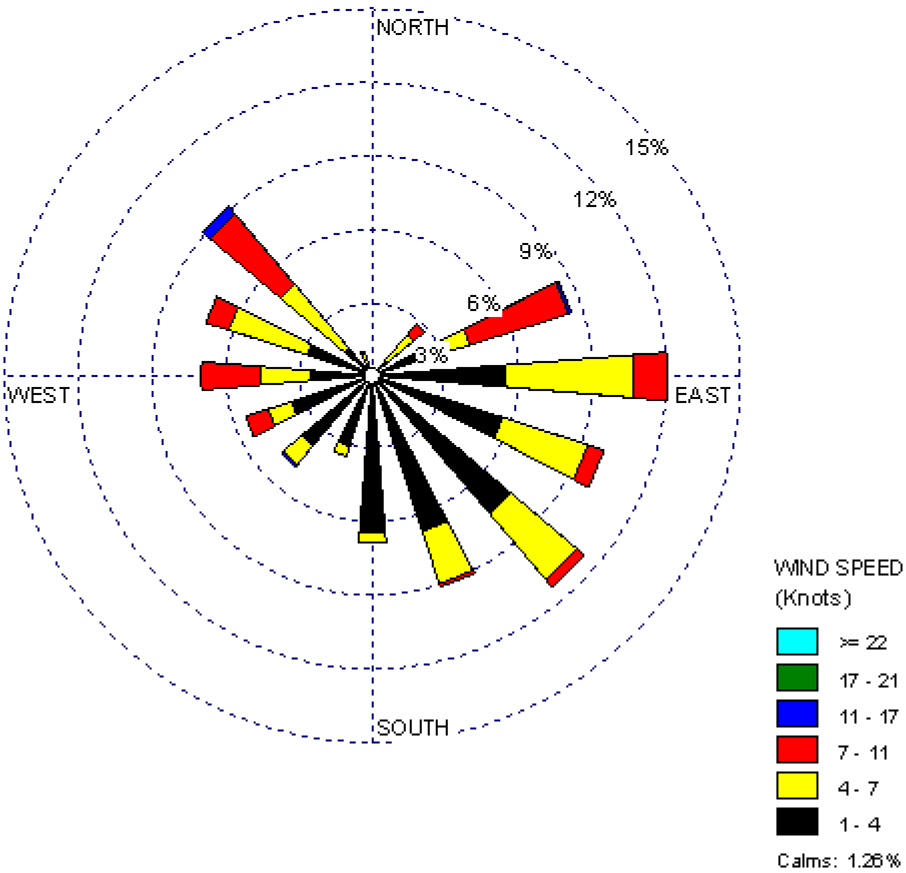
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.000000	0.001397	0.000000	0.000000	0.000000	0.000000	0.001397
33.75 - 56.25	0.008380	0.013966	0.005587	0.000000	0.000000	0.000000	0.027933
56.25 - 78.75	0.023743	0.018156	0.041899	0.001397	0.000000	0.000000	0.085196
78.75 - 101.25	0.054469	0.051676	0.013966	0.000000	0.000000	0.000000	0.120112
101.25 - 123.75	0.055866	0.036313	0.006983	0.000000	0.000000	0.000000	0.099162
123.75 - 146.25	0.074022	0.034916	0.004190	0.000000	0.000000	0.000000	0.113128
146.25 - 168.75	0.067039	0.022346	0.001397	0.000000	0.000000	0.000000	0.090782
168.75 - 191.25	0.064246	0.004190	0.000000	0.000000	0.000000	0.000000	0.068436
191.25 - 213.75	0.030726	0.004190	0.000000	0.000000	0.000000	0.000000	0.034916
213.75 - 236.25	0.037709	0.009777	0.000000	0.001397	0.000000	0.000000	0.048883
236.25 - 258.75	0.034916	0.009777	0.009777	0.000000	0.000000	0.000000	0.054469
258.75 - 281.25	0.025140	0.020950	0.023743	0.000000	0.000000	0.000000	0.069832
281.25 - 303.75	0.027933	0.033520	0.009777	0.000000	0.000000	0.000000	0.071229
303.75 - 326.25	0.015363	0.033520	0.037709	0.004190	0.000000	0.000000	0.090782
326.25 - 348.75	0.000000	0.009777	0.001397	0.000000	0.000000	0.000000	0.011173
Sub-Total:	0.519553	0.304469	0.156425	0.006983	0.000000	0.000000	0.892677

Calms:
0.011364
Missing/Incomplete:
0.095960
Total:
1.000000

Frequency of Calm Winds: 1.26%
Average Wind Speed: 4.45 Knots


NORTH
SOUTH
EAST
WEST
3%
6%
9%
12%
15%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 1.26%

POWERTECH (USA) INC.

JULY

Station ID: 1 Run ID:
Year: 2007
Date Range: Jul 1 - Jul 31
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.000000	0.001364	0.001364	0.001364	0.000000	0.000000	0.004093
33.75 - 56.25	0.005457	0.009550	0.016371	0.002729	0.000000	0.000000	0.034106
56.25 - 78.75	0.031378	0.035471	0.035471	0.004093	0.000000	0.000000	0.106412
78.75 - 101.25	0.050477	0.070941	0.015007	0.000000	0.000000	0.000000	0.136426
101.25 - 123.75	0.070941	0.065484	0.027285	0.000000	0.000000	0.000000	0.163711
123.75 - 146.25	0.064120	0.053206	0.034106	0.000000	0.001364	0.000000	0.152797
146.25 - 168.75	0.051842	0.028649	0.000000	0.001364	0.000000	0.000000	0.081855
168.75 - 191.25	0.049113	0.010914	0.001364	0.000000	0.000000	0.000000	0.061392
191.25 - 213.75	0.021828	0.008186	0.001364	0.000000	0.000000	0.000000	0.031378
213.75 - 236.25	0.042292	0.009550	0.001364	0.000000	0.000000	0.000000	0.053206
236.25 - 258.75	0.025921	0.004093	0.000000	0.000000	0.000000	0.000000	0.030014
258.75 - 281.25	0.020464	0.013643	0.001364	0.001364	0.000000	0.000000	0.036835
281.25 - 303.75	0.012278	0.023192	0.008186	0.001364	0.000000	0.000000	0.045020
303.75 - 326.25	0.006821	0.016371	0.015007	0.001364	0.000000	0.000000	0.039563
326.25 - 348.75	0.002729	0.000000	0.004093	0.000000	0.000000	0.000000	0.006821
Sub-Total:	0.455662	0.350614	0.162347	0.013643	0.001364	0.000000	

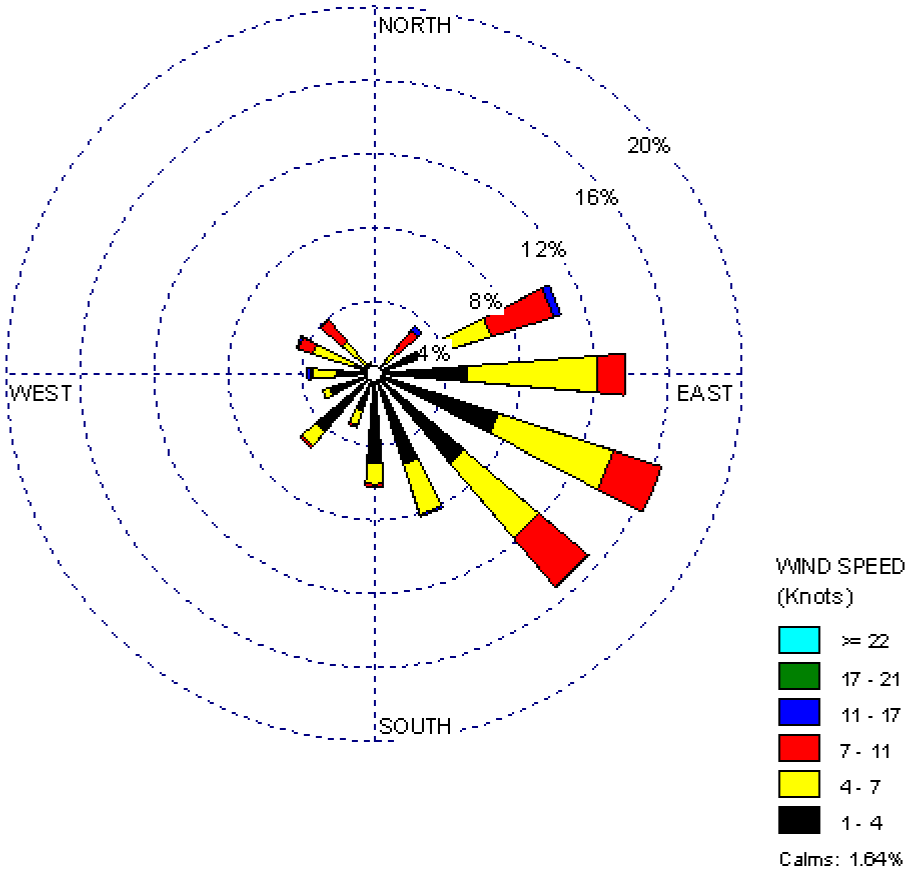
0.891224

Calms:
0.014833

Missing/Incomplete:
0.093943

Total:
1.000000

Frequency of Calm Winds: 1.64%
Average Wind Speed: 4.66 Knots


NORTH
SOUTH
WEST
EAST
4%
8%
12%
16%
20%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 1.64%

POWERTECH (USA) INC.

AUGUST

Station ID: 1 Run ID:
Year: 2007
Date Range: Aug 1 - Aug 31
Time Range: 00:00 - 23:00

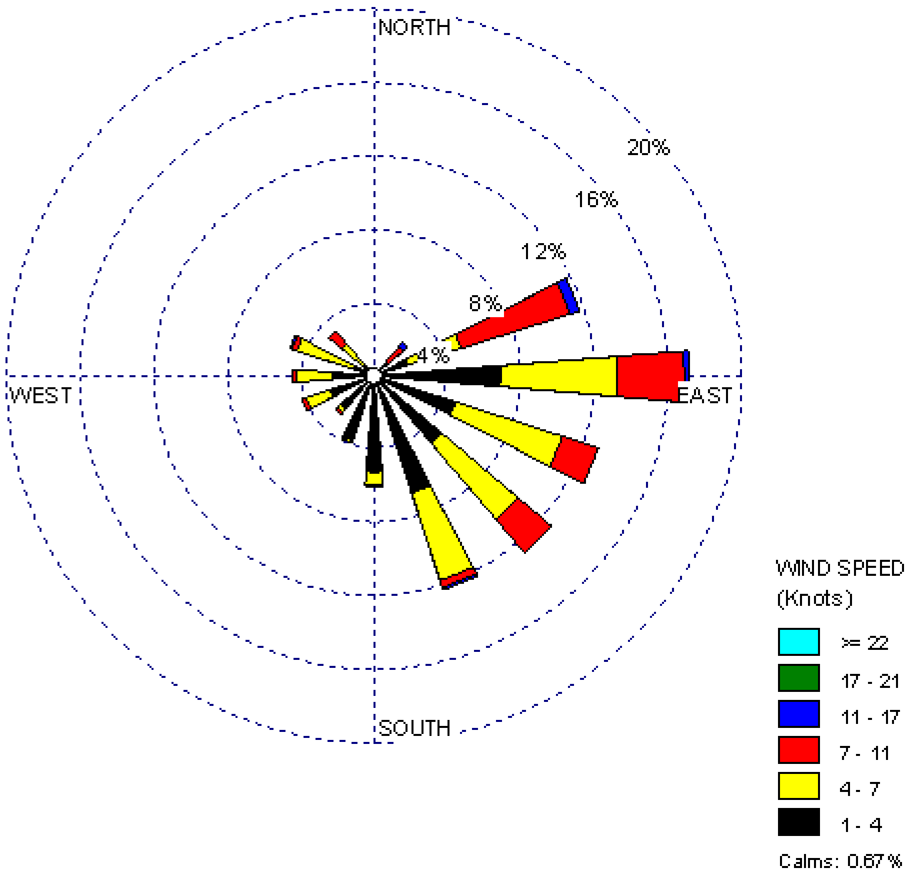
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.001346	0.001346	0.001346	0.000000	0.000000	0.000000	0.004038
33.75 - 56.25	0.005384	0.004038	0.012113	0.002692	0.000000	0.000000	0.024226
56.25 - 78.75	0.020188	0.029610	0.061911	0.005384	0.000000	0.000000	0.117093
78.75 - 101.25	0.068641	0.063257	0.036339	0.002692	0.000000	0.000000	0.170929
101.25 - 123.75	0.047106	0.060565	0.020188	0.000000	0.000000	0.000000	0.127860
123.75 - 146.25	0.048452	0.053836	0.024226	0.000000	0.000000	0.000000	0.126514
146.25 - 168.75	0.067295	0.049798	0.004038	0.001346	0.000000	0.000000	0.122476
168.75 - 191.25	0.052490	0.006729	0.001346	0.000000	0.000000	0.000000	0.060565
191.25 - 213.75	0.037685	0.001346	0.000000	0.000000	0.000000	0.000000	0.039031
213.75 - 236.25	0.024226	0.002692	0.001346	0.000000	0.000000	0.000000	0.028264
236.25 - 258.75	0.025572	0.013459	0.002692	0.000000	0.000000	0.000000	0.041723
258.75 - 281.25	0.022880	0.020188	0.001346	0.000000	0.000000	0.000000	0.044415
281.25 - 303.75	0.012113	0.032301	0.002692	0.001346	0.000000	0.000000	0.048452
303.75 - 326.25	0.008075	0.014805	0.009421	0.000000	0.000000	0.000000	0.032301
326.25 - 348.75	0.000000	0.001346	0.004038	0.000000	0.000000	0.000000	0.005384
Sub-Total:	0.441454	0.355316	0.183042	0.013459	0.000000	0.000000	0.901099

Calms:
0.006105
Missing/Incomplete:
0.092796
Total:
1.000000

Frequency of Calm Winds: 0.67%
Average Wind Speed: 4.85 Knots


NORTH
SOUTH
WEST
EAST
4%
8%
12%
16%
20%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.67%

SEPTEMBER

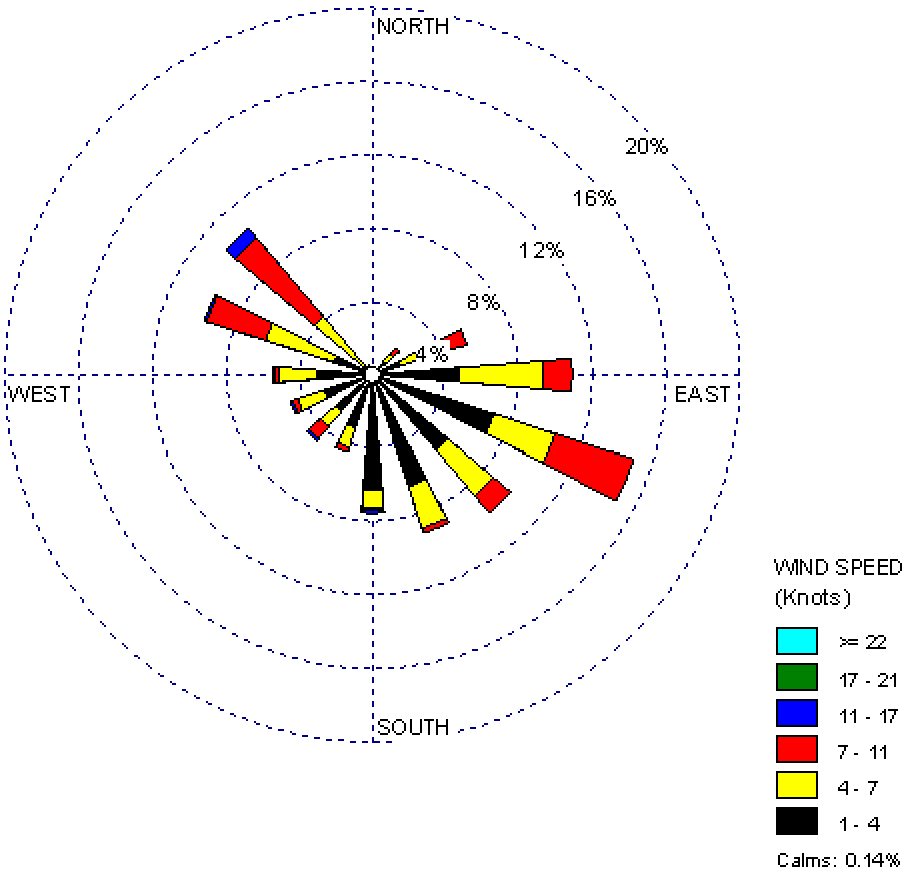
Station ID: 1 Run ID:
Year: 2007
Date Range: Sep 1 - Sep 30
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.001395	0.000000	0.000000	0.000000	0.000000	0.000000	0.001395
33.75 - 56.25	0.009763	0.005579	0.004184	0.000000	0.000000	0.000000	0.019526
56.25 - 78.75	0.016736	0.026499	0.011158	0.000000	0.000000	0.000000	0.054393
78.75 - 101.25	0.047420	0.046025	0.015342	0.000000	0.000000	0.000000	0.108787
101.25 - 123.75	0.069735	0.034868	0.044630	0.000000	0.000000	0.000000	0.149233
123.75 - 146.25	0.054393	0.032078	0.012552	0.000000	0.000000	0.000000	0.099024
146.25 - 168.75	0.064156	0.023710	0.002789	0.000000	0.000000	0.000000	0.090656
168.75 - 191.25	0.062762	0.009763	0.001395	0.001395	0.000000	0.000000	0.075314
191.25 - 213.75	0.030683	0.011158	0.002789	0.000000	0.000000	0.000000	0.044630
213.75 - 236.25	0.026499	0.011158	0.008368	0.001395	0.000000	0.000000	0.047420
236.25 - 258.75	0.027894	0.015342	0.002789	0.001395	0.000000	0.000000	0.047420
258.75 - 281.25	0.030683	0.020921	0.001395	0.001395	0.000000	0.000000	0.054393
281.25 - 303.75	0.022315	0.039052	0.033473	0.001395	0.000000	0.000000	0.096234
303.75 - 326.25	0.006974	0.034868	0.055788	0.006974	0.000000	0.000000	0.104603
326.25 - 348.75	0.001395	0.001395	0.002789	0.000000	0.000000	0.000000	0.005579
Sub-Total:	0.472803	0.312413	0.199442	0.013947	0.000000	0.000000	0.902900
Calms:							0.001261
Missing/Incomplete:							0.095839
Total:							1.000000

Frequency of Calm Winds: 0.14%
Average Wind Speed: 4.76 Knots


NORTH
WEST
EAST
SOUTH
4%
8%
12%
16%
20%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.14%

POWERTECH (USA) INC.

OCTOBER

Station ID: 1 Run ID:
Year: 2007
Date Range: Oct 1 - Oct 31
Time Range: 00:00 - 23:00

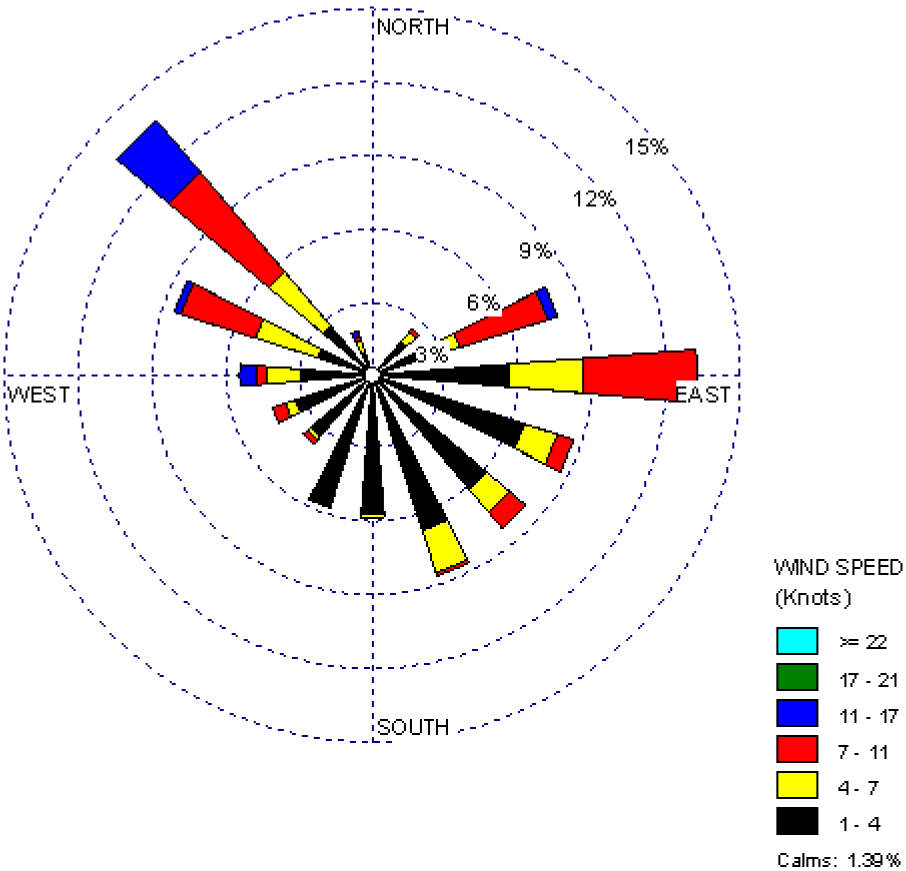
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.001391	0.000000	0.000000	0.000000	0.000000	0.001391
11.25 - 33.75	0.000000	0.002782	0.000000	0.000000	0.000000	0.000000	0.002782
33.75 - 56.25	0.018081	0.005563	0.001391	0.000000	0.000000	0.000000	0.025035
56.25 - 78.75	0.026426	0.011127	0.037552	0.004172	0.000000	0.000000	0.079277
78.75 - 101.25	0.055633	0.030598	0.045897	0.000000	0.000000	0.000000	0.132128
101.25 - 123.75	0.065369	0.013908	0.006954	0.000000	0.000000	0.000000	0.086231
123.75 - 146.25	0.061196	0.012517	0.008345	0.000000	0.000000	0.000000	0.082058
146.25 - 168.75	0.066759	0.018081	0.001391	0.000000	0.000000	0.000000	0.086231
168.75 - 191.25	0.057024	0.001391	0.000000	0.000000	0.000000	0.000000	0.058414
191.25 - 213.75	0.057024	0.000000	0.000000	0.000000	0.000000	0.000000	0.057024
213.75 - 236.25	0.033380	0.001391	0.002782	0.000000	0.000000	0.000000	0.037552
236.25 - 258.75	0.033380	0.004172	0.005563	0.000000	0.000000	0.000000	0.043115
258.75 - 281.25	0.029207	0.013908	0.004172	0.006954	0.000000	0.000000	0.054242
281.25 - 303.75	0.023644	0.026426	0.031989	0.002782	0.000000	0.000000	0.084840
303.75 - 326.25	0.026426	0.029207	0.052851	0.027816	0.000000	0.000000	0.136300
326.25 - 348.75	0.009736	0.005563	0.001391	0.002782	0.000000	0.000000	0.019471
Sub-Total:	0.563282	0.178025	0.200278	0.044506	0.000000	0.000000	0.891824
Calms:							0.012579
Missing/Incomplete:							0.095597
Total:							1.000000

Frequency of Calm Winds: 1.39%
Average Wind Speed: 4.62 Knots

Powertech (USA) Inc.



POWERTECH (USA) INC.

NOVEMBER

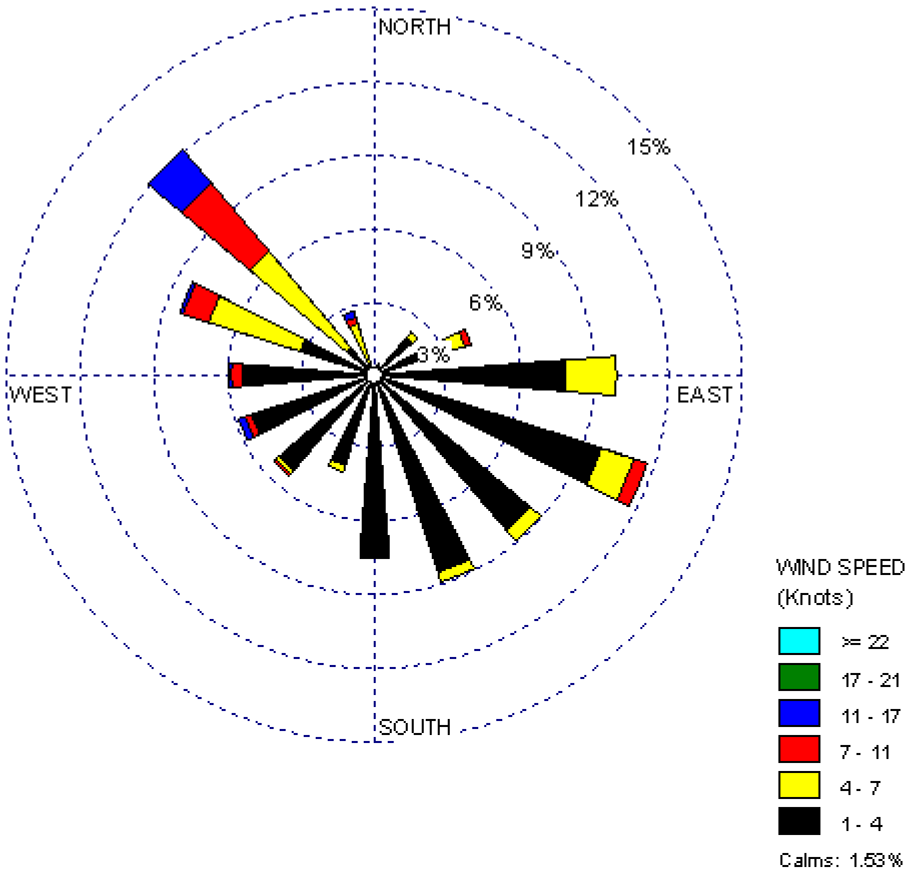
Station ID: 1 Run ID:
Year: 2007
Date Range: Nov 1 - Nov 30
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.004167	0.001389	0.000000	0.000000	0.000000	0.000000	0.005556
33.75 - 56.25	0.020833	0.002778	0.000000	0.000000	0.000000	0.000000	0.023611
56.25 - 78.75	0.031944	0.006944	0.002778	0.000000	0.000000	0.000000	0.041667
78.75 - 101.25	0.077778	0.020833	0.000000	0.000000	0.000000	0.000000	0.098611
101.25 - 123.75	0.097222	0.013889	0.005556	0.000000	0.000000	0.000000	0.116667
123.75 - 146.25	0.083333	0.005556	0.000000	0.000000	0.000000	0.000000	0.088889
146.25 - 168.75	0.084722	0.004167	0.000000	0.000000	0.000000	0.000000	0.088889
168.75 - 191.25	0.075000	0.000000	0.000000	0.000000	0.000000	0.000000	0.075000
191.25 - 213.75	0.038889	0.002778	0.000000	0.000000	0.000000	0.000000	0.041667
213.75 - 236.25	0.051389	0.001389	0.001389	0.000000	0.000000	0.000000	0.054167
236.25 - 258.75	0.052778	0.000000	0.002778	0.002778	0.000000	0.000000	0.058333
258.75 - 281.25	0.052778	0.001389	0.004167	0.001389	0.000000	0.000000	0.059722
281.25 - 303.75	0.031944	0.038889	0.011111	0.001389	0.000000	0.000000	0.083333
303.75 - 326.25	0.015278	0.051389	0.036111	0.018056	0.000000	0.000000	0.120833
326.25 - 348.75	0.005556	0.016667	0.002778	0.002778	0.000000	0.000000	0.027778
Sub-Total:	0.723611	0.168056	0.066667	0.026389	0.000000	0.000000	0.890704
Calms:							0.013819
Missing/Incomplete:							0.095477
Total:							1.000000

Frequency of Calm Winds: 1.53%
Average Wind Speed: 3.36 Knots



NORTH
SOUTH
EAST
WEST
3%
6%
9%
12%
15%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 1.53%

POWERTECH (USA) INC.

DECEMBER

Station ID: 1 Run ID:
Year: 2007
Date Range: Dec 1 - Dec 31
Time Range: 00:00 - 23:00

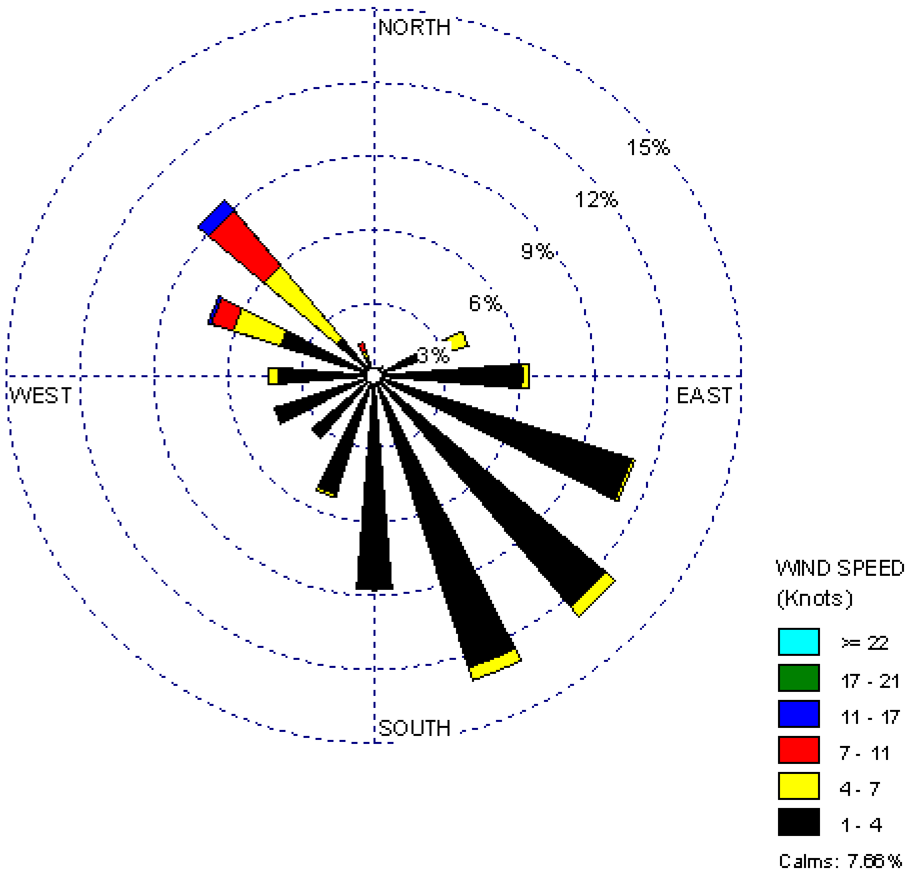
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.004032	0.000000	0.000000	0.000000	0.000000	0.000000	0.004032
33.75 - 56.25	0.005376	0.000000	0.000000	0.000000	0.000000	0.000000	0.005376
56.25 - 78.75	0.033602	0.006720	0.000000	0.000000	0.000000	0.000000	0.040323
78.75 - 101.25	0.060484	0.002688	0.000000	0.000000	0.000000	0.000000	0.063172
101.25 - 123.75	0.110215	0.001344	0.000000	0.000000	0.000000	0.000000	0.111559
123.75 - 146.25	0.123656	0.005376	0.000000	0.000000	0.000000	0.000000	0.129032
146.25 - 168.75	0.125000	0.005376	0.000000	0.000000	0.000000	0.000000	0.130376
168.75 - 191.25	0.087366	0.000000	0.000000	0.000000	0.000000	0.000000	0.087366
191.25 - 213.75	0.051075	0.001344	0.000000	0.000000	0.000000	0.000000	0.052419
213.75 - 236.25	0.033602	0.000000	0.000000	0.000000	0.000000	0.000000	0.033602
236.25 - 258.75	0.043011	0.000000	0.000000	0.000000	0.000000	0.000000	0.043011
258.75 - 281.25	0.038978	0.004032	0.000000	0.000000	0.000000	0.000000	0.043011
281.25 - 303.75	0.040323	0.020161	0.009409	0.001344	0.000000	0.000000	0.071237
303.75 - 326.25	0.020161	0.038978	0.029570	0.005376	0.000000	0.000000	0.094086
326.25 - 348.75	0.008065	0.002688	0.004032	0.000000	0.000000	0.000000	0.014785
Sub-Total:	0.784946	0.088710	0.043011	0.006720	0.000000	0.000000	0.837805

Calms:
0.069512
Missing/Incomplete:
0.092683
Total:
1.000000

Frequency of Calm Winds: 7.66%
Average Wind Speed: 2.46 Knots


NORTH
SOUTH
WEST
EAST
3%
6%
9%
12%
15%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 7.66%

POWERTECH (USA) INC.

WINTER

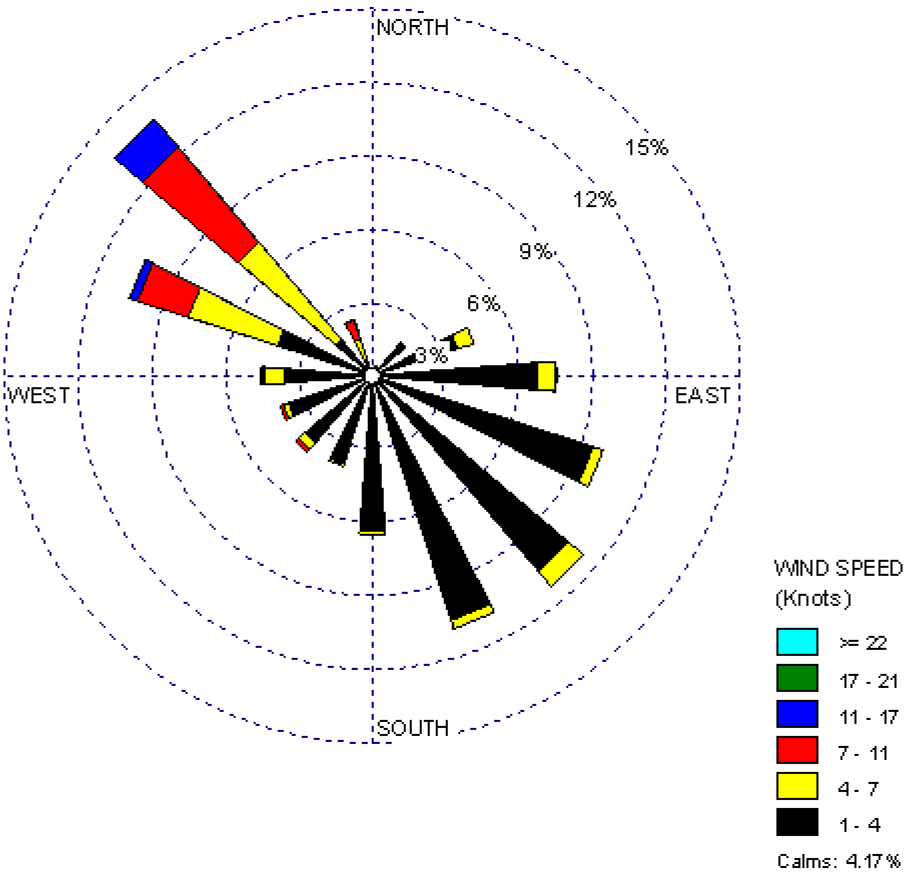
Station ID: 1 Run ID:
Year: 2007 2008
Date Range: Dec 2007-Feb 2008
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000927	0.000000	0.000000	0.000000	0.000000	0.000000	0.000927
11.25 - 33.75	0.005097	0.000000	0.000000	0.000000	0.000000	0.000000	0.005097
33.75 - 56.25	0.018072	0.000000	0.000000	0.000000	0.000000	0.000000	0.018072
56.25 - 78.75	0.036608	0.006951	0.000000	0.000000	0.000000	0.000000	0.043559
78.75 - 101.25	0.067192	0.007414	0.000463	0.000000	0.000000	0.000000	0.075070
101.25 - 123.75	0.094532	0.004171	0.000000	0.000000	0.000000	0.000000	0.098703
123.75 - 146.25	0.104727	0.007878	0.000000	0.000000	0.000000	0.000000	0.112604
146.25 - 168.75	0.104727	0.003707	0.000000	0.000000	0.000000	0.000000	0.108434
168.75 - 191.25	0.063485	0.001390	0.000000	0.000000	0.000000	0.000000	0.064875
191.25 - 213.75	0.037998	0.000927	0.000000	0.000000	0.000000	0.000000	0.038925
213.75 - 236.25	0.036145	0.003707	0.001390	0.000000	0.000000	0.000000	0.041242
236.25 - 258.75	0.036145	0.002317	0.001390	0.000000	0.000000	0.000000	0.039852
258.75 - 281.25	0.036145	0.007878	0.000927	0.000463	0.000000	0.000000	0.045412
281.25 - 303.75	0.040778	0.037998	0.021779	0.003244	0.000000	0.000000	0.103800
303.75 - 326.25	0.019926	0.051900	0.050510	0.014829	0.000000	0.000000	0.137164
326.25 - 348.75	0.006487	0.009731	0.007878	0.000463	0.000000	0.000000	0.024560
Sub-Total:	0.708990	0.145968	0.084337	0.018999	0.000000	0.000000	0.925694
Calms:							0.040286
Missing/Incomplete:							0.034020
Total:							1.000000

Frequency of Calm Winds: 4.17%
Average Wind Speed: 3.23 Knots


NORTH
15%
12%
9%
6%
3%
WEST
EAST
SOUTH
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 4.17%

POWERTECH (USA) INC.

SPRING

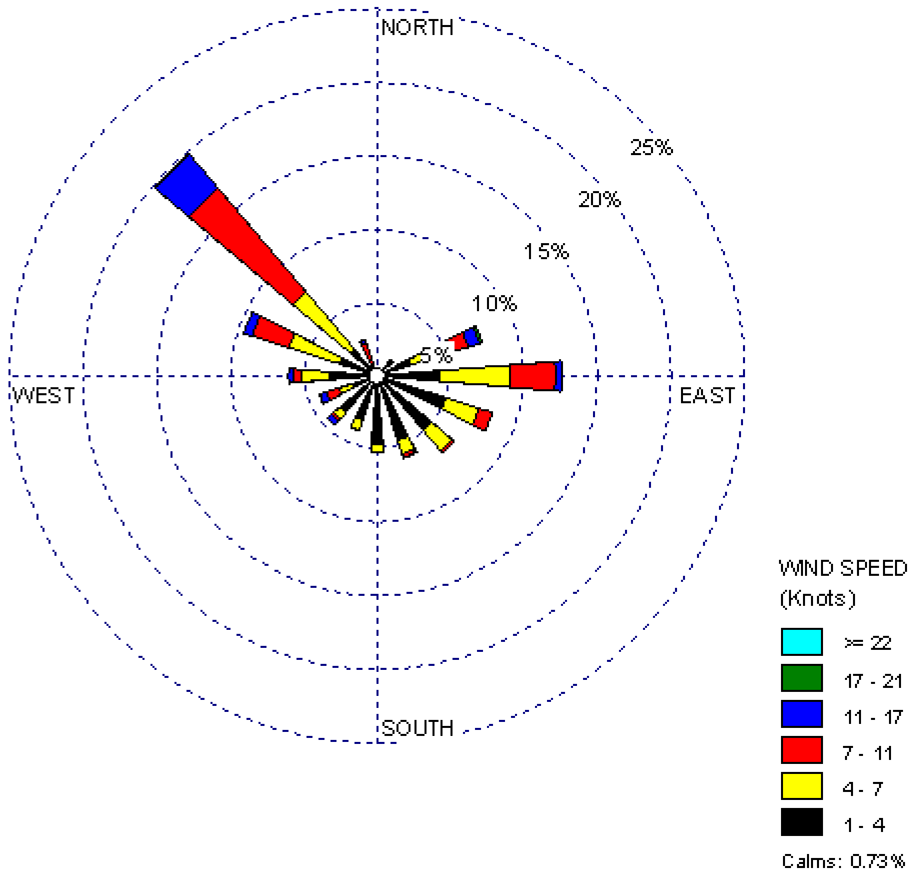
Station ID: 1 Run ID:
Year: 2008
Date Range: Mar 1 - May 31
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000459	0.000000	0.000000	0.000000	0.000000	0.000000	0.000459
11.25 - 33.75	0.002755	0.000459	0.000918	0.000000	0.000000	0.000000	0.004132
33.75 - 56.25	0.008724	0.001377	0.001837	0.001377	0.000918	0.000918	0.015152
56.25 - 78.75	0.024793	0.018365	0.022039	0.008264	0.001837	0.000000	0.075298
78.75 - 101.25	0.042700	0.047291	0.031221	0.004132	0.000000	0.000000	0.125344
101.25 - 123.75	0.050046	0.022957	0.009642	0.000000	0.000000	0.000000	0.082645
123.75 - 146.25	0.049128	0.018825	0.001377	0.000459	0.000000	0.000000	0.069789
146.25 - 168.75	0.046832	0.009642	0.002296	0.000459	0.000000	0.000000	0.059229
168.75 - 191.25	0.047291	0.005051	0.000459	0.000459	0.000000	0.000000	0.053260
191.25 - 213.75	0.032140	0.007346	0.000000	0.000459	0.000000	0.000000	0.039945
213.75 - 236.25	0.033058	0.005969	0.002296	0.003214	0.000000	0.000000	0.044536
236.25 - 258.75	0.017906	0.009642	0.009183	0.004591	0.000459	0.000000	0.041781
258.75 - 281.25	0.032599	0.019743	0.004591	0.003673	0.000000	0.000000	0.060606
281.25 - 303.75	0.027548	0.035813	0.026171	0.005969	0.000000	0.000000	0.095500
303.75 - 326.25	0.024334	0.050964	0.092287	0.029844	0.000918	0.000000	0.198347
326.25 - 348.75	0.004591	0.005051	0.013774	0.002755	0.000459	0.000000	0.026630
Sub-Total:	0.444904	0.258494	0.218090	0.065657	0.004591	0.000918	0.959184
Calms:							0.007098
Missing/Incomplete:							0.033718
Total:							1.000000

Frequency of Calm Winds: 0.73%
Average Wind Speed: 5.41 Knots


NORTH
SOUTH
WEST
EAST
5%
10%
15%
20%
25%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.73%

POWERTECH (USA) INC.

SUMMER

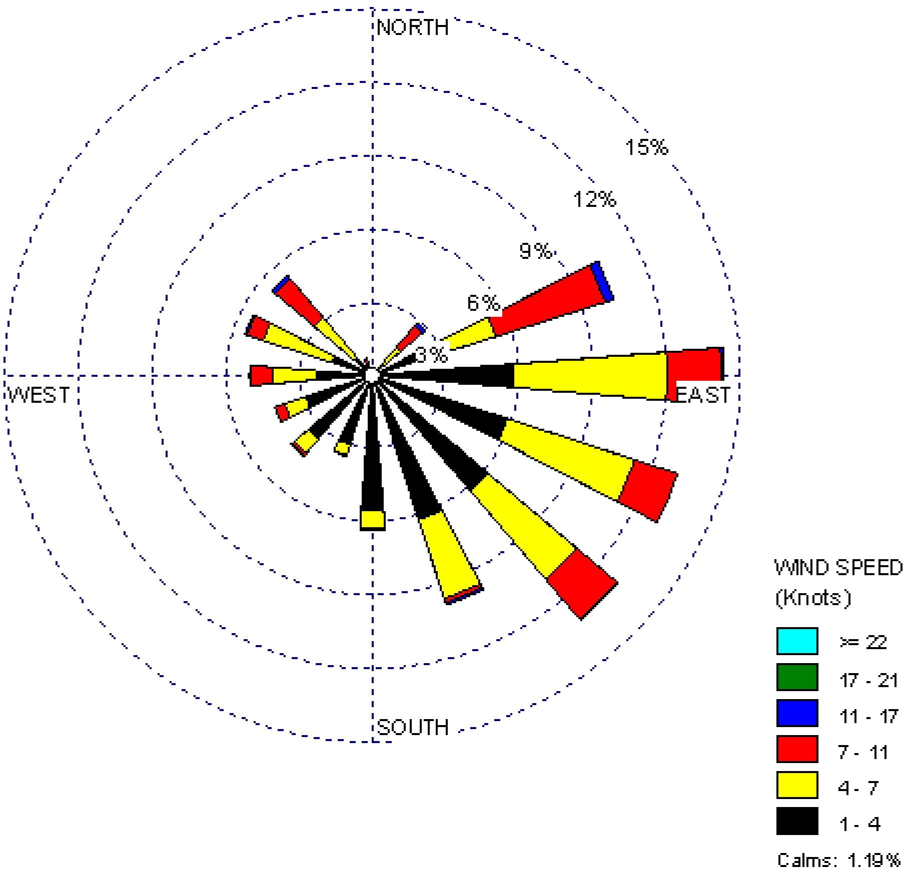
Station ID: 1 Run ID:
Year: 2007 2008
Date Range: Jun 1 - Aug 31
Time Range: 00:00 - 23:00

Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11.25 - 33.75	0.000456	0.001369	0.000912	0.000456	0.000000	0.000000	0.003193
33.75 - 56.25	0.006387	0.009124	0.011405	0.001825	0.000000	0.000000	0.028741
56.25 - 78.75	0.025091	0.027828	0.046533	0.003650	0.000000	0.000000	0.103102
78.75 - 101.25	0.057938	0.062044	0.021898	0.000912	0.000000	0.000000	0.142792
101.25 - 123.75	0.057938	0.054288	0.018248	0.000000	0.000000	0.000000	0.130474
123.75 - 146.25	0.062044	0.047445	0.020985	0.000000	0.000456	0.000000	0.130931
146.25 - 168.75	0.062044	0.033759	0.001825	0.000912	0.000000	0.000000	0.098540
168.75 - 191.25	0.055201	0.007299	0.000912	0.000000	0.000000	0.000000	0.063412
191.25 - 213.75	0.030109	0.004562	0.000456	0.000000	0.000000	0.000000	0.035128
213.75 - 236.25	0.034672	0.007299	0.000912	0.000456	0.000000	0.000000	0.043339
236.25 - 258.75	0.028741	0.009124	0.004106	0.000000	0.000000	0.000000	0.041971
258.75 - 281.25	0.022810	0.018248	0.008668	0.000456	0.000000	0.000000	0.050182
281.25 - 303.75	0.017336	0.029653	0.006843	0.000912	0.000000	0.000000	0.054745
303.75 - 326.25	0.010036	0.021442	0.020529	0.001825	0.000000	0.000000	0.053832
326.25 - 348.75	0.000912	0.003650	0.003193	0.000000	0.000000	0.000000	0.007755
Sub-Total:	0.471715	0.337135	0.167427	0.011405	0.000456	0.000000	0.955026
Calms:							0.011464
Missing/Incomplete:							0.033510
Total:							1.000000

Frequency of Calm Winds: 1.19%
Average Wind Speed: 4.66 Knots


NORTH
SOUTH
WEST
EAST
3%
6%
9%
12%
15%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 1.19%

POWERTECH (USA) INC.

FALL

Station ID: 1 Run ID:
Year: 2007
Date Range: Sep 1 - Nov 30
Time Range: 00:00 - 23:00

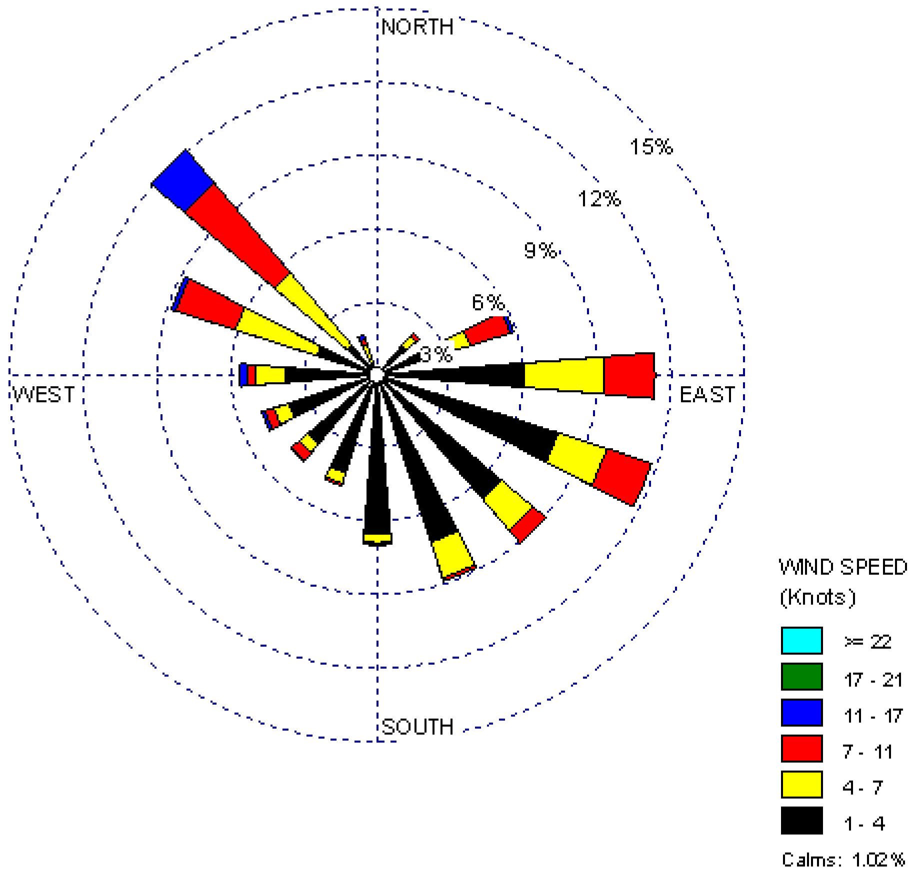
Frequency Distribution
(Normalized)

Speed Knots

Wind Direction	1 - 4	4 - 7	7 - 11	11 - 17	17 - 21	>= 22	Total
348.75 - 11.25	0.000000	0.000464	0.000000	0.000000	0.000000	0.000000	0.000464
11.25 - 33.75	0.001855	0.001391	0.000000	0.000000	0.000000	0.000000	0.003247
33.75 - 56.25	0.016234	0.004638	0.001855	0.000000	0.000000	0.000000	0.022727
56.25 - 78.75	0.025046	0.014842	0.017161	0.001391	0.000000	0.000000	0.058442
78.75 - 101.25	0.060297	0.032468	0.020408	0.000000	0.000000	0.000000	0.113173
101.25 - 123.75	0.077458	0.020872	0.019017	0.000000	0.000000	0.000000	0.117347
123.75 - 146.25	0.066327	0.016698	0.006957	0.000000	0.000000	0.000000	0.089981
146.25 - 168.75	0.071892	0.015306	0.001391	0.000000	0.000000	0.000000	0.088590
168.75 - 191.25	0.064935	0.003711	0.000464	0.000464	0.000000	0.000000	0.069573
191.25 - 213.75	0.042208	0.004638	0.000928	0.000000	0.000000	0.000000	0.047774
213.75 - 236.25	0.037106	0.004638	0.004174	0.000464	0.000000	0.000000	0.046382
236.25 - 258.75	0.038033	0.006494	0.003711	0.001391	0.000000	0.000000	0.049629
258.75 - 281.25	0.037570	0.012059	0.003247	0.003247	0.000000	0.000000	0.056122
281.25 - 303.75	0.025974	0.034787	0.025510	0.001855	0.000000	0.000000	0.088126
303.75 - 326.25	0.016234	0.038497	0.048237	0.017625	0.000000	0.000000	0.120594
326.25 - 348.75	0.005566	0.007885	0.002319	0.001855	0.000000	0.000000	0.017625

Sub-Total: 0.586735 0.219388 0.155380 0.028293 0.000000 0.000000
0.956093
Calms:
0.009857
Missing/Incomplete:
0.034050
Total:
1.000000

Frequency of Calm Winds: 1.02%
Average Wind Speed: 4.25 Knots


NORTH
SOUTH
WEST
EAST
3%
6%
9%
12%
15%
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 1.02%

POWERTECH (USA) INC.

APPENDIX 5.7-A

SPAW MODEL RESULTS

POWERTECH (USA) INC.

SPAW MODEL RESULTS

DEWEY FIELD

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--80-94\Dew 15yr--80-94.spw
File Creation Date : Sep 15, 2008 17:26:13
File Last Modified Date : Sep 16, 2008 08:28:28
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--80-94
Simulation Start Date : Jan 01, 1980
Simulation End Date : Dec 31, 1994
Simulation Run Date : Sep 16, 2008 08:28
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--80-94
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--80-94\Dew 15yr--80-94.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 81-94 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8094 - Jan 01, 1980 to Dec 31, 1994
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Air Temperature : SD8094 - Jan 01, 1980 to Dec 31, 1994
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1980	44.04	28.76	10.32	11.41	7.03	16.33	16.32	0.74	24.88	0.13	0	3.03	8.1	0
1981	44	28.66	10.98	11.22	6.45	13.46	16.32	1.28	22.04	0.08	0	-0.24	7.32	0
1982	44	32.6	14.27	9.8	8.53	21.88	16.32	0.65	29.02	1.11	0	3.84	5.23	0
1983	44	31.24	13.14	10.61	7.48	16.16	16.32	1.18	23.82	-0.02	0	0.08	3.64	0
1984	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
1985	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
1986	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
1987	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
1988	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
1989	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
1990	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.17	13.19	10.63	7.35	16.29	16.32	1.03	24.23	0.07	0	0.34	4.4	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--81-95\Dew 15 yr--81-95.spw
File Creation Date : Sep 16, 2008 08:35:03
File Last Modified Date : Sep 16, 2008 08:35:03
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--81-95
Simulation Start Date : Jan 01, 1981
Simulation End Date : Dec 31, 1995
Simulation Run Date : Sep 16, 2008 08:35
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--81-95
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--81-95\Dew 15 yr--81-95.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 81-95 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8195 - Jan 01, 1981 to Dec 31, 1995
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Air Temperature : SD8195 - Jan 01, 1981 to Dec 31, 1995
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1981	44	27.39	9.7	11.23	6.45	13.46	16.32	1.01	22.31	-0.27	0	1.65	21.62	0
1982	44	31.37	12.92	9.93	8.53	21.88	16.32	0.63	29.04	1.56	0	4.63	7.16	0
1983	44	30.93	12.79	10.66	7.48	16.16	16.32	1.18	23.82	0	0	0.37	3.7	0
1984	44.04	32.64	14.1	10.48	8.07	16.89	16.32	1.13	24	0	0	-0.57	3.42	0
1985	44	28.86	11.1	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
1986	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
1987	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
1988	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
1989	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
1990	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.25	13.23	10.55	7.48	16.42	16.32	1.02	24.25	0.08	0	0.39	5.19	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--82-96\Dew 15 yr--82-96.spw
File Creation Date : Sep 16, 2008 08:36:39
File Last Modified Date : Sep 16, 2008 08:36:39
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--82-96
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Sep 16, 2008 08:36
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--82-96
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--82-96\Dew 15 yr--82-96.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 82-96 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8296 - Jan 01, 1982 to Dec 31, 1996
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Air Temperature : SD8296 - Jan 01, 1982 to Dec 31, 1996
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
1982	44	30.79	12.4	9.91	8.48	21.83	16.32	0.63	29.04	1.06	0	5.66	16.24	0
1983	44	30.5	12.28	10.74	7.48	16.16	16.32	0.96	24.04	0.23	0	0.8	3.83	0
1984	44.04	32.45	13.88	10.5	8.07	16.89	16.32	1.13	24	0.01	0	-0.39	3.43	0
1985	44	28.85	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.41	3.94	0
1986	44	34.76	16.75	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
1987	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
1988	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
1989	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
1990	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
44.04	31.51	13.46	10.49	7.56	16.7	16.32	0.98	24.47	0.09	0	0.44	4.6	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--83-97\Dew 15 yr--83-97.spw
File Creation Date : Sep 16, 2008 08:38:04
File Last Modified Date : Sep 16, 2008 08:38:04
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--83-97
Simulation Start Date : Jan 01, 1983
Simulation End Date : Dec 31, 1997
Simulation Run Date : Sep 16, 2008 08:38
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--83-97
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--83-97\Dew 15 yr--83-97.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 83-97 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8397 - Jan 01, 1983 to Dec 31, 1997
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Air Temperature : SD8397 - Jan 01, 1983 to Dec 31, 1997
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1983	44	28.2	9.74	11.06	7.4	16.08	16.32	0.82	24.18	0.01	0	3.37	21.27	0
1984	44.04	30.99	12.11	10.81	8.07	16.89	16.32	0.79	24.35	0.71	0	0.72	4.48	0
1985	44	27.93	9.99	11.46	6.49	11.75	16.32	1.03	20.55	-0.28	0	-0.62	5.07	0
1986	44	33.7	15.48	9.88	8.34	23.59	16.32	2.08	29.49	0.85	0	3.29	3.6	0
1987	44	30.65	13.1	11.18	6.38	12.36	16.32	0.12	22.19	-0.21	0	-1.89	4.34	0
1988	44.04	28.88	11.59	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.22	4.06	0
1989	44	30.47	12.51	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.26	3.76	0
1990	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.22	13.14	10.57	7.51	16.42	16.32	1	24.22	0.09	0	0.43	5.08	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--84-98\Dew 15 yr--84-98.spw
File Creation Date : Sep 16, 2008 08:39:34
File Last Modified Date : Sep 16, 2008 08:39:35
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--84-98
Simulation Start Date : Jan 01, 1984
Simulation End Date : Dec 31, 1998
Simulation Run Date : Sep 16, 2008 08:39
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--84-98
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--84-98\Dew 15 yr--84-98.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 84-98 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8498 - Jan 01, 1984 to Dec 31, 1998
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Air Temperature : SD8498 - Jan 01, 1984 to Dec 31, 1998
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1984	44.04	29.51	10.86	10.83	7.82	15.65	16.32	0.44	23.71	-0.1	0	2.12	15.85	0
1985	44	26.91	8.8	11.62	6.49	11.75	16.32	1.02	20.56	0.08	0	0.06	8.98	0
1986	44	33.01	14.7	9.97	8.34	23.59	16.32	2.08	29.49	1	0	3.82	3.84	0
1987	44	29.82	12.05	11.4	6.38	12.36	16.32	0.12	22.19	0.06	0	-1.31	4.67	0
1988	44.04	28.76	11.45	10.91	6.4	13.79	16.32	0.9	22.8	0.14	0	0.3	4.2	0
1989	44	30.39	12.42	10.61	7.36	15.58	16.32	0.04	24.5	0.13	0	1.35	3.78	0
1990	44	33.48	15.72	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.04	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.37	13.29	10.53	7.55	16.88	16.32	1.16	24.49	0.11	0	0.56	4.96	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--85-99\Dew 15 yr--85-99.spw
File Creation Date : Sep 16, 2008 08:41:06
File Last Modified Date : Sep 16, 2008 08:41:07
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--85-99
Simulation Start Date : Jan 01, 1985
Simulation End Date : Dec 31, 1999
Simulation Run Date : Sep 16, 2008 08:41
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--85-99
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--85-99\Dew 15 yr--85-99.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 85-99 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8599 - Jan 01, 1985 to Dec 31, 1999
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Air Temperature : SD8599 - Jan 01, 1985 to Dec 31, 1999
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
1985	44	25.89	7.78	11.62	6.49	11.75	16.32	1.02	20.56	-0.29	0	1.45	20.09	0
1986	44	32.7	14.33	10.02	8.34	23.59	16.32	2.08	29.49	1.05	0	4.09	4.09	0
1987	44	29.45	11.57	11.51	6.38	12.36	16.32	0.12	22.19	0.2	0	-1.09	5	0
1988	44.04	28.64	11.27	10.97	6.4	13.79	16.32	0.9	22.8	0.18	0	0.37	4.45	0
1989	44	30.23	12.23	10.63	7.36	15.58	16.32	0.04	24.5	0.16	0	1.48	3.83	0
1990	44	33.45	15.69	10.19	7.57	19.14	16.32	1.94	25.95	0.01	0	0.07	3.55	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
44.04	31.53	13.5	10.5	7.53	16.98	16.32	1.3	24.47	0.09	0	0.38	4.93	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--86-00\Dew 15 yr--86-00.spw
File Creation Date : Sep 16, 2008 08:42:52
File Last Modified Date : Sep 16, 2008 08:42:52
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--86-00
Simulation Start Date : Jan 01, 1986
Simulation End Date : Dec 31, 2000
Simulation Run Date : Sep 16, 2008 08:42
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--86-00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--86-00\Dew 15 yr--86-00.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 86-00 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8600 - Jan 01, 1986 to Dec 31, 2000
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.txt (Sep 16, 2008 00:00)
Air Temperature : SD8600 - Jan 01, 1986 to Dec 31, 2000
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
1986	44	31.28	12.98	10.19	8.11	22.03	16.32	2.08	28.16	0.3	0	4.69	8.52	0
1987	44	29.16	11.24	11.54	6.38	12.36	16.32	0.12	22.19	0.36	0	-0.96	5.35	0
1988	44.04	28.28	10.7	11.18	6.4	13.79	16.32	0.9	22.8	0.33	0	0.59	5.42	0
1989	44	29.75	11.65	10.73	7.36	15.58	16.32	0.04	24.5	0.3	0	1.82	4.07	0
1990	44	33.35	15.58	10.19	7.57	19.14	16.32	1.86	26.02	0.02	0	0.23	3.56	0
1991	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
1992	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
1993	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET in	AET in	EVAP in	TRAN in	INT in	PRECIP in	IRRIG in	RUNOFF in	INFIL in	PERC in	DEEPDRN in	DLT-SM in	STRESS	YLDRED
44.04	31.71	13.66	10.48	7.57	17.06	16.32	1.35	24.47	0.05	0	0.27	4.28	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--89-03\Dew 15 yr--89-03.spw
File Creation Date : Sep 16, 2008 08:47:32
File Last Modified Date : Sep 16, 2008 08:47:33
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--89-03
Simulation Start Date : Jan 01, 1989
Simulation End Date : Dec 31, 2003
Simulation Run Date : Sep 16, 2008 08:47
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--89-03
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--89-03\Dew 15 yr--89-03.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 89-03 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8903 - Jan 01, 1989 to Dec 31, 2003
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Air Temperature : SD8903 - Jan 01, 1989 to Dec 31, 2003
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1989	44	27.54	9.1	11.15	7.29	15.49	16.32	0.04	24.47	0.28	0	3.95	15.08	0
1990	44	30.99	12.73	10.68	7.57	19.14	16.32	1.6	26.29	0.95	0	1.92	3.95	0
1991	44	30.09	11.77	11.03	7.29	15.03	16.32	1.4	22.66	0.02	0	-0.16	3.7	0
1992	44.04	29.68	11.97	10.59	7.11	14.08	16.32	0.41	22.88	0.04	0	0.27	3.75	0
1993	44	35.28	16.83	9.44	9.01	22.31	16.32	2.14	27.48	0.02	0	1.19	3.4	0
1994	44	30.4	12.4	11.21	6.79	12.01	16.32	0.19	21.35	-0.29	0	-1.96	4.45	0
1995	44	32.83	13.93	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.48	13.35	10.53	7.6	16.9	16.32	1.27	24.36	0.09	0	0.39	4.5	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--90-04\Dew 15 yr--90-04.spw
File Creation Date : Sep 16, 2008 08:48:54
File Last Modified Date : Sep 16, 2008 08:48:55
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--90-04
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Sep 16, 2008 08:48
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--90-04
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--90-04\Dew 15 yr--90-04.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 90-04 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9004 - Jan 01, 1990 to Dec 31, 2004
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Air Temperature : SD9004 - Jan 01, 1990 to Dec 31, 2004
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1990	44	30.25	12.04	10.67	7.54	19.11	16.32	1.45	26.44	0.11	0	3.63	12.13	0
1991	44	28.56	9.86	11.41	7.29	15.03	16.32	1.23	22.83	0.78	0	0.78	5.59	0
1992	44.04	28.9	10.99	10.8	7.11	14.08	16.32	0.37	22.92	0.32	0	0.81	4.49	0
1993	44	35.09	16.62	9.46	9.01	22.31	16.32	1.44	28.18	0.11	0	1.99	3.42	0
1994	44	30.43	12.43	11.21	6.79	12.01	16.32	0.19	21.35	-0.3	0	-1.99	4.44	0
1995	44	32.83	13.94	10.02	8.87	18.32	16.32	0.82	24.95	0.19	0	0.8	3.66	0
1996	44.04	32.46	14.48	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.69	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.38	13.25	10.55	7.58	16.84	16.32	1.21	24.36	0.07	0	0.49	4.48	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--91-05\Dew 15 yr--91-05.spw
File Creation Date : Sep 16, 2008 09:05:32
File Last Modified Date : Sep 16, 2008 09:05:33
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--91-05
Simulation Start Date : Jan 01, 1991
Simulation End Date : Dec 31, 2005
Simulation Run Date : Sep 16, 2008 09:05
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--91-05
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--91-05\Dew 15 yr--91-05.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 91-05 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9105 - Jan 01, 1991 to Dec 31, 2005
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Air Temperature : SD9105 - Jan 01, 1991 to Dec 31, 2005
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1991	44	27.98	9.4	11.33	7.25	14.99	16.32	0.53	23.53	0.2	0	2.6	16.09	0
1992	44.04	28.54	10.58	10.85	7.11	14.08	16.32	0.37	22.92	0.42	0	1.08	6.39	0
1993	44	33.4	14.67	9.71	9.01	22.31	16.32	1.34	28.27	0.69	0	3.2	3.47	0
1994	44	30.11	12.08	11.24	6.79	12.01	16.32	0.19	21.35	-0.28	0	-1.68	4.47	0
1995	44	32.81	13.9	10.04	8.87	18.32	16.32	0.82	24.95	0.19	0	0.82	3.66	0
1996	44.04	32.45	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.09	0	0.7	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.28	13.17	10.56	7.55	16.9	16.32	1.32	24.35	0.09	0	0.53	4.74	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--92-06\Dew 15 yr--92-06.spw
File Creation Date : Sep 16, 2008 09:06:49
File Last Modified Date : Sep 16, 2008 09:06:50
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--92-06
Simulation Start Date : Jan 01, 1992
Simulation End Oate : Dec 31, 2006
Simulation Run Date : Sep 16, 2008 09:06
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--92-06
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--92-06\Dew 15 yr--92-06.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 92-06 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9206 - Jan 01, 1992 to Dec 31, 2006
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Air Temperature : SD9206 - Jan 01, 1992 to Dec 31, 2006
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1992	44.04	28.01	10.12	10.78	7.11	14.08	16.32	0.37	22.92	-0.07	0	2.09	15.31	0
1993	44	31.96	12.92	10.02	9.01	22.31	16.32	1.08	28.53	1.31	0	4.28	3.76	0
1994	44	29.71	11.61	11.31	6.79	12.01	16.32	0.19	21.35	-0.27	0	-1.29	4.63	0
1995	44	32.81	13.9	10.03	8.87	18.32	16.32	0.66	25.11	0.24	0	0.94	3.68	0
1996	44.04	32.45	14.47	10.16	7.82	17.6	16.32	0.69	25.41	0.08	0	0.7	3.53	0
1997	44	32.55	14.73	10.09	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.18	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.24	13.16	10.56	7.52	16.79	16.32	1.29	24.3	0.08	0	0.5	4.54	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--93-07\Dew 15 yr--93-07.spw
File Creation Date : Sep 16, 2008 09:39:44
File Last Modified Date : Sep 16, 2008 09:39:45
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--93-07
Simulation Start Date : Jan 01, 1993
Simulation End Date : Dec 31, 2007
Simulation Run Date : Sep 16, 2008 09:39
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--93-07
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--93-07\Dew 15 yr--93-07.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 93-07 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9307 - Jan 01, 1993 to Dec 31, 2007
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Air Temperature : SD9307 - Jan 01, 1993 to Dec 31, 2007
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1993	44	30.45	11.29	10.26	8.91	21.44	16.32	1.06	27.8	0.84	0	5.42	7.24	0
1994	44	29.46	11.34	11.33	6.79	12.01	16.32	0.19	21.35	-0.18	0	-1.13	5	0
1995	44	31.87	12.65	10.35	8.87	18.32	16.32	0.66	25.11	0.51	0	1.6	3.93	0
1996	44.04	32.29	14.27	10.19	7.82	17.6	16.32	0.69	25.41	0.14	0	0.81	3.54	0
1997	44	32.54	14.71	10.1	7.73	17.73	16.32	1.67	24.66	0.01	0	-0.17	3.54	0
1998	44	34.73	16.59	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.94	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.19	13.09	10.61	7.49	16.82	16.32	1.33	24.31	0.07	0	0.54	4.05	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--94-80\Dew 15 yr--94-80.spw
File Creation Date : Sep 16, 2008 09:41:28
File Last Modified Date : Sep 16, 2008 09:41:29
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--94-80
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Sep 16, 2008 09:41
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--94-80
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--94-80\Dew 15 yr--94-80.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 94-80 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9480 - Jan 01, 1994 to Dec 31, 2008
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Air Temperature : SD9480 - Jan 01, 1994 to Dec 31, 2008
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1994	44	26.64	8.27	11.58	6.79	12.01	16.32	0.19	21.35	-0.3	0	1.81	21.39	0
1995	44	30.88	11.46	10.54	8.87	18.32	16.32	0.58	25.18	0.72	0	2.46	6.38	0
1996	44.04	30.39	11.97	10.59	7.82	17.6	16.32	0.68	25.41	0.83	0	2.02	3.77	0
1997	44	32.17	14.31	10.13	7.73	17.73	16.32	1.59	24.74	0.06	0	0.23	3.55	0
1998	44	34.72	16.57	9.94	8.2	24.28	16.32	3.6	28.8	0.33	0	1.96	3.45	0
1999	44	33.86	16.16	10.16	7.54	17.17	16.32	2.53	23.41	-0.34	0	-2.56	3.48	0
2000	44.04	31.23	13.09	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.48	13.33	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0

AVERAGE ANNUAL VALUES OF SOIL HYOROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.84	12.75	10.72	7.37	16.43	16.32	1.32	24.05	0.08	0	0.5	5.08	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--95-81\Dew 15 yr--95-81.spw
File Creation Date : Sep 16, 2008 09:42:54
File Last Modified Date : Sep 16, 2008 09:42:55
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--95-81
Simulation Start Date : Jan 01, 1995
Simulation End Date : Dec 31, 2009
Simulation Run Date : Sep 16, 2008 09:42
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--95-81
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--95-81\Dew 15 yr--95-81.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 95-81 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9581 - Jan 01, 1995 to Dec 31, 2009
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Air Temperature : SD9581 - Jan 01, 1995 to Dec 31, 2009
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1995	44	30.45	11.12	10.5	8.83	18.14	16.32	0.51	25.12	0.01	0	3.49	15.1	0
1996	44.04	30.14	11.68	10.63	7.82	17.6	16.32	0.68	25.41	0.94	0	2.15	4.05	0
1997	44	31.65	13.72	10.21	7.73	17.73	16.32	1.27	25.05	0.36	0	0.77	3.57	0
1998	44	34.65	16.5	9.95	8.2	24.28	16.32	3.57	28.82	0.33	0	2.05	3.46	0
1999	44	33.84	16.14	10.16	7.54	17.17	16.32	2.53	23.41	-0.33	0	-2.56	3.48	0
2000	44.04	31.23	13.08	10.8	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.39	0
2001	44	30.51	12.52	10.69	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.72	0
2002	44	29.78	12.19	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.48	13.33	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0
2009	44	29.42	11.8	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.85	4.68	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.94	12.9	10.7	7.35	16.52	16.32	1.38	24.11	0.06	0	0.45	4.56	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--96-82\Dew 15 yr--96-82.spw
File Creation Date : Sep 16, 2008 09:44:20
File Last Modified Date : Sep 16, 2008 09:44:20
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--96-82
Simulation Start Date : Jan 01, 1996
Simulation End Date : Dec 31, 2010
Simulation Run Date : Sep 16, 2008 09:44
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--96-82
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--96-82\Dew 15 yr--96-82.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 96-82 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9682 - Jan 01, 1996 to Dec 31, 2010
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Air Temperature : SD9682 - Jan 01, 1996 to Dec 31, 2010
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1996	44.04	29.28	10.78	10.68	7.82	17.6	16.32	0.51	25.59	0.13	0	4	10.8	0
1997	44	30.23	11.97	10.54	7.73	17.73	16.32	0.96	25.36	1.13	0	1.73	3.78	0
1998	44	34.31	16.13	9.98	8.2	24.28	16.32	3.5	28.9	0.25	0	2.55	3.48	0
1999	44	33.78	16.09	10.15	7.54	17.17	16.32	2.28	23.67	-0.21	0	-2.37	3.48	0
2000	44.04	31.24	13.09	10.79	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.63	4.39	0
2001	44	30.51	12.52	10.69	7.29	18.1	16.32	1.32	25.81	0.49	0	2.1	3.72	0
2002	44	29.78	12.19	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.48	13.33	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0
2009	44	29.42	11.8	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.85	4.68	0
2010	44	33.31	15.07	9.71	8.53	21.88	16.32	1.72	27.95	0.41	0	2.76	3.97	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.96	12.96	10.67	7.32	16.77	16.32	1.4	24.35	0.09	0	0.63	4.29	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--97-83\Dew 15 yr--97-83.spw
File Creation Date : Sep 16, 2008 09:45:40
File Last Modified Date : Sep 16, 2008 09:45:41
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--97-83
Simulation Start Date : Jan 01, 1997
Simulation End Date : Dec 31, 2011
Simulation Run Date : Sep 16, 2008 09:45
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--97-83
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--97-83\Dew 15 yr--97-83.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 97-83 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9783 - Jan 01, 1997 to Dec 31, 2011
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Air Temperature : SD9783 - Jan 01, 1997 to Dec 31, 2011
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1997	44	29.17	10.8	10.65	7.73	17.73	16.32	0.93	25.39	0.45	0	3.49	10.48	0
1998	44	33.54	15.26	10.09	8.2	24.28	16.32	2.35	30.05	0.91	0	3.79	3.73	0
1999	44	32.67	14.85	10.28	7.54	17.17	16.32	2.28	23.67	-0.06	0	-1.39	3.49	0
2000	44.04	31.23	13.08	10.79	7.35	14.51	16.32	1.72	21.76	-0.5	0	-1.62	4.4	0
2001	44	30.51	12.52	10.7	7.29	18.1	16.32	1.32	25.81	0.49	0	2.11	3.73	0
2002	44	29.78	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.48	13.33	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0
2009	44	29.42	11.79	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.84	4.68	0
2010	44	33.31	15.07	9.71	8.53	21.88	16.32	1.72	27.95	0.41	0	2.76	3.97	0
2011	44	31.99	13.96	10.55	7.48	16.16	16.32	1.33	23.67	-0.07	0	-0.77	3.61	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.95	12.96	10.68	7.31	16.74	16.32	1.38	24.37	0.09	0	0.64	4.27	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--98-84\Dew 15 yr--98-84.spw
File Creation Date : Sep 16, 2008 09:47:14
File Last Modified Date : Sep 16, 2008 09:47:14
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--98-84
Simulation Start Date : Jan 01, 1998
Simulation End Date : Dec 31, 2012
Simulation Run Date : Sep 16, 2008 09:47
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--98-84
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--98-84\Dew 15 yr--98-84.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 98-84 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9884 - Jan 01, 1998 to Dec 31, 2012
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Air Temperature : SD9884 - Jan 01, 1998 to Dec 31, 2012
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1998	44	32.32	13.91	10.21	8.2	24.28	16.32	1.8	30.6	0.86	0	5.61	8.88	0
1999	44	31.13	13.06	10.53	7.54	17.17	16.32	1.91	24.03	0.42	0	0.02	3.57	0
2000	44.04	31.06	12.88	10.82	7.35	14.51	16.32	1.72	21.76	-0.52	0	-1.43	4.45	0
2001	44	30.49	12.51	10.69	7.29	18.1	16.32	1.23	25.9	0.52	0	2.18	3.74	0
2002	44	29.77	12.18	10.9	6.7	13.11	16.32	0.35	22.38	-0.01	0	-0.69	3.71	0
2003	44	30.07	11.59	11.07	7.41	14.69	16.32	0.56	23.05	0.01	0	0.38	3.57	0
2004	44.04	29.14	11.37	10.8	6.96	12.18	16.32	0.29	21.24	-0.26	0	-0.68	4.01	0
2005	44	31.81	14.06	10.62	7.14	20.16	16.32	3.81	25.53	0.26	0	0.59	3.53	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.48	13.33	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0
2009	44	29.42	11.8	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.84	4.68	0
2010	44	33.31	15.07	9.71	8.53	21.88	16.32	1.72	27.95	0.41	0	2.76	3.97	0
2011	44	31.99	13.96	10.55	7.48	16.16	16.32	1.33	23.67	-0.07	0	-0.77	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.98	12.95	10.7	7.32	16.61	16.32	1.33	24.28	0.09	0	0.54	4.15	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--99-85\Dew 15 yr--99-85.spw
File Creation Date : Sep 16, 2008 09:48:36
File Last Modified Date : Sep 16, 2008 09:48:37
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--99-85
Simulation Start Date : Jan 01, 1999
Simulation End Date : Dec 31, 2013
Simulation Run Date : Sep 16, 2008 09:48
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--99-85
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--99-85\Dew 15 yr--99-85.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 99-85 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9985 - Jan 01, 1999 to Dec 31, 2013
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Air Temperature : SD9985 - Jan 01, 1999 to Dec 31, 2013
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYOROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1999	44	28.66	10.14	10.98	7.54	17.17	16.32	0.8	25.14	0.5	0	3.52	10.95	0
2000	44.04	29.89	11.52	11.02	7.35	14.51	16.32	1.72	21.76	-0.2	0	-0.59	5.86	0
2001	44	29.79	11.57	10.92	7.29	18.1	16.32	1.23	25.9	0.81	0	2.59	4.61	0
2002	44	29.35	11.66	10.99	6.7	13.11	16.32	0.35	22.38	0.02	0	-0.29	3.84	0
2003	44	29.6	11	11.19	7.41	14.69	16.32	0.56	23.05	0.16	0	0.7	3.65	0
2004	44.04	29.07	11.29	10.82	6.96	12.18	16.32	0.29	21.24	-0.27	0	-0.59	4.05	0
2005	44	31.76	13.98	10.64	7.14	20.16	16.32	3.81	25.53	0.28	0	0.63	3.54	0
2006	44	29.65	12.01	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.46	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.47	13.32	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.36	3.57	0
2009	44	29.42	11.79	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.84	4.68	0
2010	44	33.31	15.07	9.71	8.53	21.88	16.32	1.72	27.95	0.41	0	2.76	3.97	0
2011	44	31.99	13.96	10.55	7.48	16.16	16.32	1.33	23.67	-0.07	0	-0.77	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.39	12.33	10.85	7.21	15.78	16.32	1.2	23.68	0.06	0	0.44	4.49	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--00-86\Dew 15 yr--00-86.spw
File Creation Date : Sep 16, 2008 09:49:51
File Last Modified Date : Sep 16, 2008 09:49:52
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--00-86
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Sep 16, 2008 09:49
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--00-86
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--00-86\Dew 15 yr--00-86.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 00-86 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0086 - Jan 01, 2000 to Dec 31, 2014
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Air Temperature : SD0086 - Jan 01, 2000 to Dec 31, 2014
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2000	44.04	27.77	9.12	11.3	7.35	14.51	16.32	1.72	21.76	-0.22	0	1.56	12.77	0
2001	44	29.06	10.73	11.04	7.29	18.1	16.32	1.13	26	1.03	0	3.2	6.26	0
2002	44	29.16	11.46	11.01	6.7	13.11	16.32	0.35	22.38	0.04	0	-0.13	4.01	0
2003	44	29.23	10.56	11.26	7.41	14.69	16.32	0.55	23.05	0.34	0	0.89	3.9	0
2004	44.04	28.9	11.08	10.85	6.96	12.18	16.32	0.21	21.32	-0.26	0	-0.36	4.15	0
2005	44	31.86	14.11	10.61	7.14	20.16	16.32	3.43	25.9	0.37	0	0.82	3.54	0
2006	44	29.66	12.02	10.97	6.67	13.22	16.32	0.48	22.39	-0.12	0	-0.47	3.67	0
2007	44	30.07	12.31	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.5	13.37	11.01	7.13	16.74	16.32	0.96	24.97	0.15	0	0.46	3.54	0
2009	44	29.44	11.82	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.86	4.63	0
2010	44	33.25	15.02	9.71	8.53	21.88	16.32	2.06	27.61	0.36	0	2.53	3.94	0
2011	44	31.83	13.78	10.56	7.48	16.16	16.32	1.33	23.67	-0.06	0	-0.62	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.55	12.49	10.79	7.26	16.21	16.32	1.27	23.99	0.09	0	0.62	4.59	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--01-87\Dew 15 yr--01-87.spw
File Creation Date : Sep 16, 2008 09:51:19
File Last Modified Date : Sep 16, 2008 09:51:20
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--01-87
Simulation Start Date : Jan 01, 2001
Simulation End Date : Dec 31, 2015
Simulation Run Date : Sep 16, 2008 09:51
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--01-87
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--01-87\Dew 15 yr--01-87.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 01-87 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0187 - Jan 01, 2001 to Dec 31, 2015
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Air Temperature : SD0187 - Jan 01, 2001 to Dec 31, 2015
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2001	44	28.73	10.42	11.02	7.29	18.1	16.32	1.04	26.09	0.55	0	4.1	11.88	0
2002	44	28.96	11.24	11.02	6.7	13.11	16.32	0.35	22.38	0.07	0	0.05	4.46	0
2003	44	29.09	10.41	11.27	7.41	14.69	16.32	0.55	23.05	0.39	0	0.99	4.02	0
2004	44.04	28.77	10.92	10.89	6.96	12.18	16.32	0.21	21.32	-0.22	0	-0.27	4.27	0
2005	44	31.48	13.63	10.71	7.14	20.16	16.32	3.43	25.9	0.5	0	1.06	3.55	0
2006	44	29.62	11.97	10.98	6.67	13.22	16.32	0.48	22.39	-0.13	0	-0.42	3.68	0
2007	44	30.06	12.3	10.94	6.82	14.33	16.32	1.04	22.79	-0.13	0	-0.32	3.85	0
2008	44.04	31.46	13.3	11.02	7.13	16.74	16.32	1.12	24.81	0.11	0	0.37	3.58	0
2009	44	29.42	11.79	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.84	4.69	0
2010	44	33.31	15.06	9.71	8.53	21.88	16.32	1.72	27.95	0.41	0	2.76	3.97	0
2011	44	31.99	13.96	10.55	7.48	16.16	16.32	1.33	23.67	-0.07	0	-0.77	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.7	12.7	10.79	7.2	16.13	16.32	1.15	24.1	0.07	0	0.53	4.45	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--02-88\Dew 15 yr--02-88.spw
File Creation Date : Sep 16, 2008 09:52:50
File Last Modified Date : Sep 16, 2008 09:52:51
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--02-88
Simulation Start Date : Jan 01, 2002
Simulation End Date : Dec 31, 2016
Simulation Run Date : Sep 16, 2008 09:52
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--02-88
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--02-88\Dew 15 yr--02-88.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 02-88 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0288 - Jan 01, 2002 to Dec 31, 2016
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Air Temperature : SD0288 - Jan 01, 2002 to Dec 31, 2016
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2002	44	27.02	8.92	11.39	6.7	13.11	16.32	0.31	22.42	-0.22	0	2.33	18.49	0
2003	44	28.54	9.82	11.32	7.41	14.69	16.32	0.55	23.05	0.59	0	1.33	5	0
2004	44.04	28.03	9.99	11.08	6.96	12.18	16.32	0.21	21.32	0	0	0.25	5.73	0
2005	44	30.51	12.49	10.88	7.14	20.16	16.32	3.24	26.1	0.91	0	1.81	3.66	0
2006	44	29.47	11.76	11.03	6.67	13.22	16.32	0.48	22.39	-0.13	0	-0.28	3.74	0
2007	44	30.05	12.29	10.94	6.82	14.33	16.32	1.04	22.79	-0.14	0	-0.3	3.86	0
2008	44.04	31.44	13.28	11.02	7.13	16.74	16.32	0.96	24.97	0.17	0	0.5	3.55	0
2009	44	29.44	11.81	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.86	4.64	0
2010	44	33.24	15	9.71	8.53	21.88	16.32	2.06	27.61	0.37	0	2.53	3.95	0
2011	44	31.82	13.78	10.57	7.48	16.16	16.32	1.33	23.67	-0.06	0	-0.61	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.4	12.42	10.84	7.14	15.78	16.32	1.13	23.82	0.08	0	0.48	5.03	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--03-89\Dew 15 yr--03-89.spw
File Creation Date : Sep 16, 2008 09:54:17
File Last Modified Date : Sep 16, 2008 09:54:17
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--03-89
Simulation Start Date : Jan 01, 2003
Simulation End Date : Dec 31, 2017
Simulation Run Date : Sep 16, 2008 09:54
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--03-89
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--03-89\Dew 15 yr--03-89.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 03-89 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0289 - Jan 01, 2003 to Dec 31, 2017
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Air Temperature : SD0289 - Jan 01, 2003 to Dec 31, 2017
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2003	44	27.99	9.27	11.31	7.41	14.69	16.32	0.33	23.27	-0.06	0	2.75	9.98	0
2004	44.04	27.44	9.27	11.21	6.96	12.18	16.32	0.21	21.32	0.2	0	0.65	7.33	0
2005	44	30.29	12.19	10.97	7.14	20.16	16.32	3.01	26.33	1.1	0	2.07	3.81	0
2006	44	29.25	11.48	11.1	6.67	13.22	16.32	0.48	22.39	-0.1	0	-0.09	3.82	0
2007	44	30.03	12.27	10.94	6.82	14.33	16.32	1.04	22.79	-0.14	0	-0.28	3.87	0
2008	44.04	31.37	13.2	11.04	7.13	16.74	16.32	1.12	24.81	0.14	0	0.43	3.58	0
2009	44	29.41	11.79	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.84	4.7	0
2010	44	33.3	15.05	9.72	8.53	21.88	16.32	1.72	27.95	0.41	0	2.77	3.97	0
2011	44	31.98	13.95	10.55	7.48	16.16	16.32	1.33	23.67	-0.07	0	-0.76	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
2017	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.53	12.54	10.8	7.18	15.94	16.32	1.08	24	0.09	0	0.56	4.51	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--04-90\Dew 15 yr--04-90.spw
File Creation Date : Sep 16, 2008 09:55:46
File Last Modified Date : Sep 16, 2008 09:55:47
Description : Dewey TP1, TP2, TP5 Soils--0.6 in/5th day--04-90
Simulation Start Date : Jan 01, 2004
Simulation End Date : Dec 31, 2018
Simulation Run Date : Sep 16, 2008 09:55
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Soils--0.6 in/5th day--04-90
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--04-90\Dew 15 yr--04-90.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 04-90 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0490 - Jan 01, 2004 to Dec 31, 2018
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Air Temperature : SD0490 - Jan 01, 2004 to Dec 31, 2018
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2004	44.04	25.97	7.77	11.25	6.95	12.16	16.32	0.21	21.32	-0.24	0	2.54	21.75	0
2005	44	29.79	11.58	11.07	7.14	20.16	16.32	3.01	26.33	1.28	0	2.4	4.23	0
2006	44	28.67	10.73	11.27	6.67	13.22	16.32	0.48	22.39	0.07	0	0.33	4.03	0
2007	44	30	12.23	10.95	6.82	14.33	16.32	1.04	22.79	-0.14	0	-0.24	3.9	0
2008	44.04	31.3	13.11	11.06	7.13	16.74	16.32	0.96	24.97	0.21	0	0.59	3.56	0
2009	44	29.43	11.8	11.17	6.45	13.46	16.32	1.39	21.93	-0.19	0	-0.85	4.65	0
2010	44	33.23	14.98	9.72	8.53	21.88	16.32	2.06	27.61	0.37	0	2.54	3.95	0
2011	44	31.82	13.77	10.57	7.48	16.16	16.32	1.33	23.67	-0.06	0	-0.61	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
2017	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
2018	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.71	12.76	10.75	7.19	16.24	16.32	1.19	24.16	0.09	0	0.57	5.08	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--05-91\Dew 15 yr--05-91.spw
File Creation Date : Sep 16, 2008 09:57:03
File Last Modified Date : Sep 16, 2008 09:57:04
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--05-91
Simulation Start Date : Jan 01, 2005
Simulation End Date : Dec 31, 2019
Simulation Run Date : Sep 16, 2008 09:57
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--05-91
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--05-91\Dew 15 yr--05-91.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 05-91 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0591 - Jan 01, 2005 to Dec 31, 2019
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Air Temperature : SD0591 - Jan 01, 2005 to Dec 31, 2019
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2005	44	29.08	10.83	11.11	7.14	20.16	16.32	3.01	26.33	0.57	0	3.81	8.67	0
2006	44	28.21	10.15	11.39	6.67	13.22	16.32	0.26	22.61	0.28	0	0.79	4.81	0
2007	44	29.84	12.06	10.96	6.82	14.33	16.32	1.04	22.79	-0.12	0	-0.11	4.09	0
2008	44.04	30.8	12.48	11.19	7.13	16.74	16.32	0.96	24.97	0.36	0	0.94	3.66	0
2009	44	29.37	11.74	11.18	6.45	13.46	16.32	1.39	21.93	-0.17	0	-0.82	4.75	0
2010	44	33.25	15	9.72	8.53	21.88	16.32	1.72	27.95	0.44	0	2.79	4	0
2011	44	31.93	13.89	10.56	7.48	16.16	16.32	1.33	23.67	-0.06	0	-0.71	3.61	0
2012	44.04	32.69	14.15	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.62	3.42	0
2013	44	28.86	11.09	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
2017	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
2018	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
2019	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.88	12.92	10.75	7.21	16.27	16.32	1.24	24.15	0.09	0	0.39	4.25	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--06-92\Dew 15 yr--06-92.spw
File Creation Date : Sep 16, 2008 09:58:16
File Last Modified Date : Sep 16, 2008 09:58:17
Description : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--06-92
Simulation Start Date : Jan 01, 2006
Simulation End Date : Dec 31, 2020
Simulation Run Date : Sep 16, 2008 09:58
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--06-92
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--06-92\Dew 15 yr--06-92.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 06-92 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0692 - Jan 01, 2006 to Dec 31, 2020
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Air Temperature : SD0692 - Jan 01, 2006 to Dec 31, 2020
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2006	44	27.24	9.22	11.4	6.61	13.13	16.32	0.25	22.58	-0.17	0	2.13	19.79	0
2007	44	28.74	10.82	11.1	6.82	14.33	16.32	1.04	22.79	0.18	0	0.69	7.66	0
2008	44.04	30.15	11.71	11.31	7.13	16.74	16.32	0.91	25.02	0.6	0	1.4	4.28	0
2009	44	29.02	11.35	11.22	6.45	13.46	16.32	1.33	21.99	-0.05	0	-0.53	5.62	0
2010	44	33.05	14.77	9.76	8.53	21.88	16.32	1.01	28.66	0.78	0	3.36	4.52	0
2011	44	31.67	13.63	10.56	7.48	16.16	16.32	1.18	23.82	-0.04	0	-0.33	3.61	0
2012	44.04	32.71	14.17	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.64	3.42	0
2013	44	28.87	11.1	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
2017	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
2018	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
2019	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
2020	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	30.7	12.76	10.74	7.2	15.86	16.32	1	23.98	0.09	0	0.39	5.29	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--07-93\Dew 15 yr--07-93.spw
File Creation Date : Sep 16, 2008 09:59:44
File Last Modified Date : Sep 16, 2008 09:59:45
Description : Dewey TP1, TP2, TP5 revised Soils--0.6 in/5th day--07-93
Simulation Start Date : Jan 01, 2007
Simulation End Date : Dec 31, 2021
Simulation Run Date : Sep 16, 2008 09:59
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Dewey TP1, TP2, TP5 revised Soils--0.6 in/5th day--07-93
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--07-93\Dew 15 yr--07-93.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 07-93 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0793 - Jan 01, 2007 to Dec 31, 2021
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Air Temperature : SD0793 - Jan 01, 2007 to Dec 31, 2021
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Management : 0.6 in every 5 days
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--5 day.mgmt (Aug 28, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Dewey TP1, TP2, TP5 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\DRev 1-2-5.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 9
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 4.00 12.00 24.00 4.00 23.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2007	44	27.64	9.58	11.23	6.82	14.33	16.32	1.04	22.79	-0.23	0	2.21	17.35	0
2008	44.04	29.94	11.48	11.33	7.13	16.74	16.32	0.53	25.4	0.77	0	1.83	4.49	0
2009	44	28.99	11.32	11.22	6.45	13.46	16.32	1.28	22.04	-0.03	0	-0.47	5.84	0
2010	44	32.97	14.68	9.76	8.53	21.88	16.32	1.15	28.52	0.82	0	3.27	4.61	0
2011	44	31.45	13.38	10.58	7.48	16.16	16.32	1.18	23.82	-0.03	0	-0.12	3.62	0
2012	44.04	32.7	14.16	10.47	8.07	16.89	16.32	1.13	24	0	0	-0.63	3.42	0
2013	44	28.87	11.1	11.28	6.49	11.75	16.32	1.03	20.55	-0.41	0	-1.42	3.94	0
2014	44	34.76	16.74	9.67	8.34	23.59	16.32	2.19	29.38	0.44	0	2.52	3.46	0
2015	44	31.02	13.52	11.13	6.38	12.36	16.32	0.19	22.12	-0.24	0	-2.29	4.3	0
2016	44.04	28.89	11.61	10.88	6.4	13.79	16.32	0.9	22.8	0.11	0	0.21	4.05	0
2017	44	30.48	12.53	10.59	7.36	15.58	16.32	0.07	24.48	0.11	0	1.25	3.76	0
2018	44	33.49	15.74	10.18	7.57	19.14	16.32	1.94	25.95	0.01	0	0.03	3.55	0
2019	44	30.42	12.17	10.96	7.29	15.03	16.32	1.4	22.66	-0.03	0	-0.45	3.61	0
2020	44.04	29.87	12.21	10.55	7.11	14.08	16.32	0.41	22.88	0.02	0	0.1	3.72	0
2021	44	35.3	16.84	9.44	9.01	22.31	16.32	2.17	27.45	0.02	0	1.14	3.4	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	31.13	13.14	10.62	7.36	16.47	16.32	1.11	24.32	0.09	0	0.47	4.88	0

POWERTECH (USA) INC.

SPAW MODEL RESULTS

DEWEY POND

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--00-86\Dew--00-86.pnd
File Creation Date : Sep 16, 2008 15:02:04
File Last Modified Date : Sep 16, 2008 15:02:04
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2000-1986
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Sep 16, 2008 15:02
SPAW Interface Version : Sep 16, 2008 15:02:04
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--00-86	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--00-86\Dew 15 yr--00-86.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--00-86	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--00-86\Dew 15 yr--00-86.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2000	577.62	431.87	145.74	14.51	18.6	54.06	3.48	0	501.47	0	0	0	0	0	54.91	0	0	376.96	133.04	0	0
2001	563.73	562.6	1.13	18.1	24.88	35	3.74	0	500.1	0	0	0	0	0	58.32	0	0	504.28	5.72	0	0
2002	530.67	533.16	-2.5	13.1	17.47	10.63	2.46	0	500.1	0	0	0	0	0	57.62	0	0	475.54	34.46	0	0
2003	540.2	540.2	0	14.69	20.09	17.19	2.83	0	500.1	0	0	0	0	0	57.99	0	0	482.21	27.79	0	0
2004	526.08	517.77	8.31	12.19	15.87	6.56	2.17	0	501.47	0	0	0	0	0	57.55	0	0	460.21	49.79	0	0
2005	639.43	570.78	68.65	20.16	28.79	106.88	3.66	0	500.1	0	0	0	0	0	60.78	0	0	510	0	0	0
2006	536.02	570.66	-34.65	13.22	18.79	15	2.12	0	500.1	0	0	0	0	0	60.66	0	0	510	0	0	0
2007	555.41	569.76	-14.35	14.34	19.83	32.81	2.66	0	500.1	0	0	0	0	0	59.76	0	0	510	0	0	0
2008	557.86	569.52	-11.66	16.74	23.56	29.69	3.14	0	501.47	0	0	0	0	0	59.52	0	0	510	0	0	0
2009	564.4	559.34	5.05	13.46	18.5	43.13	2.67	0	500.1	0	0	0	0	0	58.65	0	0	500.69	9.31	0	0
2010	597.29	569.35	27.94	21.88	30.1	63.13	3.96	0	500.1	0	0	0	0	0	59.35	0	0	510	0	0	0
2011	567.03	570.14	-3.11	16.16	22.48	41.56	2.89	0	500.1	0	0	0	0	0	60.14	0	0	510	0	0	0
2012	563.55	570.44	-6.89	16.9	24.27	35.63	2.19	0	501.47	0	0	0	0	0	60.44	0	0	510	0	0	0
2013	550.11	569.81	-19.7	11.75	16.44	31.88	1.69	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
2014	605.56	569.57	35.99	23.59	32.21	68.13	5.13	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
566.26	551.71	14.56	16.21	22.34	39.42	3.03	0	501.47	0	0	0	0	0	59.05	0	0	492.66	17.34	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--01-87\Dew--01-87.pnd
File Creation Date : Sep 16, 2008 15:03:53
File Last Modified Date : Sep 16, 2008 15:03:53
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2001-1987
Simulation Start Date : Jan 01, 2001
Simulation End Date : Dec 31, 2015
Simulation Run Date : Sep 16, 2008 15:03
SPAW Interface Version : Sep 16, 2008 15:03:53
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--01-87	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--01-87\Dew 15 yr--01-87.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--01-87	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--01-87\Dew 15 yr--01-87.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2001	560.17	413.3	146.87	18.1	22.74	32.19	5.14	0	500.1	0	0	0	0	0	54.1	0	0	359.2	150.8	0	0
2002	530.67	533.16	-2.5	13.1	17.47	10.63	2.46	0	500.1	0	0	0	0	0	57.62	0	0	475.54	34.46	0	0
2003	540.2	540.2	0	14.69	20.09	17.19	2.83	0	500.1	0	0	0	0	0	57.99	0	0	482.21	27.79	0	0
2004	526.08	517.77	8.31	12.19	15.87	6.56	2.17	0	501.47	0	0	0	0	0	57.55	0	0	460.21	49.79	0	0
2005	639.43	570.78	68.65	20.16	28.79	106.88	3.66	0	500.1	0	0	0	0	0	60.78	0	0	510	0	0	0
2006	536.02	570.66	-34.65	13.22	18.79	15	2.12	0	500.1	0	0	0	0	0	60.66	0	0	510	0	0	0
2007	555.41	569.76	-14.35	14.34	19.83	32.81	2.66	0	500.1	0	0	0	0	0	59.76	0	0	510	0	0	0
2008	562.87	569.61	-6.74	16.74	23.58	34.69	3.13	0	501.47	0	0	0	0	0	59.61	0	0	510	0	0	0
2009	564.42	564.29	0.13	13.46	18.55	43.13	2.64	0	500.1	0	0	0	0	0	58.81	0	0	505.48	4.52	0	0
2010	586.97	569.31	17.66	21.88	30.09	52.81	3.96	0	500.1	0	0	0	0	0	59.31	0	0	510	0	0	0
2011	566.96	569.7	-2.74	16.16	22.32	41.56	2.98	0	500.1	0	0	0	0	0	59.7	0	0	510	0	0	0
2012	563.48	570.02	-6.54	16.9	24.11	35.63	2.27	0	501.47	0	0	0	0	0	60.02	0	0	510	0	0	0
2013	550.06	569.41	-19.35	11.75	16.34	31.88	1.74	0	500.1	0	0	0	0	0	59.41	0	0	510	0	0	0
2014	605.49	569.18	36.31	23.59	31.99	68.13	5.27	0	500.1	0	0	0	0	0	59.18	0	0	510	0	0	0
2015	525.05	569.2	-44.15	12.37	17.4	5.63	1.93	0	500.1	0	0	0	0	0	59.2	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
562.36	551.14	11.23	16.14	22.18	35.65	3.06	0	501.47	0	0	0	0	0	58.96	0	0	492.18	17.82	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--02-88\Dew--02-88.pnd
File Creation Date : Sep 16, 2008 15:06:17
File Last Modified Date : Sep 16, 2008 15:06:17
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2002-1988
Simulation Start Date : Jan 01, 2002
Simulation End Date : Dec 31, 2016
Simulation Run Date : Sep 16, 2008 15:06
SPAW Interface Version : Sep 16, 2008 15:06:17
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--02-88	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--02-88\Dew 15 yr--02-88.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--02-88	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--02-88\Dew 15 yr--02-88.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2002	528.83	384.46	144.37	13.1	16.31	9.38	3.04	0	500.1	0	0	0	0	0	53.87	0	0	330.59	179.41	0	0
2003	540.2	540.2	0	14.69	20.09	17.19	2.83	0	500.1	0	0	0	0	0	57.99	0	0	482.21	27.79	0	0
2004	526.08	517.77	8.31	12.19	15.87	6.56	2.17	0	501.47	0	0	0	0	0	57.55	0	0	460.21	49.79	0	0
2005	633.48	570.68	62.8	20.16	28.77	100.94	3.67	0	500.1	0	0	0	0	0	60.68	0	0	510	0	0	0
2006	535.98	570.42	-34.43	13.22	18.72	15	2.16	0	500.1	0	0	0	0	0	60.42	0	0	510	0	0	0
2007	555.37	569.52	-14.14	14.34	19.75	32.81	2.71	0	500.1	0	0	0	0	0	59.52	0	0	510	0	0	0
2008	557.83	569.29	-11.46	16.74	23.47	29.69	3.19	0	501.47	0	0	0	0	0	59.29	0	0	510	0	0	0
2009	564.38	554.09	10.28	13.46	18.45	43.13	2.7	0	500.1	0	0	0	0	0	58.48	0	0	495.62	14.38	0	0
2010	597.29	569.35	27.94	21.88	30.1	63.13	3.96	0	500.1	0	0	0	0	0	59.35	0	0	510	0	0	0
2011	567.03	570.14	-3.11	16.16	22.48	41.56	2.89	0	500.1	0	0	0	0	0	60.14	0	0	510	0	0	0
2012	563.55	570.44	-6.89	16.9	24.27	35.63	2.19	0	501.47	0	0	0	0	0	60.44	0	0	510	0	0	0
2013	550.11	569.81	-19.7	11.75	16.44	31.88	1.69	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
2014	605.56	569.57	35.99	23.59	32.21	68.13	5.13	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
2015	525.1	569.58	-44.48	12.37	17.5	5.63	1.87	0	500.1	0	0	0	0	0	59.58	0	0	510	0	0	0
2016	551.39	563.45	-12.07	13.79	19.01	28.13	2.77	0	501.47	0	0	0	0	0	58.49	0	0	504.97	5.03	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
561.41	550.63	10.79	15.78	21.78	35.25	2.91	0	501.47	0	0	0	0	0	59.05	0	0	491.57	18.43	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--03-89\Dew--03-89.pnd
File Creation Date : Sep 16, 2008 15:08:09
File Last Modified Date : Sep 16, 2008 15:08:09
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2003-1989
Simulation Start Date : Jan 01, 2003
Simulation End Date : Dec 31, 2017
Simulation Run Date : Sep 16, 2008 15:08
SPAW Interface Version : Sep 16, 2008 15:08:09
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--03-89 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--03-89\Dew 15 yr--03-89.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--03-89 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--03-89\Dew 15 yr--03-89.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2003	532.69	388.32	144.38	14.69	18.58	10.31	3.7	0	500.1	0	0	0	0	0	54.02	0	0	334.3	175.7	0	0
2004	526.08	517.77	8.31	12.19	15.87	6.56	2.17	0	501.47	0	0	0	0	0	57.55	0	0	460.21	49.79	0	0
2005	626.25	570.42	55.83	20.16	28.66	93.75	3.74	0	500.1	0	0	0	0	0	60.42	0	0	510	0	0	0
2006	535.95	570.12	-34.18	13.22	18.63	15	2.21	0	500.1	0	0	0	0	0	60.12	0	0	510	0	0	0
2007	555.34	569.23	-13.9	14.34	19.66	32.81	2.76	0	500.1	0	0	0	0	0	59.23	0	0	510	0	0	0
2008	562.8	569.1	-6.3	16.74	23.39	34.69	3.25	0	501.47	0	0	0	0	0	59.1	0	0	510	0	0	0
2009	564.37	552.79	11.59	13.46	18.44	43.13	2.7	0	500.1	0	0	0	0	0	58.43	0	0	494.35	15.65	0	0
2010	586.97	569.31	17.66	21.88	30.09	52.81	3.96	0	500.1	0	0	0	0	0	59.31	0	0	510	0	0	0
2011	566.96	569.7	-2.74	16.16	22.32	41.56	2.98	0	500.1	0	0	0	0	0	59.7	0	0	510	0	0	0
2012	563.48	570.02	-6.54	16.9	24.11	35.63	2.27	0	501.47	0	0	0	0	0	60.02	0	0	510	0	0	0
2013	550.06	569.41	-19.35	11.75	16.34	31.88	1.74	0	500.1	0	0	0	0	0	59.41	0	0	510	0	0	0
2014	605.49	569.18	36.31	23.59	31.99	68.13	5.27	0	500.1	0	0	0	0	0	59.18	0	0	510	0	0	0
2015	525.05	569.2	-44.15	12.37	17.4	5.63	1.93	0	500.1	0	0	0	0	0	59.2	0	0	510	0	0	0
2016	551.35	554.84	-3.49	13.79	18.91	28.13	2.84	0	501.47	0	0	0	0	0	58.2	0	0	496.64	13.36	0	0
2017	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
559.84	548.76	11.08	15.94	21.87	33.44	3.06	0	501.47	0	0	0	0	0	58.8	0	0	489.96	20.04	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--04-90\Dew--04-90.pnd
File Creation Date : Sep 16, 2008 15:10:21
File Last Modified Date : Sep 16, 2008 15:10:21
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2004-1990
Simulation Start Date : Jan 01, 2004
Simulation End Date : Dec 31, 2018
Simulation Run Date : Sep 16, 2008 15:10
SPAW Interface Version : Sep 16, 2008 15:10:21
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Soils--0.6 in/5th day--04-90	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--04-90\Dew 15 yr--04-90.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Soils--0.6 in/5th day--04-90	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--04-90\Dew 15 yr--04-90.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2004	525.45	372.76	152.69	12.17	14.9	6.56	2.51	0	501.47	0	0	0	0	0	53.93	0	0	318.83	191.17	0	0
2005	626.25	570.42	55.83	20.16	28.66	93.75	3.74	0	500.1	0	0	0	0	0	60.42	0	0	510	0	0	0
2006	535.95	570.12	-34.18	13.22	18.63	15	2.21	0	500.1	0	0	0	0	0	60.12	0	0	510	0	0	0
2007	555.34	569.23	-13.9	14.34	19.66	32.81	2.76	0	500.1	0	0	0	0	0	59.23	0	0	510	0	0	0
2008	557.79	569.02	-11.22	16.74	23.37	29.69	3.26	0	501.47	0	0	0	0	0	59.02	0	0	510	0	0	0
2009	564.35	547.84	16.51	13.46	18.39	43.13	2.73	0	500.1	0	0	0	0	0	58.27	0	0	489.56	20.44	0	0
2010	597.29	569.35	27.94	21.88	30.1	63.13	3.96	0	500.1	0	0	0	0	0	59.35	0	0	510	0	0	0
2011	567.03	570.14	-3.11	16.16	22.48	41.56	2.89	0	500.1	0	0	0	0	0	60.14	0	0	510	0	0	0
2012	563.55	570.44	-6.89	16.9	24.27	35.63	2.19	0	501.47	0	0	0	0	0	60.44	0	0	510	0	0	0
2013	550.11	569.81	-19.7	11.75	16.44	31.88	1.69	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
2014	605.56	569.57	35.99	23.59	32.21	68.13	5.13	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
2015	525.1	569.58	-44.48	12.37	17.5	5.63	1.87	0	500.1	0	0	0	0	0	59.58	0	0	510	0	0	0
2016	551.39	563.45	-12.07	13.79	19.01	28.13	2.77	0	501.47	0	0	0	0	0	58.49	0	0	504.97	5.03	0	0
2017	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
2018	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
564.05	551.5	12.55	16.24	22.35	37.13	3.1	0	501.47	0	0	0	0	0	59.02	0	0	492.48	17.52	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--05-91\Dew--05-91.pnd
File Creation Date : Sep 16, 2008 15:13:27
File Last Modified Date : Sep 16, 2008 15:13:27
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2005-1991
Simulation Start Date : Jan 01, 2005
Simulation End Date : Dec 31, 2019
Simulation Run Date : Sep 16, 2008 15:13
SPAW Interface Version : Sep 16, 2008 15:13:27
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--05-91	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--05-91\Dew 15 yr--05-91.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--05-91	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--05-91\Dew 15 yr--05-91.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2005	625.34	476.85	148.49	20.16	25.86	93.75	5.62	0	500.1	0	0	0	0	0	54.93	0	0	421.91	88.09	0	0
2006	529.08	532.51	-3.44	13.22	17.91	8.44	2.62	0	500.1	0	0	0	0	0	57.79	0	0	474.72	35.28	0	0
2007	555.18	551.09	4.09	14.34	19.29	32.81	2.98	0	500.1	0	0	0	0	0	58.15	0	0	492.94	17.06	0	0
2008	557.74	560.46	-2.72	16.74	23.21	29.69	3.37	0	501.47	0	0	0	0	0	58.61	0	0	501.85	8.15	0	0
2009	564.34	545.03	19.31	13.46	18.36	43.13	2.75	0	500.1	0	0	0	0	0	58.18	0	0	486.85	23.15	0	0
2010	586.97	569.31	17.66	21.88	30.09	52.81	3.96	0	500.1	0	0	0	0	0	59.31	0	0	510	0	0	0
2011	566.96	569.7	-2.74	16.16	22.32	41.56	2.98	0	500.1	0	0	0	0	0	59.7	0	0	510	0	0	0
2012	563.48	570.02	-6.54	16.9	24.11	35.63	2.27	0	501.47	0	0	0	0	0	60.02	0	0	510	0	0	0
2013	550.06	569.41	-19.35	11.75	16.34	31.88	1.74	0	500.1	0	0	0	0	0	59.41	0	0	510	0	0	0
2014	605.49	569.18	36.31	23.59	31.99	68.13	5.27	0	500.1	0	0	0	0	0	59.18	0	0	510	0	0	0
2015	525.05	569.2	-44.15	12.37	17.4	5.63	1.93	0	500.1	0	0	0	0	0	59.2	0	0	510	0	0	0
2016	551.35	554.84	-3.49	13.79	18.91	28.13	2.84	0	501.47	0	0	0	0	0	58.2	0	0	496.64	13.36	0	0
2017	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
2018	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.6	0	0	510	0	0	0
2019	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
565.44	553.2	12.24	16.27	22.26	38.48	3.23	0	501.47	0	0	0	0	0	58.62	0	0	494.58	15.42	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--06-92\Dew--06-92.pnd
File Creation Date : Sep 16, 2008 15:36:47
File Last Modified Date : Sep 16, 2008 15:36:47
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2006-1992
Simulation Start Date : Jan 01, 2006
Simulation End Date : Dec 31, 2020
Simulation Run Date : Sep 16, 2008 15:36
SPAW Interface Version : Sep 16, 2008 15:36:47
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--06-92 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--06-92\Dew 15 yr--06-92.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--06-92 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--06-92\Dew 15 yr--06-92.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2006	528.05	382.99	145.06	13.13	16.35	8.13	3.47	0	500.1	0	0	0	0	0	53.9	0	0	329.09	180.91	0	0
2007	555.18	551.09	4.09	14.34	19.29	32.81	2.98	0	500.1	0	0	0	0	0	58.15	0	0	492.94	17.06	0	0
2008	556.17	558.89	-2.72	16.74	23.19	28.13	3.37	0	501.47	0	0	0	0	0	58.57	0	0	500.32	9.68	0	0
2009	562.46	543.15	19.31	13.46	18.35	41.25	2.75	0	500.1	0	0	0	0	0	58.14	0	0	485.01	24.99	0	0
2010	564.35	568.14	-3.8	21.88	29.82	30.31	4.11	0	500.1	0	0	0	0	0	58.72	0	0	509.42	0.58	0	0
2011	562.1	568.63	-6.53	16.16	21.92	36.88	3.2	0	500.1	0	0	0	0	0	58.63	0	0	510	0	0	0
2012	563.27	568.95	-5.67	16.9	23.7	35.63	2.48	0	501.47	0	0	0	0	0	58.95	0	0	510	0	0	0
2013	549.94	554.58	-4.64	11.75	16.09	31.88	1.87	0	500.1	0	0	0	0	0	58.5	0	0	496.08	13.92	0	0
2014	605.41	567.2	38.21	23.59	31.78	68.13	5.4	0	500.1	0	0	0	0	0	58.79	0	0	508.42	1.58	0	0
2015	525.02	563.39	-38.38	12.37	17.31	5.63	1.97	0	500.1	0	0	0	0	0	58.92	0	0	504.47	5.53	0	0
2016	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
2017	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
2018	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
2019	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
2020	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
557.22	546.69	10.53	15.86	21.62	31.02	3.11	0	501.47	0	0	0	0	0	58.3	0	0	488.39	21.61	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--07-93\Dew--07-93.pnd
File Creation Date : Sep 16, 2008 15:38:55
File Last Modified Date : Sep 16, 2008 15:38:55
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 2007-1993
Simulation Start Date : Jan 01, 2007
Simulation End Date : Dec 31, 2021
Simulation Run Date : Sep 16, 2008 15:38
SPAW Interface Version : Sep 16, 2008 15:38:55
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 revised Soils--0.6 in/5th day--07-93 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--07-93\Dew 15 yr--07-93.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 revised Soils--0.6 in/5th day--07-93 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--07-93\Dew 15 yr--07-93.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2007	554.63	405.49	149.15	14.34	17.86	32.81	3.86	0	500.1	0	0	0	0	0	54.18	0	0	351.31	158.69	0	0
2008	544.26	546.99	-2.72	16.74	23.13	16.25	3.41	0	501.47	0	0	0	0	0	58.3	0	0	488.68	21.32	0	0
2009	560.89	541.58	19.31	13.46	18.34	39.69	2.76	0	500.1	0	0	0	0	0	58.1	0	0	483.48	26.52	0	0
2010	569.08	568.93	0.15	21.88	29.93	35	4.05	0	500.1	0	0	0	0	0	58.93	0	0	510	0	0	0
2011	562.13	568.8	-6.67	16.16	21.98	36.88	3.17	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
2012	563.3	569.11	-5.81	16.9	23.76	35.63	2.45	0	501.47	0	0	0	0	0	59.11	0	0	510	0	0	0
2013	549.96	558.28	-8.32	11.75	16.13	31.88	1.85	0	500.1	0	0	0	0	0	58.62	0	0	499.65	10.35	0	0
2014	605.41	567.2	38.21	23.59	31.78	68.13	5.4	0	500.1	0	0	0	0	0	58.79	0	0	508.42	1.58	0	0
2015	525.02	563.39	-38.38	12.37	17.31	5.63	1.97	0	500.1	0	0	0	0	0	58.92	0	0	504.47	5.53	0	0
2016	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
2017	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
2018	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
2019	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
2020	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
2021	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.96	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
561.59	548.8	12.78	16.47	22.5	34.4	3.22	0	501.47	0	0	0	0	0	58.4	0	0	490.4	19.6	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--80-94\Dew--80-94.pnd
File Creation Date : Sep 16, 2008 11:04:20
File Last Modified Date : Sep 16, 2008 13:05:46
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1980-1994
Simulation Start Date : Jan 01, 1980
Simulation End Date : Dec 31, 1994
Simulation Run Date : Sep 16, 2008 13:05
SPAW Interface Version : Sep 16, 2008 13:05:45
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--80-94	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--80-94\Dew 15yr--80-94.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--80-94	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--80-94\Dew 15yr--80-94.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1980	549.55	403.13	146.42	16.33	20.8	22.81	4.46	0	501.47	0	0	0	0	0	54.34	0	0	348.79	161.21	0	0
1981	560.89	541.58	19.31	13.46	18.34	39.69	2.76	0	500.1	0	0	0	0	0	58.1	0	0	483.48	26.52	0	0
1982	553.4	565.59	-12.19	21.88	29.8	19.38	4.12	0	500.1	0	0	0	0	0	58.66	0	0	506.93	3.07	0	0
1983	562.05	566.19	-4.14	16.16	21.8	36.88	3.27	0	500.1	0	0	0	0	0	58.29	0	0	507.89	2.11	0	0
1984	563.23	567.58	-4.36	16.9	23.6	35.63	2.53	0	501.47	0	0	0	0	0	58.7	0	0	508.88	1.12	0	0
1985	549.92	549.88	0.04	11.75	16.05	31.88	1.89	0	500.1	0	0	0	0	0	58.35	0	0	491.53	18.47	0	0
1986	605.41	567.2	38.21	23.59	31.78	68.13	5.4	0	500.1	0	0	0	0	0	58.79	0	0	508.42	1.58	0	0
1987	525.02	563.39	-38.38	12.37	17.31	5.63	1.97	0	500.1	0	0	0	0	0	58.92	0	0	504.47	5.53	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
558.86	548.06	10.8	16.29	22.22	31.98	3.19	0	501.47	0	0	0	0	0	58.34	0	0	489.72	20.28	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--81-95\Dew--81-95.pnd
File Creation Date : Sep 16, 2008 13:32:11
File Last Modified Date : Sep 16, 2008 13:42:23
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1981-1995
Simulation Start Date : Jan 01, 1981
Simulation End Date : Dec 31, 1995
Simulation Run Date : Sep 16, 2008 13:42
SPAW Interface Version : Sep 16, 2008 13:42:23
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--81-95 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--81-95\Dew 15 yr--81-95.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--81-95 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--81-95\Dew 15 yr--81-95.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1981	552.18	386.45	165.73	13.46	16.94	31.56	3.57	0	500.1	0	0	0	0	0	54.13	0	0	332.31	177.69	0	0
1982	553.09	565.59	-12.5	21.88	29.79	19.06	4.12	0	500.1	0	0	0	0	0	58.66	0	0	506.93	3.07	0	0
1983	562.05	565.87	-3.83	16.16	21.79	36.88	3.28	0	500.1	0	0	0	0	0	58.28	0	0	507.59	2.41	0	0
1984	563.23	567.58	-4.36	16.9	23.6	35.63	2.53	0	501.47	0	0	0	0	0	58.7	0	0	508.88	1.12	0	0
1985	549.92	549.88	0.04	11.75	16.05	31.88	1.89	0	500.1	0	0	0	0	0	58.35	0	0	491.53	18.47	0	0
1986	605.41	567.2	38.21	23.59	31.78	68.13	5.4	0	500.1	0	0	0	0	0	58.79	0	0	508.42	1.58	0	0
1987	525.02	563.39	-38.38	12.37	17.31	5.63	1.97	0	500.1	0	0	0	0	0	58.92	0	0	504.47	5.53	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
558.62	546.53	12.09	16.42	22.39	31.58	3.17	0	501.47	0	0	0	0	0	58.33	0	0	488.2	21.8	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--82-96\Dew--82-96.pnd
File Creation Date : Sep 16, 2008 11:07:40
File Last Modified Date : Sep 16, 2008 13:55:06
Description : 450 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1982-1996
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Sep 16, 2008 13:55
SPAW Interface Version : Sep 16, 2008 13:55:05
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--82-96 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--82-96\Dew 15 yr--82-96.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--82-96 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--82-96\Dew 15 yr--82-96.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
1982	551.94	398.71	153.23	21.83	27.32	19.06	5.45	0	500.1	0	0	0	0	0	54.06	0	0	344.65	165.35	0	0
1983	555.15	558.98	-3.83	16.16	21.75	30	3.3	0	500.1	0	0	0	0	0	58.15	0	0	500.83	9.17	0	0
1984	563.23	567.58	-4.36	16.9	23.6	35.63	2.53	0	501.47	0	0	0	0	0	58.7	0	0	508.88	1.12	0	0
1985	549.92	549.88	0.04	11.75	16.05	31.88	1.89	0	500.1	0	0	0	0	0	58.35	0	0	491.53	18.47	0	0
1986	605.41	567.2	38.21	23.59	31.78	68.13	5.4	0	500.1	0	0	0	0	0	58.79	0	0	508.42	1.58	0	0
1987	525.02	563.39	-38.38	12.37	17.31	5.63	1.97	0	500.1	0	0	0	0	0	58.92	0	0	504.47	5.53	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
557.84	547.05	10.79	16.69	22.71	30.42	3.25	0	501.47	0	0	0	0	0	58.32	0	0	488.73	21.27	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--83-97\Dew--83-97.pnd
File Creation Date : Sep 16, 2008 11:09:10
File Last Modified Date : Sep 16, 2008 13:56:41
Description : 450 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1983-1997
Simulation Start Date : Jan 01, 1983
Simulation End Date : Dec 31, 1997
Simulation Run Date : Sep 16, 2008 13:56
SPAW Interface Version : Sep 16, 2008 13:56:41
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--83-97	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--83-97\Dew 15 yr--83-97.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--83-97	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--83-97\Dew 15 yr--83-97.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1983	549.95	400.55	149.4	16.08	19.96	25.63	4.26	0	500.1	0	0	0	0	0	53.93	0	0	346.61	163.39	0	0
1984	552.25	556.61	-4.36	16.9	23.55	24.69	2.55	0	501.47	0	0	0	0	0	58.52	0	0	498.1	11.9	0	0
1985	549.92	549.88	0.04	11.75	16.05	31.88	1.89	0	500.1	0	0	0	0	0	58.35	0	0	491.53	18.47	0	0
1986	601.66	563.45	38.21	23.59	31.77	64.38	5.41	0	500.1	0	0	0	0	0	58.75	0	0	504.7	5.3	0	0
1987	523.13	561.51	-38.38	12.37	17.3	3.75	1.98	0	500.1	0	0	0	0	0	58.87	0	0	502.64	7.36	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.8	521.37	4.43	15.58	20.46	1.56	3.67	0	500.1	0	0	0	0	0	57.52	0	0	463.85	46.15	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
558.21	546.71	11.49	16.42	22.39	31.19	3.15	0	501.47	0	0	0	0	0	58.34	0	0	488.38	21.62	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--84-98\Dew--84-98.pnd
File Creation Date : Sep 16, 2008 11:11:14
File Last Modified Date : Sep 16, 2008 14:00:19
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1984-1998
Simulation Start Date : Jan 01, 1984
Simulation End Date : Dec 31, 1998
Simulation Run Date : Sep 16, 2008 14:00
SPAW Interface Version : Sep 16, 2008 14:00:19
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--84-98	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--84-98\Dew 15 yr--84-98.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--84-98	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--84-98\Dew 15 yr--84-98.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1984	538.28	393.23	145.05	15.65	19.92	13.75	3.14	0	501.47	0	0	0	0	0	54.16	0	0	339.07	170.93	0	0
1985	549.61	549.57	0.04	11.75	16.05	31.56	1.89	0	500.1	0	0	0	0	0	58.34	0	0	491.23	18.77	0	0
1986	601.66	563.45	38.21	23.59	31.77	64.38	5.41	0	500.1	0	0	0	0	0	58.75	0	0	504.7	5.3	0	0
1987	523.13	561.51	-38.38	12.37	17.3	3.75	1.98	0	500.1	0	0	0	0	0	58.87	0	0	502.64	7.36	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.17	520.74	4.43	15.58	20.46	0.94	3.67	0	500.1	0	0	0	0	0	57.51	0	0	463.23	46.77	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
563.97	547.04	16.92	16.88	23.05	36.19	3.26	0	501.47	0	0	0	0	0	58.43	0	0	488.61	21.39	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--85-99\Dew--85-99.pnd
File Creation Date : Sep 16, 2008 11:12:39
File Last Modified Date : Sep 16, 2008 14:06:17
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1985-1999
Simulation Start Date : Jan 01, 1985
Simulation End Date : Dec 31, 1999
Simulation Run Date : Sep 16, 2008 14:06
SPAW Interface Version : Sep 16, 2008 14:06:16
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--85-99 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--85-99\Dew 15 yr--85-99.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--85-99 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--85-99\Dew 15 yr--85-99.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1985	549.09	404	145.09	11.75	14.89	31.56	2.54	0	500.1	0	0	0	0	0	54.34	0	0	349.66	160.34	0	0
1986	601.66	563.45	38.21	23.59	31.77	64.38	5.41	0	500.1	0	0	0	0	0	58.75	0	0	504.7	5.3	0	0
1987	523.13	561.51	-38.38	12.37	17.3	3.75	1.98	0	500.1	0	0	0	0	0	58.87	0	0	502.64	7.36	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.17	520.74	4.43	15.58	20.46	0.94	3.67	0	500.1	0	0	0	0	0	57.51	0	0	463.23	46.77	0	0
1990	590.73	568.8	21.93	19.14	26.23	60.31	4.09	0	500.1	0	0	0	0	0	58.8	0	0	510	0	0	0
1991	567.6	569.57	-1.97	15.03	21.4	43.75	2.34	0	500.1	0	0	0	0	0	59.57	0	0	510	0	0	0
1992	535.83	560.12	-24.29	14.07	19.45	12.81	2.09	0	501.47	0	0	0	0	0	58.63	0	0	501.49	8.51	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
568.58	549.35	19.23	16.98	23.35	40.52	3.24	0	501.47	0	0	0	0	0	58.79	0	0	490.57	19.43	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--86-00\Dew--86-00.pnd
File Creation Date : Sep 16, 2008 11:16:27
File Last Modified Date : Sep 16, 2008 14:07:42
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1986-2000
Simulation Start Date : Jan 01, 1986
Simulation End Date : Dec 31, 2000
Simulation Run Date : Sep 16, 2008 14:07
SPAW Interface Version : Sep 16, 2008 14:07:42
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--86-00 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--86-00\Dew 15 yr--86-00.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--86-00 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--86-00\Dew 15 yr--86-00.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
1986	598.32	415.02	183.3	22.02	27.67	64.38	6.16	0	500.1	0	0	0	0	0	54.54	0	0	360.48	149.52	0	0
1987	523.13	561.51	-38.38	12.37	17.3	3.75	1.98	0	500.1	0	0	0	0	0	58.87	0	0	502.64	7.36	0	0
1988	551.34	552.84	-1.5	13.79	18.88	28.13	2.86	0	501.47	0	0	0	0	0	58.13	0	0	494.71	15.29	0	0
1989	525.17	520.74	4.43	15.58	20.46	0.94	3.67	0	500.1	0	0	0	0	0	57.51	0	0	463.23	46.77	0	0
1990	588.54	568.75	19.79	19.14	26.21	58.13	4.1	0	500.1	0	0	0	0	0	58.75	0	0	510	0	0	0
1991	567.58	569.48	-1.89	15.03	21.37	43.75	2.36	0	500.1	0	0	0	0	0	59.48	0	0	510	0	0	0
1992	535.82	558.04	-22.22	14.07	19.43	12.81	2.11	0	501.47	0	0	0	0	0	58.56	0	0	499.48	10.52	0	0
1993	602.75	568.98	33.77	22.3	30.88	67.5	4.27	0	500.1	0	0	0	0	0	58.98	0	0	510	0	0	0
1994	524.33	554.08	-29.75	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.66	0	0	495.41	14.59	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
570.11	550.68	19.43	17.06	23.55	41.88	3.21	0	501.47	0	0	0	0	0	59.18	0	0	491.51	18.49	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--87-01\Dew--87-01.pnd
File Creation Date : Sep 16, 2008 12:34:17
File Last Modified Date : Sep 16, 2008 14:09:04
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1987-2001
Simulation Start Date : Jan 01, 1987
Simulation End Date : Dec 31, 2001
Simulation Run Date : Sep 16, 2008 14:09
SPAW Interface Version : Sep 16, 2008 14:09:03
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--87-01	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--87-01\Dew 15 yr--87-01.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--87-01	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--87-01\Dew 15 yr--87-01.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1987	521.15	376.23	144.92	12.37	15.52	2.5	3.03	0	500.1	0	0	0	0	0	53.91	0	0	322.32	187.68	0	0
1988	536.63	538.13	-1.5	13.79	18.8	13.44	2.92	0	501.47	0	0	0	0	0	57.84	0	0	480.28	29.72	0	0
1989	525.17	520.74	4.43	15.58	20.46	0.94	3.67	0	500.1	0	0	0	0	0	57.51	0	0	463.23	46.77	0	0
1990	581.34	568.67	12.67	19.14	26.18	50.94	4.12	0	500.1	0	0	0	0	0	58.67	0	0	510	0	0	0
1991	567.54	569.17	-1.64	15.03	21.27	43.75	2.42	0	500.1	0	0	0	0	0	59.17	0	0	510	0	0	0
1992	535.78	551.15	-15.37	14.07	19.34	12.81	2.15	0	501.47	0	0	0	0	0	58.34	0	0	492.81	17.19	0	0
1993	602.44	568.97	33.47	22.3	30.88	67.19	4.27	0	500.1	0	0	0	0	0	58.97	0	0	510	0	0	0
1994	524.33	553.77	-29.44	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.65	0	0	495.12	14.88	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
566.64	547.43	19.2	16.8	23.37	38.75	3.04	0	501.47	0	0	0	0	0	59.41	0	0	488.03	21.97	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--88-02\Dew--88-02.pnd
File Creation Date : Sep 16, 2008 12:36:02
File Last Modified Date : Sep 16, 2008 14:10:46
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1988-2002
Simulation Start Date : Jan 01, 1988
Simulation End Date : Dec 31, 2002
Simulation Run Date : Sep 16, 2008 14:10
SPAW Interface Version : Sep 16, 2008 14:10:45
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--88-02 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--88-02\Dew 15 yr--88-02.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--88-02 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--88-02\Dew 15 yr--88-02.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1988	535.47	392.05	143.42	13.4	16.71	13.44	3.84	0	501.47	0	0	0	0	0	53.98	0	0	338.07	171.93	0	0
1989	525.17	520.74	4.43	15.58	20.46	0.94	3.67	0	500.1	0	0	0	0	0	57.51	0	0	463.23	46.77	0	0
1990	581.34	568.67	12.67	19.14	26.18	50.94	4.12	0	500.1	0	0	0	0	0	58.67	0	0	510	0	0	0
1991	567.54	569.17	-1.64	15.03	21.27	43.75	2.42	0	500.1	0	0	0	0	0	59.17	0	0	510	0	0	0
1992	535.78	551.15	-15.37	14.07	19.34	12.81	2.15	0	501.47	0	0	0	0	0	58.34	0	0	492.81	17.19	0	0
1993	602.44	568.97	33.47	22.3	30.88	67.19	4.27	0	500.1	0	0	0	0	0	58.97	0	0	510	0	0	0
1994	524.33	553.77	-29.44	12	16.44	5.63	2.16	0	500.1	0	0	0	0	0	58.65	0	0	495.12	14.88	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.26	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.36	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
567.24	550.79	16.46	16.82	23.46	39.29	3.01	0	501.47	0	0	0	0	0	59.73	0	0	491.06	18.94	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--89-03\Dew--89-03.pnd
File Creation Date : Sep 16, 2008 12:38:15
File Last Modified Date : Sep 16, 2008 14:12:11
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1989-2003
Simulation Start Date : Jan 01, 1989
Simulation End Date : Dec 31, 2003
Simulation Run Date : Sep 16, 2008 14:12
SPAW Interface Version : Sep 16, 2008 14:12:10
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--89-03	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--89-03\Dew 15 yr--89-03.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--89-03	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--89-03\Dew 15 yr--89-03.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00
ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1989	524.44	376.59	147.85	15.49	19.17	0.94	4.23	0	500.1	0	0	0	0	0	53.89	0	0	322.7	187.3	0	0
1990	580.4	568.64	11.76	19.14	26.17	50	4.13	0	500.1	0	0	0	0	0	58.64	0	0	510	0	0	0
1991	567.53	569.13	-1.6	15.03	21.25	43.75	2.42	0	500.1	0	0	0	0	0	59.13	0	0	510	0	0	0
1992	535.46	549.95	-14.49	14.07	19.33	12.5	2.16	0	501.47	0	0	0	0	0	58.3	0	0	491.65	18.35	0	0
1993	601.81	568.96	32.85	22.3	30.88	66.56	4.27	0	500.1	0	0	0	0	0	58.96	0	0	510	0	0	0
1994	524.33	553.16	-28.83	12	16.43	5.63	2.16	0	500.1	0	0	0	0	0	58.63	0	0	494.52	15.48	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0
2003	541.02	571.45	-30.43	14.69	21.27	17.5	2.14	0	500.1	0	0	0	0	0	61.45	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
567.53	553.01	14.52	16.9	23.68	39.44	2.94	0	501.47	0	0	0	0	0	59.98	0	0	493.03	16.97	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--90-04\Dew--90-04.pnd
File Creation Date : Sep 16, 2008 14:22:34
File Last Modified Date : Sep 16, 2008 14:22:34
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1990-2004
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Sep 16, 2008 14:22
SPAW Interface Version : Sep 16, 2008 14:22:34
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--90-04	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--90-04\Dew 15 yr--90-04.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--90-04	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--90-04\Dew 15 yr--90-04.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1990	574.82	425.57	149.25	19.11	23.99	45.31	5.4	0	500.1	0	0	0	0	0	54.12	0	0	371.44	138.56	0	0
1991	562.15	566.79	-4.64	15.03	21.09	38.44	2.52	0	500.1	0	0	0	0	0	58.61	0	0	508.18	1.82	0	0
1992	534.12	535.2	-1.08	14.07	19.16	11.25	2.24	0	501.47	0	0	0	0	0	57.86	0	0	477.35	32.65	0	0
1993	579.88	568.59	11.29	22.3	30.76	44.69	4.33	0	500.1	0	0	0	0	0	58.59	0	0	510	0	0	0
1994	524.24	531.51	-7.27	12	16.26	5.63	2.25	0	500.1	0	0	0	0	0	57.94	0	0	473.57	36.43	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0
2003	541.02	571.45	-30.43	14.69	21.27	17.5	2.14	0	500.1	0	0	0	0	0	61.45	0	0	510	0	0	0
2004	528.9	569.5	-40.6	12.19	16.39	9.06	1.97	0	501.47	0	0	0	0	0	59.5	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
565.71	553.73	11.99	16.84	23.53	37.77	2.93	0	501.47	0	0	0	0	0	59.91	0	0	493.81	16.19	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--91-05\Dew--91-05.pnd
File Creation Date : Sep 16, 2008 14:29:45
File Last Modified Date : Sep 16, 2008 14:29:45
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1991-2005
Simulation Start Date : Jan 01, 1991
Simulation End Date : Dec 31, 2005
Simulation Run Date : Sep 16, 2008 14:29
SPAW Interface Version : Sep 16, 2008 14:29:45
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--91-05	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--91-05\Dew 15 yr--91-05.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--91-05	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--91-05\Dew 15 yr--91-05.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1991	539.4	394.8	144.6	14.99	19.1	16.56	3.63	0	500.1	0	0	0	0	0	54.07	0	0	340.72	169.28	0	0
1992	534.12	535.2	-1.08	14.07	19.16	11.25	2.24	0	501.47	0	0	0	0	0	57.86	0	0	477.35	32.65	0	0
1993	577.05	568.49	8.56	22.3	30.72	41.88	4.35	0	500.1	0	0	0	0	0	58.49	0	0	510	0	0	0
1994	524.23	528.77	-4.54	12	16.23	5.63	2.26	0	500.1	0	0	0	0	0	57.85	0	0	470.91	39.09	0	0
1995	553.64	535.54	18.1	18.32	24.86	25.31	3.37	0	500.1	0	0	0	0	0	58.09	0	0	477.46	32.54	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0
2003	541.02	571.45	-30.43	14.69	21.27	17.5	2.14	0	500.1	0	0	0	0	0	61.45	0	0	510	0	0	0
2004	528.9	569.5	-40.6	12.19	16.39	9.06	1.97	0	501.47	0	0	0	0	0	59.5	0	0	510	0	0	0
2005	651.39	571.39	80	20.16	29.02	118.75	3.51	0	500.1	0	0	0	0	0	61.39	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
569.11	551.79	17.32	16.9	23.73	41.02	2.88	0	501.47	0	0	0	0	0	60.08	0	0	491.71	18.29	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--92-06\Dew--92-06.pnd
File Creation Date : Sep 16, 2008 14:31:28
File Last Modified Date : Sep 16, 2008 14:31:28
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1992-2006
Simulation Start Date : Jan 01, 1992
Simulation End Date : Dec 31, 2006
Simulation Run Date : Sep 16, 2008 14:31
SPAW Interface Version : Sep 16, 2008 14:31:28
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--92-06	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--92-06\Dew 15 yr--92-06.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--92-06	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--92-06\Dew 15 yr--92-06.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1992	533.34	389.82	143.52	14.07	17.52	11.25	3.09	0	501.47	0	0	0	0	0	54.03	0	0	335.79	174.21	0	0
1993	568.91	561.03	7.88	22.3	30.69	33.75	4.36	0	500.1	0	0	0	0	0	58.38	0	0	502.65	7.35	0	0
1994	524.22	528.08	-3.85	12	16.23	5.63	2.27	0	500.1	0	0	0	0	0	57.83	0	0	470.24	39.76	0	0
1995	548.63	530.53	18.1	18.32	24.84	20.31	3.37	0	500.1	0	0	0	0	0	57.99	0	0	472.54	37.46	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0
2003	541.02	571.45	-30.43	14.69	21.27	17.5	2.14	0	500.1	0	0	0	0	0	61.45	0	0	510	0	0	0
2004	528.9	569.5	-40.6	12.19	16.39	9.06	1.97	0	501.47	0	0	0	0	0	59.5	0	0	510	0	0	0
2005	651.39	571.39	80	20.16	29.02	118.75	3.51	0	500.1	0	0	0	0	0	61.39	0	0	510	0	0	0
2006	536.12	571.5	-35.38	13.22	19.04	15	1.98	0	500.1	0	0	0	0	0	61.5	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
567.96	553	14.96	16.79	23.62	40.04	2.83	0	501.47	0	0	0	0	0	60.31	0	0	492.69	17.31	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--93-07\Dew--93-07.pnd
File Creation Date : Sep 16, 2008 14:44:30
File Last Modified Date : Sep 16, 2008 14:44:30
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1993-2007
Simulation Start Date : Jan 01, 1993
Simulation End Date : Dec 31, 2007
Simulation Run Date : Sep 16, 2008 14:44
SPAW Interface Version : Sep 16, 2008 14:44:30
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--93-07	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--93-07\Dew 15 yr--93-07.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dowey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--93-07	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--93-07\Dew 15 yr--93-07.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX OEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
1993	565.56	414.16	151.4	21.42	27.05	32.81	5.59	0	500.1	0	0	0	0	0	54.23	0	0	359.93	150.07	0	0
1994	524.22	528.08	-3.85	12	16.23	5.63	2.27	0	500.1	0	0	0	0	0	57.83	0	0	470.24	39.76	0	0
1995	548.63	530.53	18.1	18.32	24.84	20.31	3.37	0	500.1	0	0	0	0	0	57.99	0	0	472.54	37.46	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	579.21	568.72	10.49	17.73	24.5	51.56	3.04	0	500.1	0	0	0	0	0	58.72	0	0	510	0	0	0
1998	651.25	569.81	81.44	24.29	33.37	112.5	5.27	0	500.1	0	0	0	0	0	59.81	0	0	510	0	0	0
1999	606.67	573.4	33.28	17.17	25.67	78.75	2.15	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2000	578.95	574.6	4.34	14.51	22	54.06	1.41	0	501.47	0	0	0	0	0	64.6	0	0	510	0	0	0
2001	570.5	573.87	-3.38	18.1	27.15	40.94	2.31	0	500.1	0	0	0	0	0	63.87	0	0	510	0	0	0
2002	531.41	572.62	-41.21	13.1	18.99	10.63	1.7	0	500.1	0	0	0	0	0	62.62	0	0	510	0	0	0
2003	541.02	571.45	-30.43	14.69	21.27	17.5	2.14	0	500.1	0	0	0	0	0	61.45	0	0	510	0	0	0
2004	528.9	569.5	-40.6	12.19	16.39	9.06	1.97	0	501.47	0	0	0	0	0	59.5	0	0	510	0	0	0
2005	651.39	571.39	80	20.16	29.02	118.75	3.51	0	500.1	0	0	0	0	0	61.39	0	0	510	0	0	0
2006	536.12	571.5	-35.38	13.22	19.04	15	1.98	0	500.1	0	0	0	0	0	61.5	0	0	510	0	0	0
2007	555.52	570.57	-15.05	14.34	20.1	32.81	2.51	0	500.1	0	0	0	0	0	60.57	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
569.43	555.27	14.16	16.82	23.65	41.42	2.89	0	501.47	0	0	0	0	0	60.47	0	0	494.79	15.21	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--94-80\Dew--94-80.pnd
File Creation Date : Sep 16, 2008 14:46:58
File Last Modified Date : Sep 16, 2008 14:46:58
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1994-1980
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Sep 16, 2008 14:46
SPAW Interface Version : Sep 16, 2008 14:46:58
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--94-80	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--94-80\Dew 15 yr--94-80.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--94-80	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--94-80\Dew 15 yr--94-80.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1994	523.64	376.1	147.54	12	15.01	5.63	2.91	0	500.1	0	0	0	0	0	53.93	0	0	322.17	187.83	0	0
1995	546.43	528.33	18.1	18.32	24.83	18.13	3.37	0	500.1	0	0	0	0	0	57.94	0	0	470.39	39.61	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	576.7	568.67	8.03	17.73	24.48	49.06	3.05	0	500.1	0	0	0	0	0	58.67	0	0	510	0	0	0
1998	650.91	569.7	81.21	24.29	33.31	112.19	5.31	0	500.1	0	0	0	0	0	59.7	0	0	510	0	0	0
1999	606.66	573.29	33.37	17.17	25.62	78.75	2.18	0	500.1	0	0	0	0	0	63.29	0	0	510	0	0	0
2000	578.93	574.5	4.44	14.51	21.96	54.06	1.43	0	501.47	0	0	0	0	0	64.5	0	0	510	0	0	0
2001	570.48	573.77	-3.29	18.1	27.11	40.94	2.34	0	500.1	0	0	0	0	0	63.77	0	0	510	0	0	0
2002	531.4	572.52	-41.12	13.1	18.96	10.63	1.71	0	500.1	0	0	0	0	0	62.52	0	0	510	0	0	0
2003	541.01	571.35	-30.34	14.69	21.24	17.5	2.16	0	500.1	0	0	0	0	0	61.35	0	0	510	0	0	0
2004	528.88	569.41	-40.53	12.19	16.36	9.06	1.98	0	501.47	0	0	0	0	0	59.41	0	0	510	0	0	0
2005	651.38	571.3	80.08	20.16	28.98	118.75	3.54	0	500.1	0	0	0	0	0	61.3	0	0	510	0	0	0
2006	536.11	571.41	-35.3	13.22	19.02	15	1.99	0	500.1	0	0	0	0	0	61.41	0	0	510	0	0	0
2007	555.51	570.49	-14.98	14.34	20.07	32.81	2.52	0	500.1	0	0	0	0	0	60.49	0	0	510	0	0	0
2008	562.97	570.31	-7.35	16.74	23.85	34.69	2.95	0	501.47	0	0	0	0	0	60.31	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
568.66	555.32	13.34	16.43	23.22	41.21	2.75	0	501.47	0	0	0	0	0	60.54	0	0	494.78	15.22	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--95-81\Dew--95-81.pnd
File Creation Date : Sep 16, 2008 14:49:40
File Last Modified Date : Sep 16, 2008 14:49:41
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1995-1981
Simulation Start Date : Jan 01, 1995
Simulation End Date : Dec 31, 2009
Simulation Run Date : Sep 16, 2008 14:49
SPAW Interface Version : Sep 16, 2008 14:49:40
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--95-81 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--95-81\Dew 15 yr--95-81.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--95-81 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--95-81\Dew 15 yr--95-81.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1995	542.95	377.31	165.64	18.14	22.89	15.94	4.02	0	500.1	0	0	0	0	0	54.08	0	0	323.23	186.77	0	0
1996	549.88	568.06	-18.19	17.59	24.17	20.94	3.29	0	501.47	0	0	0	0	0	58.89	0	0	509.18	0.82	0	0
1997	566.95	568.35	-1.39	17.73	24.37	39.38	3.11	0	500.1	0	0	0	0	0	58.35	0	0	510	0	0	0
1998	650.21	569.29	80.92	24.29	33.08	111.56	5.46	0	500.1	0	0	0	0	0	59.29	0	0	510	0	0	0
1999	606.59	572.89	33.71	17.17	25.47	78.75	2.27	0	500.1	0	0	0	0	0	62.89	0	0	510	0	0	0
2000	578.88	574.12	4.77	14.51	21.84	54.06	1.51	0	501.47	0	0	0	0	0	64.12	0	0	510	0	0	0
2001	570.43	573.4	-2.97	18.1	26.95	40.94	2.43	0	500.1	0	0	0	0	0	63.4	0	0	510	0	0	0
2002	531.34	572.16	-40.81	13.1	18.85	10.63	1.77	0	500.1	0	0	0	0	0	62.16	0	0	510	0	0	0
2003	540.96	571	-30.04	14.69	21.12	17.5	2.23	0	500.1	0	0	0	0	0	61	0	0	510	0	0	0
2004	528.83	567.76	-38.94	12.19	16.27	9.06	2.02	0	501.47	0	0	0	0	0	59.07	0	0	508.69	1.31	0	0
2005	651.33	571.02	80.31	20.16	28.86	118.75	3.62	0	500.1	0	0	0	0	0	61.02	0	0	510	0	0	0
2006	536.08	571.15	-35.07	13.22	18.94	15	2.04	0	500.1	0	0	0	0	0	61.15	0	0	510	0	0	0
2007	555.47	570.23	-14.76	14.34	19.98	32.81	2.57	0	500.1	0	0	0	0	0	60.23	0	0	510	0	0	0
2008	562.93	570.07	-7.13	16.74	23.76	34.69	3.01	0	501.47	0	0	0	0	0	60.07	0	0	510	0	0	0
2009	564.47	569.22	-4.74	13.46	18.67	43.13	2.57	0	500.1	0	0	0	0	0	59.22	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
570.42	557.78	12.65	16.52	23.24	42.88	2.83	0	501.47	0	0	0	0	0	60.37	0	0	497.41	12.59	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--96-82\Dew--96-82.pnd
File Creation Date : Sep 16, 2008 14:51:02
File Last Modified Date : Sep 16, 2008 14:51:03
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1996-1982
Simulation Start Date : Jan 01, 1996
Simulation End Date : Dec 31, 2010
Simulation Run Date : Sep 16, 2008 14:51
SPAW Interface Version : Sep 16, 2008 14:51:02
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--96-82	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--96-82\Dew 15 yr--96-82.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--96-82	375.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--96-82\Dew 15 yr--96-82.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1996	543.74	396.28	147.46	17.59	22.24	15.63	4.4	0	501.47	0	0	0	0	0	54.2	0	0	342.08	167.92	0	0
1997	557.25	559.86	-2.61	17.73	24.34	29.69	3.12	0	500.1	0	0	0	0	0	58.22	0	0	501.63	8.37	0	0
1998	647.69	569.2	78.49	24.29	33.03	109.06	5.49	0	500.1	0	0	0	0	0	59.2	0	0	510	0	0	0
1999	598.4	572.44	25.96	17.17	25.3	70.63	2.37	0	500.1	0	0	0	0	0	62.44	0	0	510	0	0	0
2000	578.82	573.65	5.17	14.51	21.68	54.06	1.6	0	501.47	0	0	0	0	0	63.65	0	0	510	0	0	0
2001	570.36	572.95	-2.59	18.1	26.77	40.94	2.55	0	500.1	0	0	0	0	0	62.95	0	0	510	0	0	0
2002	531.28	571.72	-40.44	13.1	18.72	10.63	1.83	0	500.1	0	0	0	0	0	61.72	0	0	510	0	0	0
2003	540.9	570.57	-29.67	14.69	20.98	17.5	2.31	0	500.1	0	0	0	0	0	60.57	0	0	510	0	0	0
2004	528.77	557.86	-29.08	12.19	16.18	9.06	2.06	0	501.47	0	0	0	0	0	58.74	0	0	499.11	10.89	0	0
2005	651.33	571.02	80.31	20.16	28.86	118.75	3.62	0	500.1	0	0	0	0	0	61.02	0	0	510	0	0	0
2006	536.08	571.15	-35.07	13.22	18.94	15	2.04	0	500.1	0	0	0	0	0	61.15	0	0	510	0	0	0
2007	555.47	570.23	-14.76	14.34	19.98	32.81	2.57	0	500.1	0	0	0	0	0	60.23	0	0	510	0	0	0
2008	562.93	570.07	-7.13	16.74	23.76	34.69	3.01	0	501.47	0	0	0	0	0	60.07	0	0	510	0	0	0
2009	564.47	569.22	-4.74	13.46	18.67	43.13	2.57	0	500.1	0	0	0	0	0	59.22	0	0	510	0	0	0
2010	587.02	569.55	17.47	21.88	30.21	52.81	3.9	0	500.1	0	0	0	0	0	59.55	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
571.57	557.76	13.81	16.77	23.53	43.63	2.94	0	501.47	0	0	0	0	0	60.24	0	0	497.52	12.48	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--97-83\Dew--97-83.pnd
File Creation Date : Sep 16, 2008 14:52:47
File Last Modified Date : Sep 16, 2008 14:52:48
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1997-1983
Simulation Start Date : Jan 01, 1997
Simulation End Date : Dec 31, 2011
Simulation Run Date : Sep 16, 2008 14:52
SPAW Interface Version : Sep 16, 2008 14:52:47
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--97-83	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--97-83\Dew 15 yr--97-83.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--97-83	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--97-83\Dew 15 yr--97-83.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1997	555.36	410.51	144.85	17.73	22.18	28.75	4.32	0	500.1	0	0	0	0	0	54.06	0	0	356.45	153.55	0	0
1998	612	568.91	43.09	24.29	32.84	73.44	5.62	0	500.1	0	0	0	0	0	58.91	0	0	510	0	0	0
1999	598.17	570.96	27.2	17.17	24.73	70.63	2.71	0	500.1	0	0	0	0	0	60.96	0	0	510	0	0	0
2000	578.62	572.24	6.38	14.51	21.22	54.06	1.87	0	501.47	0	0	0	0	0	62.24	0	0	510	0	0	0
2001	570.15	571.58	-1.43	18.1	26.2	40.94	2.91	0	500.1	0	0	0	0	0	61.58	0	0	510	0	0	0
2002	531.08	570.38	-39.3	13.1	18.32	10.63	2.03	0	500.1	0	0	0	0	0	60.38	0	0	510	0	0	0
2003	540.71	569.27	-28.56	14.69	20.55	17.5	2.56	0	500.1	0	0	0	0	0	59.27	0	0	510	0	0	0
2004	528.61	528.16	0.45	12.19	15.93	9.06	2.15	0	501.47	0	0	0	0	0	57.8	0	0	470.37	39.63	0	0
2005	651.33	571.02	80.31	20.16	28.86	118.75	3.62	0	500.1	0	0	0	0	0	61.02	0	0	510	0	0	0
2006	536.08	571.15	-35.07	13.22	18.94	15	2.04	0	500.1	0	0	0	0	0	61.15	0	0	510	0	0	0
2007	555.47	570.23	-14.76	14.34	19.98	32.81	2.57	0	500.1	0	0	0	0	0	60.23	0	0	510	0	0	0
2008	562.93	570.07	-7.13	16.74	23.76	34.69	3.01	0	501.47	0	0	0	0	0	60.07	0	0	510	0	0	0
2009	564.47	569.22	-4.74	13.46	18.67	43.13	2.57	0	500.1	0	0	0	0	0	59.22	0	0	510	0	0	0
2010	587.02	569.55	17.47	21.88	30.21	52.81	3.9	0	500.1	0	0	0	0	0	59.55	0	0	510	0	0	0
2011	567	569.93	-2.93	16.16	22.4	41.56	2.93	0	500.1	0	0	0	0	0	59.93	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
570.75	556.93	13.82	16.74	23.3	42.92	3.05	0	501.47	0	0	0	0	0	59.8	0	0	497.12	12.88	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--98-84\Dew--98-84.pnd
File Creation Date : Sep 16, 2008 14:58:35
File Last Modified Date : Sep 16, 2008 14:58:36
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1998-1984
Simulation Start Date : Jan 01, 1998
Simulation End Date : Dec 31, 2012
Simulation Run Date : Sep 16, 2008 14:58
SPAW Interface Version : Sep 16, 2008 14:58:35
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--98-84 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--98-84\Dew 15 yr--98-84.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--98-84 375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--98-84\Dew 15 yr--98-84.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1998	593.88	419.31	174.56	24.29	30.47	56.25	7.06	0	500.1	0	0	0	0	0	54.41	0	0	364.91	145.09	0	0
1999	586.47	570.05	16.42	17.17	24.42	59.06	2.89	0	500.1	0	0	0	0	0	60.05	0	0	510	0	0	0
2000	578.48	571.23	7.25	14.51	20.89	54.06	2.06	0	501.47	0	0	0	0	0	61.23	0	0	510	0	0	0
2001	567.19	570.56	-3.37	18.1	25.79	38.13	3.16	0	500.1	0	0	0	0	0	60.56	0	0	510	0	0	0
2002	530.92	569.32	-38.4	13.1	18	10.63	2.19	0	500.1	0	0	0	0	0	59.32	0	0	510	0	0	0
2003	540.58	552.67	-12.09	14.69	20.23	17.5	2.74	0	500.1	0	0	0	0	0	58.39	0	0	494.28	15.72	0	0
2004	528.58	520.27	8.31	12.19	15.87	9.06	2.17	0	501.47	0	0	0	0	0	57.55	0	0	462.71	47.29	0	0
2005	651.33	571.02	80.31	20.16	28.86	118.75	3.62	0	500.1	0	0	0	0	0	61.02	0	0	510	0	0	0
2006	536.08	571.15	-35.07	13.22	18.94	15	2.04	0	500.1	0	0	0	0	0	61.15	0	0	510	0	0	0
2007	555.47	570.23	-14.76	14.34	19.98	32.81	2.57	0	500.1	0	0	0	0	0	60.23	0	0	510	0	0	0
2008	562.93	570.07	-7.13	16.74	23.76	34.69	3.01	0	501.47	0	0	0	0	0	60.07	0	0	510	0	0	0
2009	564.47	569.22	-4.74	13.46	18.67	43.13	2.57	0	500.1	0	0	0	0	0	59.22	0	0	510	0	0	0
2010	587.02	569.55	17.47	21.68	30.21	52.81	3.9	0	500.1	0	0	0	0	0	59.55	0	0	510	0	0	0
2011	567	569.93	-2.93	16.16	22.4	41.56	2.93	0	500.1	0	0	0	0	0	59.93	0	0	510	0	0	0
2012	563.52	570.24	-6.72	16.9	24.19	35.63	2.23	0	501.47	0	0	0	0	0	60.24	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
568.86	555.7	13.17	16.62	23.06	41.27	3.06	0	501.47	0	0	0	0	0	59.57	0	0	496.13	13.87	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Dew 15 yr\Dew--99-85\Dew--99-85.pnd
File Creation Date : Sep 16, 2008 15:00:42
File Last Modified Date : Sep 16, 2008 15:00:42
Description : 510 AF Pond using TP1, TP2, TP5 Dewey soils, 0.6 in/5th da, 375 ac, 1999-1985
Simulation Start Date : Jan 01, 1999
Simulation End Date : Dec 31, 2013
Simulation Run Date : Sep 16, 2008 15:00
SPAW Interface Version : Sep 16, 2008 15:00:42
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--99-85	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--99-85\Dew 15 yr--99-85.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Dewey TP1, TP2, TP5 Revised Soils--0.6 in/5th day--99-85	375.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Dew 15-yr\Dew 15 yr--99-85\Dew 15 yr--99-85.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	14.05	0.00
5.00	14.96	72.53
10.00	15.90	149.68
15.00	16.87	231.60
20.00	17.87	318.45
25.00	18.90	410.38
30.00	19.95	507.50
33.00	20.60	568.33

POND PROFILE
MAX AREA (AC) = 20.49
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 558.19
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1999	550.68	407.06	143.62	17.17	21.69	24.38	4.52	0	500.1	0	0	0	0	0	54.08	0	0	352.98	157.02	0	0
2000	578.21	569.23	8.98	14.51	20.23	54.06	2.44	0	501.47	0	0	0	0	0	59.23	0	0	510	0	0	0
2001	566.9	568.62	-1.73	18.1	25	38.13	3.67	0	500.1	0	0	0	0	0	58.62	0	0	510	0	0	0
2002	530.68	537.18	-6.5	13.1	17.51	10.63	2.45	0	500.1	0	0	0	0	0	57.75	0	0	479.43	30.57	0	0
2003	540.52	540.51	0	14.69	20.09	17.5	2.83	0	500.1	0	0	0	0	0	58	0	0	482.52	27.48	0	0
2004	528.58	520.27	8.31	12.19	15.87	9.06	2.17	0	501.47	0	0	0	0	0	57.55	0	0	462.71	47.29	0	0
2005	651.33	571.02	80.31	20.16	28.86	118.75	3.62	0	500.1	0	0	0	0	0	61.02	0	0	510	0	0	0
2006	536.08	571.15	-35.07	13.22	18.94	15	2.04	0	500.1	0	0	0	0	0	61.15	0	0	510	0	0	0
2007	555.47	570.23	-14.76	14.34	19.98	32.81	2.57	0	500.1	0	0	0	0	0	60.23	0	0	510	0	0	0
2008	562.93	570.07	-7.13	16.74	23.76	34.69	3.01	0	501.47	0	0	0	0	0	60.07	0	0	510	0	0	0
2009	564.47	569.22	-4.74	13.46	18.67	43.13	2.57	0	500.1	0	0	0	0	0	59.22	0	0	510	0	0	0
2010	587.02	569.55	17.47	21.88	30.21	52.81	3.9	0	500.1	0	0	0	0	0	59.55	0	0	510	0	0	0
2011	567	569.93	-2.93	16.16	22.4	41.56	2.93	0	500.1	0	0	0	0	0	59.93	0	0	510	0	0	0
2012	563.52	570.24	-6.72	16.9	24.19	35.63	2.23	0	501.47	0	0	0	0	0	60.24	0	0	510	0	0	0
2013	550.08	569.62	-19.53	11.75	16.39	31.88	1.71	0	500.1	0	0	0	0	0	59.62	0	0	510	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
563.5	551.64	11.87	15.78	21.8	37.33	2.89	0	501.47	0	0	0	0	0	59.13	0	0	492.51	17.49	0	0

Powertech (USA) Inc.

SPAW MODEL RESULTS

BURDOCK FIELD

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--80-94\Bur 15 yr--80-94.spw
File Creation Date : Sep 17, 2008 09:25:56
File Last Modified Date : Sep 17, 2008 09:25:56
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--80-94
Simulation Start Date : Jan 01, 1980
Simulation End Date : Dec 31, 1994
Simulation Run Date : Sep 17, 2008 09:25
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--80-94
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--80-94\Bur 15 yr--80-94.fld (Sep 16, 200800:00)
Climate : Dewey Burdock 81-94 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8094 - Jan 01, 1980 to Dec 31, 1994
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Air Temperature : SD8094 - Jan 01, 1980 to Dec 31, 1994
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\80-94.txt (Sep 15, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1980	44.04	26.22	6.93	12.26	7.03	16.33	12.27	0.27	21.3	0.49	0	1.61	17.5	0
1981	44	25.29	7.05	11.78	6.45	13.46	12.27	1.01	18.26	-0.17	0	-0.4	19.62	0
1982	44	28.2	8.4	11.27	8.53	21.88	12.27	0.3	25.33	1.45	0	4.21	8.57	0
1983	44	27.8	8.21	12.11	7.48	16.16	12.27	2.11	18.84	-0.46	0	-1.02	4.23	0
1984	44.04	29.09	9.24	11.78	8.07	16.89	12.27	1.07	20.02	-0.12	0	-0.87	4.52	0
1985	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.27	0
1986	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
1987	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
1988	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
1989	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
1990	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
1991	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.33	7.98	11.99	7.35	16.29	12.27	0.99	20.22	0.06	0	0.19	7.9	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--81-95\Bur 15 yr--81-95.spw
File Creation Date : Sep 17, 2008 09:27:28
File Last Modified Date : Sep 17, 2008 09:27:29
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--81-95
Simulation Start Date : Jan 01, 1981
Simulation End Date : Dec 31, 1995
Simulation Run Date : Sep 17, 2008 09:27
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--81-95
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--81-95\Bur 15 yr--81-95.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 81-95 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8195 - Jan 01, 1981 to Dec 31, 1995
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Air Temperature : SD8195 - Jan 01, 1981 to Dec 31, 1995
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\81-95.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1981	44	24.09	6.92	10.71	6.45	13.46	12.27	1.01	18.26	0.05	0	0.58	49.16	0
1982	44	27.9	8.07	11.3	8.53	21.88	12.27	0.3	25.33	1.56	0	4.4	13.69	0
1983	44	27.59	7.96	12.15	7.48	16.16	12.27	1.75	19.2	-0.3	0	-0.61	4.3	0
1984	44.04	29.08	9.23	11.78	8.07	16.89	12.27	1.04	20.04	-0.12	0	-0.85	4.52	0
1985	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.28	0
1986	44	28.86	8.97	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
1987	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
1988	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
1989	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
1990	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
1991	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.39	8.04	11.87	7.48	16.42	12.27	0.98	20.24	0.08	0	0.25	9.43	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--82-96\Bur 15 yr--82-96.spw
File Creation Date : Sep 17, 2008 09:28:51
File Last Modified Date : Sep 17, 2008 09:28:52
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--82-96
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Sep 17, 2008 09:28
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--82-96
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--82-96\Bur 15 yr--82-96.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 82-96 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8296 - Jan 01, 1982 to Dec 31, 1996
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Air Temperature : SD8296 - Jan 01, 1982 to Dec 31, 1996
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\82-96.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1982	44	27.65	7.93	11.24	8.48	21.83	12.27	0.3	25.33	1.49	0	4.67	26.36	0
1983	44	27.46	7.8	12.18	7.48	16.16	12.27	1.47	19.48	-0.18	0	-0.32	4.35	0
1984	44.04	29.07	9.22	11.78	8.07	16.89	12.27	1.02	20.06	-0.11	0	-0.83	4.52	0
1985	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.29	0
1986	44	28.86	8.97	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
1987	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
1988	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
1989	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
1990	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
1991	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.62	8.11	11.95	7.56	16.7	12.27	0.94	20.46	0.09	0	0.31	7.25	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--83-97\Bur 15 yr--83-97.spw
File Creation Date : Sep 17, 2008 09:29:54
File Last Modified Date : Sep 17, 2008 09:29:55
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--83-97
Simulation Start Date : Jan 01, 1983
Simulation End Date : Dec 31, 1997
Simulation Run Date : Sep 17, 2008 09:29
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--83-97
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--83-97\Bur 15 yr--83-97.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 83-97 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8397 - Jan 01, 1983 to Dec 31, 1997
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Air Temperature : SD8397 - Jan 01, 1983 to Dec 31, 1997
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\83-97.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1983	44	25.59	6.69	11.5	7.4	16.08	12.27	0.32	20.64	0.45	0	1.99	41.39	0
1984	44.04	28.1	8.09	11.94	8.07	16.89	12.27	0.44	20.65	0.4	0	0.22	8.14	0
1985	44	24.87	6.91	11.47	6.49	11.75	12.27	1.02	16.51	-0.58	0	-1.29	21.57	0
1986	44	28.53	8.59	11.6	8.34	23.59	12.27	1.23	26.29	1.5	0	4.6	4.15	0
1987	44	27.45	8.51	12.57	6.38	12.36	12.27	0.84	17.41	-0.8	0	-2.86	6.45	0
1988	44.04	25.79	6.87	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.72	0
1989	44	26.39	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.34	0
1990	44	29.03	9.45	12	7.57	19.14	12.27	0.95	22.88	0.4	0	1.03	3.68	0
1991	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.41	8	11.9	7.51	16.42	12.27	0.94	20.24	0.09	0	0.26	9.13	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--84-98\Bur 15 yr--84-98.spw
File Creation Date : Sep 17, 2008 09:31:18
File Last Modified Date : Sep 17, 2008 09:31:19
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--84-98
Simulation Start Date : Jan 01, 1984
Simulation End Date : Dec 31, 1998
Simulation Run Date : Sep 17, 2008 09:31
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--84-98
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--84-98\Bur 15 yr--84-98.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 84-98 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8498 - Jan 01, 1984 to Dec 31, 1998
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Air Temperature : SD8498 - Jan 01, 1984 to Dec 31, 1998
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\84-98.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1984	44.04	26.52	7.35	11.36	7.82	15.65	12.27	0.44	19.66	0.2	0	0.75	34.5	0
1985	44	23.68	6.7	10.48	6.49	11.75	12.27	1.02	16.51	-0.22	0	-0.46	39.21	0
1986	44	28.31	8.35	11.62	8.34	23.59	12.27	1.23	26.29	1.6	0	4.73	5.43	0
1987	44	27.11	8.12	12.61	6.38	12.36	12.27	0.58	17.67	-0.62	0	-2.44	6.65	0
1988	44.04	25.76	6.85	12.51	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.15	6.96	0
1989	44	26.38	6.84	12.17	7.36	15.58	12.27	0.04	20.45	0.15	0	1.29	6.52	0
1990	44	29.02	9.44	12.01	7.57	19.14	12.27	0.93	22.91	0.41	0	1.06	3.68	0
1991	44	27.63	8.09	12.25	7.29	15.03	12.27	2.18	17.83	-0.54	0	-1.97	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.54	8.22	11.78	7.55	16.88	12.27	1.08	20.53	0.13	0	0.4	9.67	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--85-99\Bur 15 yr--85-99.spw
File Creation Date : Sep 17, 2008 09:32:43
File Last Modified Date : Sep 17, 2008 09:32:43
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--85-99
Simulation Start Date : Jan 01, 1985
Simulation End Date : Dec 31, 1999
Simulation Run Date : Sep 17, 2008 09:32
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--85-99
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--85-99\Bur 15 yr--85-99.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 85-99 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8599 - Jan 01, 1985 to Dec 31, 1999
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Air Temperature : SD8599 - Jan 01, 1985 to Dec 31, 1999
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\85-99.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1985	44	22.95	6.62	9.84	6.49	11.75	12.27	1.02	16.51	-0.08	0	0.13	56.26	0
1986	44	28.25	8.3	11.61	8.34	23.59	12.27	1.23	26.29	1.61	0	4.77	5.95	0
1987	44	27.04	8.05	12.62	6.38	12.36	12.27	0.5	17.75	-0.58	0	-2.34	6.73	0
1988	44.04	25.75	6.84	12.51	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.14	7.05	0
1989	44	26.37	6.84	12.17	7.36	15.58	12.27	0.04	20.45	0.15	0	1.3	6.58	0
1990	44	29.01	9.43	12.01	7.57	19.14	12.27	0.92	22.92	0.41	0	1.07	3.69	0
1991	44	27.63	8.09	12.25	7.29	15.03	12.27	2.17	17.84	-0.54	0	-1.96	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.65	8.36	11.76	7.53	16.98	12.27	1.29	20.43	0.08	0	0.23	8.84	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--86-00\Bur 15 yr--86-00.spw
File Creation Date : Sep 17, 2008 09:33:55
File Last Modified Date : Sep 17, 2008 09:33:56
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--86-00
Simulation Start Date : Jan 01, 1986
Simulation End Date : Dec 31, 2000
Simulation Run Date : Sep 17, 2008 09:33
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--86-00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--86-00\Bur 15 yr--86-00.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 86-00 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8600 - Jan 01, 1986 to Dec 31, 2000
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.txt (Sep 16, 2008 00:00)
Air Temperature : SD8600 - Jan 01, 1986 to Dec 31, 2000
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\86-00.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1986	44	27.5	7.85	11.53	8.11	22.03	12.27	1.23	24.96	1.26	0	4.31	13.67	0
1987	44	26.79	7.76	12.66	6.38	12.36	12.27	0.1	18.16	-0.34	0	-1.91	7.27	0
1988	44.04	25.7	6.79	12.51	6.4	13.79	12.27	0.42	19.23	0.03	0	-0.1	7.57	0
1989	44	26.33	6.82	12.14	7.36	15.58	12.27	0.04	20.45	0.15	0	1.34	7	0
1990	44	28.98	9.39	12.02	7.57	19.14	12.27	0.87	22.97	0.43	0	1.12	3.7	0
1991	44	27.63	8.09	12.25	7.29	15.03	12.27	2.15	17.86	-0.53	0	-1.95	6.6	0
1992	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
1993	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.87	8.4	11.9	7.57	17.06	12.27	1.29	20.47	0.05	0	0.13	6.22	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--87-01\Bur 15 yr--87-01.spw
File Creation Date : Sep 17, 2008 09:35:25
File Last Modified Date : Sep 17, 2008 09:35:26
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--87-01
Simulation Start Date : Jan 01, 1987
Simulation End Date : Dec 31, 2001
Simulation Run Date : Sep 17, 2008 09:35
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--87-01
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--87-01\Bur 15 yr--87-01.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 87-01climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\87-01.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8701 - Jan 01, 1987 to Dec 31, 2001
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Air Temperature : SD8701 - Jan 01, 1987 to Dec 31, 2001
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\87-01.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1987	44	24.33	6.68	11.27	6.38	12.36	12.27	0.08	18.17	-0.02	0	0.24	40.16	0
1988	44.04	24.74	6.45	11.89	6.4	13.79	12.27	0.42	19.23	0.37	0	0.52	27.01	0
1989	44	25.53	6.64	11.52	7.36	15.58	12.27	0.04	20.45	0.33	0	1.96	18.54	0
1990	44	28.47	8.73	12.17	7.57	19.14	12.27	0.64	23.19	0.68	0	1.61	4.37	0
1991	44	27.53	7.98	12.26	7.29	15.03	12.27	1.65	18.36	-0.37	0	-1.51	6.66	0
1992	44.04	26.42	7.24	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.33	7.89	0
1993	44	28.93	8.82	11.09	9.01	22.31	12.27	2.62	22.95	0.46	0	2.57	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.52	8.23	11.78	7.52	16.8	12.27	1.24	20.31	0.07	0	0.23	10.01	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--88-02\Bur 15 yr--88-02.spw
File Creation Date : Sep 17, 2008 09:36:26
File Last Modified Date : Sep 17, 2008 09:36:26
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--88-02
Simulation Start Date : Jan 01, 1988
Simulation End Date : Dec 31, 2002
Simulation Run Date : Sep 17, 2008 09:36
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--88-02
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--88-02\Bur 15 yr--88-02.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 88-02 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\88-02.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8802 - Jan 01, 1988 to Dec 31, 2002
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Air Temperature : SD8802 - Jan 01, 1988 to Dec 31, 2002
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\88-02.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1988	44.04	24.38	6.3	11.69	6.39	13.4	12.27	0.42	18.85	0.25	0	0.61	37.37	0
1989	44	25.4	6.61	11.42	7.36	15.58	12.27	0.04	20.45	0.39	0	2.03	20.73	0
1990	44	28.43	8.68	12.18	7.57	19.14	12.27	0.64	23.19	0.7	0	1.63	4.46	0
1991	44	27.52	7.96	12.26	7.29	15.03	12.27	1.6	18.42	-0.35	0	-1.46	6.67	0
1992	44.04	26.42	7.24	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.33	7.89	0
1993	44	28.93	8.82	11.09	9.01	22.31	12.27	2.62	22.95	0.46	0	2.57	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.62	8.24	11.85	7.54	16.82	12.27	1.25	20.31	0.06	0	0.16	8.61	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--89-03\Bur 15 yr--89-03.spw
File Creation Date : Sep 17, 2008 09:37:40
File Last Modified Date : Sep 17, 2008 09:37:41
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--89-03
Simulation Start Date : Jan 01, 1989
Simulation End Date : Dec 31, 2003
Simulation Run Date : Sep 17, 2008 09:37
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--89-03
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--89-03\Bur 15 yr--89-03.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 89-03 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD8903 - Jan 01, 1989 to Dec 31, 2003
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Air Temperature : SD8903 - Jan 01, 1989 to Dec 31, 2003
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\89-03.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1989	44	24.78	6.49	11	7.29	15.49	12.27	0.04	20.42	0.52	0	2.41	33.15	0
1990	44	28.33	8.56	12.2	7.57	19.14	12.27	0.64	23.19	0.76	0	1.68	4.8	0
1991	44	27.48	7.92	12.27	7.29	15.03	12.27	1.4	18.61	-0.29	0	-1.3	6.69	0
1992	44.04	26.42	7.24	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.33	7.92	0
1993	44	28.93	8.82	11.09	9.01	22.31	12.27	2.61	22.95	0.46	0	2.57	3.58	0
1994	44	26.74	7.57	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7	0
1995	44	28.88	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.94	5.7	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.76	21.29	0.26	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.3	19.98	-0.12	0	-0.83	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.74	8.28	11.86	7.6	16.9	12.27	1.23	20.35	0.06	0	0.15	7.49	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--90-04\Bur 15 yr--90-04.spw
File Creation Date : Sep 17, 2008 09:38:37
File Last Modified Date : Sep 17, 2008 09:38:37
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--90-04
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Sep 17, 2008 09:38
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--90-04
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--90-04\Bur 15 yr--90-04.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 90-04 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9004 - Jan 01, 1990 to Dec 31, 2004
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Air Temperature : SD9004 - Jan 01, 1990 to Dec 31, 2004
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\90-04.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1990	44	27.45	7.94	11.97	7.54	19.11	12.27	0.64	23.19	0.67	0	2.62	19.51	0
1991	44	27.1	7.54	12.28	7.29	15.03	12.27	0.25	19.76	0.21	0	-0.26	9.16	0
1992	44.04	26.25	7.1	12.05	7.11	14.08	12.27	0.28	18.96	0.01	0	-0.2	9.69	0
1993	44	28.88	8.76	11.11	9.01	22.31	12.27	2.3	23.26	0.53	0	2.87	3.61	0
1994	44	26.74	7.56	12.39	6.79	12.01	12.27	0.19	17.3	-0.55	0	-2.1	7.03	0
1995	44	28.87	8.52	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.95	5.73	0
1996	44.04	27.98	8.31	11.85	7.82	17.6	12.27	0.75	21.29	0.27	0	0.87	3.73	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.29	19.98	-0.12	0	-0.82	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.68	8.2	11.89	7.58	16.84	12.27	1.14	20.38	0.03	0	0.26	7.45	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--91-05\Bur 15 yr--91-05.spw
File Creation Date : Sep 17, 2008 09:39:36
File Last Modified Date : Sep 17, 2008 09:39:36
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--91-05
Simulation Start Date : Jan 01, 1991
Simulation End Date : Dec 31, 2005
Simulation Run Date : Sep 17, 2008 09:39
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--91-05
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--91-05\Bur 15 yr--91-05.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 91-05 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9105 - Jan 01, 1991 to Dec 31, 2005
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Air Temperature : SD9105 - Jan 01, 1991 to Dec 31, 2005
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\91-05.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1991	44	25.78	6.99	11.53	7.25	14.99	12.27	0.25	19.76	0.29	0	0.95	37.14	0
1992	44.04	25.77	6.9	11.76	7.11	14.08	12.27	0.28	18.96	0.18	0	0.13	19.71	0
1993	44	28.72	8.54	11.17	9.01	22.31	12.27	1.11	24.46	0.92	0	3.84	4	0
1994	44	26.67	7.51	12.37	6.79	12.01	12.27	0.19	17.3	-0.53	0	-2.05	7.32	0
1995	44	28.84	8.49	11.48	8.87	18.32	12.27	0.51	21.21	0.26	0	0.98	5.93	0
1996	44.04	27.97	8.29	11.86	7.82	17.6	12.27	0.72	21.33	0.28	0	0.9	3.74	0
1997	44	28.65	9.42	11.5	7.73	17.73	12.27	2.27	20	-0.11	0	-0.81	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.52	8.13	11.85	7.55	16.9	12.27	1.19	20.42	0.08	0	0.37	9.07	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--92-06\Bur 15 yr--92-06.spw
File Creation Date : Sep 17, 2008 09:43:11
File Last Modified Date : Sep 17, 2008 09:43:12
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--92-06
Simulation Start Date : Jan 01, 1992
Simulation End Date : Dec 31, 2006
Simulation Run Date : Sep 17, 2008 09:43
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--92-06
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--92-06\Bur 15 yr--92-06.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 92-06 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9206 - Jan 01, 1992 to Dec 31, 2006
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Air Temperature : SD9206 - Jan 01, 1992 to Dec 31, 2006
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\92-06.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1992	44.04	25.29	6.81	11.36	7.11	14.08	12.27	0.28	18.96	0.18	0	0.61	35.09	0
1993	44	28.62	8.4	11.2	9.01	22.31	12.27	0.62	24.95	1.16	0	4.18	4.63	0
1994	44	26.61	7.46	12.36	6.79	12.01	12.27	0.19	17.3	-0.51	0	-2	7.65	0
1995	44	28.81	8.47	11.47	8.87	18.32	12.27	0.51	21.21	0.26	0	1.01	6.16	0
1996	44.04	27.96	8.27	11.86	7.82	17.6	12.27	0.68	21.36	0.3	0	0.93	3.76	0
1997	44	28.64	9.41	11.5	7.73	17.73	12.27	2.25	20.02	-0.11	0	-0.79	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.52	8.12	11.89	7.52	16.79	12.27	1.15	20.39	0.06	0	0.32	8.05	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--93-07\Bur 15 yr--93-07.spw
File Creation Date : Sep 17, 2008 09:44:46
File Last Modified Date : Sep 17, 2008 09:44:47
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--93-07
Simulation Start Date : Jan 01, 1993
Simulation End Date : Dec 31, 2007
Simulation Run Date : Sep 17, 2008 09:44
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--93-07
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--93-07\Bur 15 yr--93-07.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 93-07 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9307 - Jan 01, 1993 to Dec 31, 2007
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Air Temperature : SD9307 - Jan 01, 1993 to Dec 31, 2007
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\93-07.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1993	44	28.17	8.01	11.25	8.91	21.44	12.27	0.33	24.47	1.12	0	4.09	10.53	0
1994	44	26.25	7.24	12.22	6.79	12.01	12.27	0.19	17.3	-0.42	0	-1.74	9.78	0
1995	44	28.61	8.33	11.41	8.87	18.32	12.27	0.51	21.21	0.28	0	1.19	7.63	0
1996	44.04	27.92	8.21	11.88	7.82	17.6	12.27	0.5	21.55	0.38	0	1.08	3.84	0
1997	44	28.63	9.4	11.5	7.73	17.73	12.27	2.13	20.15	-0.07	0	-0.69	4	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.63	25.72	0.71	0	2.22	3.48	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.54	8.12	11.93	7.49	16.82	12.27	1.16	20.43	0.05	0	0.34	6.96	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--94-80\Bur 15 yr--94-80.spw
File Creation Date : Sep 17, 2008 09:46:20
File Last Modified Date : Sep 17, 2008 09:46:20
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--94-80
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Sep 17, 2008 09:46
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--94-80
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--94-80\Bur 15 yr--94-80.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 94-80 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9480 - Jan 01, 1994 to Dec 31, 2008
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Air Temperature : SD9480 - Jan 01, 1994 to Dec 31, 2008
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\94-80.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1994	44	23.37	6.59	9.99	6.79	12.01	12.27	0.19	17.3	-0.02	0	0.74	53.84	0
1995	44	27.74	8	10.86	8.87	18.32	12.27	0.51	21.21	0.51	0	1.84	20.83	0
1996	44.04	27.6	7.81	11.97	7.82	17.6	12.27	0.49	21.56	0.57	0	1.2	5.16	0
1997	44	28.5	9.2	11.57	7.73	17.73	12.27	1.14	21.13	0.22	0	0.13	4.05	0
1998	44	30.98	11.59	11.19	8.2	24.28	12.27	2.62	25.73	0.72	0	2.24	3.49	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.06	5.35	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.2	7.98	11.85	7.37	16.43	12.27	1.08	20.25	0.07	0	0.35	10.53	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--95-81\Bur 15 yr--95-81.spw
File Creation Date : Sep 17, 2008 09:47:57
File Last Modified Date : Sep 17, 2008 09:47:58
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--95-81
Simulation Start Date : Jan 01, 1995
Simulation End Date : Dec 31, 2009
Simulation Run Date : Sep 17, 2008 09:47
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--95-81
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--95-81\Bur 15 yr--95-81.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 95-81 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9581 - Jan 01, 1995 to Dec 31, 2009
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Air Temperature : SD9581 - Jan 01, 1995 to Dec 31, 2009
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\95-81.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1995	44	27.24	7.8	10.6	8.83	18.14	12.27	0.51	21.07	0.36	0	2.31	33.57	0
1996	44.04	27.51	7.72	11.97	7.82	17.6	12.27	0.49	21.56	0.62	0	1.25	5.98	0
1997	44	28.45	9.13	11.6	7.73	17.73	12.27	0.91	21.36	0.3	0	0.34	4.08	0
1998	44	30.97	11.58	11.19	8.2	24.28	12.27	2.6	25.75	0.72	0	2.26	3.49	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.06	5.35	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.02	9.73	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.33	8	11.99	7.35	16.52	12.27	1.12	20.32	0.05	0	0.28	8.49	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--96-82\Bur 15 yr--96-82.spw
File Creation Date : Sep 17, 2008 09:49:12
File Last Modified Date : Sep 17, 2008 09:49:12
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--96-82
Simulation Start Date : Jan 01, 1996
Simulation End Date : Dec 31, 2010
Simulation Run Date : Sep 17, 2008 09:49
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--96-82
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--96-82\Bur 15 yr--96-82.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 96-82 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9682 - Jan 01, 1996 to Dec 31, 2010
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Air Temperature : SD9682 - Jan 01, 1996 to Dec 31, 2010
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\96-82.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1996	44.04	26.67	7.32	11.53	7.82	17.6	12.27	0.49	21.56	0.45	0	2.26	22.56	0
1997	44	27.83	8.28	11.83	7.73	17.73	12.27	0.43	21.85	0.68	0	1.06	5.45	0
1998	44	30.83	11.39	11.24	8.2	24.28	12.27	2.02	26.33	0.87	0	2.83	3.51	0
1999	44	28.98	9.71	11.73	7.54	17.17	12.27	3.81	18.09	-0.76	0	-2.59	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.06	5.35	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.02	9.73	0
2010	44	28.73	9.08	11.12	8.53	21.88	12.27	0.82	24.81	1.11	0	3.5	5.4	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.32	7.99	12.01	7.32	16.77	12.27	1.07	20.64	0.12	0	0.51	7.81	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--97-83\Bur 15 yr--97-83.spw
File Creation Date : Sep 17, 2008 09:50:57
File Last Modified Date : Sep 17, 2008 09:50:58
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--97-83
Simulation Start Date : Jan 01, 1997
Simulation End Date : Dec 31, 2011
Simulation Run Date : Sep 17, 2008 09:50
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--97-83
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--97-83\Bur 15 yr--97-83.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 97-83 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9783 - Jan 01, 1997 to Dec 31, 2011
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Air Temperature : SD9783 - Jan 01, 1997 to Dec 31, 2011
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\97-83.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1997	44	26.85	7.4	11.72	7.73	17.73	12.27	0.43	21.85	0.76	0	1.97	17.9	0
1998	44	30.2	10.55	11.45	8.2	24.28	12.27	0.99	27.36	1.23	0	4.14	4.12	0
1999	44	28.93	9.66	11.73	7.54	17.17	12.27	3.8	18.1	-0.74	0	-2.55	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.06	5.35	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.02	9.73	0
2010	44	28.73	9.08	11.12	8.53	21.88	12.27	0.82	24.81	1.11	0	3.5	5.4	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.3	7.95	12.05	7.31	16.74	12.27	1.12	20.58	0.09	0	0.49	7.46	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--98-84\Bur 15 yr--98-84.spw
File Creation Date : Sep 17, 2008 09:52:18
File Last Modified Date : Sep 17, 2008 09:52:19
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--98-84
Simulation Start Date : Jan 01, 1998
Simulation End Date : Dec 31, 2012
Simulation Run Date : Sep 17, 2008 09:52
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--98-84
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--98-84\Bur 15 yr--98-84.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 98-84 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9884 - Jan 01, 1998 to Dec 31, 2012
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Air Temperature : SD9884 - Jan 01, 1998 to Dec 31, 2012
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\98-84.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Progrem Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1998	44	28.53	8.58	11.75	8.2	24.28	12.27	0.99	27.36	1.7	0	5.33	11.8	0
1999	44	28.2	8.84	11.81	7.54	17.17	12.27	3.47	18.43	-0.46	0	-1.77	4.21	0
2000	44.04	27.3	7.93	12.02	7.35	14.51	12.27	1.45	17.97	-0.47	0	-1.5	7.8	0
2001	44	27.18	7.69	12.2	7.29	18.1	12.27	1.23	21.85	0.34	0	1.62	5.85	0
2002	44	26.34	7.05	12.6	6.7	13.11	12.27	0.31	18.37	-0.2	0	-1.07	6.62	0
2003	44	26.92	7.25	12.26	7.41	14.69	12.27	0.25	19.31	-0.06	0	-0.15	7.73	0
2004	44.04	25.25	6.59	11.7	6.96	12.18	12.27	0.21	17.27	-0.41	0	-0.6	13.6	0
2005	44	27.26	7.83	12.3	7.14	20.16	12.27	2.67	22.61	0.77	0	1.72	4.87	0
2006	44	26.39	7.22	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.77	5.24	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.21	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.06	5.35	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.02	9.73	0
2010	44	28.73	9.08	11.12	8.53	21.88	12.27	0.82	24.81	1.11	0	3.5	5.4	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.29	7.88	12.08	7.32	16.61	12.27	1.14	20.41	0.08	0	0.37	7.08	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--99-85\Bur 15 yr--99-85.spw
File Creation Date : Sep 17, 2008 09:53:23
File Last Modified Date : Sep 17, 2008 09:53:24
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--99-85
Simulation Start Date : Jan 01, 1999
Simulation End Date : Dec 31, 2013
Simulation Run Date : Sep 17, 2008 09:53
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--99-85
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--99-85\Bur 15 yr--99-85.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 99-85 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD9985 - Jan 01, 1999 to Dec 31, 2013
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Air Temperature : SD9985 - Jan 01, 1999 to Dec 31, 2013
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\99-85.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
1999	44	26.42	6.92	11.95	7.54	17.17	12.27	0.77	21.13	0.68	0	1.57	20.3	0
2000	44.04	26.17	7.41	11.41	7.35	14.51	12.27	1.45	17.97	-0.33	0	-0.52	17.26	0
2001	44	26.94	7.45	12.2	7.29	18.1	12.27	0.48	22.59	0.66	0	2.28	8.81	0
2002	44	26.23	6.98	12.55	6.7	13.11	12.27	0.31	18.37	-0.19	0	-0.97	7.65	0
2003	44	26.83	7.19	12.23	7.41	14.69	12.27	0.25	19.31	-0.03	0	-0.08	8.67	0
2004	44.04	25.14	6.56	11.62	6.96	12.18	12.27	0.21	17.27	-0.4	0	-0.51	14.95	0
2005	44	27.24	7.8	12.3	7.14	20.16	12.27	2.59	22.69	0.81	0	1.78	4.97	0
2006	44	26.38	7.21	12.5	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.76	5.28	0
2007	44	26.53	7.56	12.15	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.68	9.27	0
2008	44.04	27.4	7.64	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.07	5.36	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.02	9.75	0
2010	44	28.72	9.08	11.12	8.53	21.88	12.27	0.81	24.81	1.11	0	3.5	5.41	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	26.86	7.59	12.06	7.21	15.78	12.27	0.91	19.92	0.04	0	0.24	9.25	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--00-86\Bur 15 yr--00-86.spw
File Creation Date : Sep 17, 2008 09:55:31
File Last Modified Date : Sep 17, 2008 09:55:32
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--00-86
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Sep 17, 2008 09:55
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--00-86
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--00-86\Bur 15 yr--00-86.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 00-86 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0086 - Jan 01, 2000 to Dec 31, 2014
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Air Temperature : SD0086 - Jan 01, 2000 to Dec 31, 2014
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\00-86.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2000	44.04	24.98	7.19	10.44	7.35	14.51	12.27	1.45	17.97	0.01	0	0.34	35.42	0
2001	44	26.66	7.29	12.08	7.29	18.1	12.27	0.43	22.64	0.85	0	2.42	14.95	0
2002	44	26.03	6.91	12.43	6.7	13.11	12.27	0.31	18.37	-0.18	0	-0.78	10.01	0
2003	44	26.66	7.11	12.15	7.41	14.69	12.27	0.25	19.31	0.02	0	0.03	10.55	0
2004	44.04	24.97	6.52	11.49	6.96	12.18	12.27	0.21	17.27	-0.37	0	-0.37	17.33	0
2005	44	27.21	7.77	12.31	7.14	20.16	12.27	2.48	22.81	0.86	0	1.88	5.13	0
2006	44	26.37	7.21	12.49	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.76	5.34	0
2007	44	26.52	7.56	12.14	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.67	9.36	0
2008	44.04	27.39	7.63	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.07	5.39	0
2009	44	26	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.01	9.79	0
2010	44	28.72	9.07	11.12	8.53	21.88	12.27	0.81	24.82	1.11	0	3.51	5.42	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	26.88	7.68	11.94	7.26	16.21	12.27	0.94	20.27	0.13	0	0.53	10.23	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--01-87\Bur 15 yr--01-87.spw
File Creation Date : Sep 17, 2008 10:04:17
File Last Modified Date : Sep 17, 2008 10:04:17
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--01-87
Simulation Start Date : Jan 01, 2001
Simulation End Date : Dec 31, 2015
Simulation Run Date : Sep 17, 2008 10:04
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--01-87
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--01-87\Bur 15 yr--01-87.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 01-87 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0187 - Jan 01, 2001 to Dec 31, 2015
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Air Temperature : SD0187 - Jan 01, 2001 to Dec 31, 2015
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\01-87.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2001	44	26.56	7.27	12	7.29	18.1	12.27	0.43	22.64	0.8	0	2.57	19.95	0
2002	44	25.96	6.89	12.37	6.7	13.11	12.27	0.31	18.37	-0.17	0	-0.72	10.94	0
2003	44	26.6	7.08	12.11	7.41	14.69	12.27	0.25	19.31	0.04	0	0.07	11.24	0
2004	44.04	24.9	6.5	11.44	6.96	12.18	12.27	0.21	17.27	-0.35	0	-0.32	18.2	0
2005	44	27.2	7.75	12.31	7.14	20.16	12.27	2.45	22.84	0.87	0	1.91	5.2	0
2006	44	26.37	7.2	12.49	6.67	13.22	12.27	0.13	18.69	-0.25	0	-0.75	5.37	0
2007	44	26.51	7.56	12.14	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.66	9.4	0
2008	44.04	27.39	7.62	12.63	7.13	16.74	12.27	0.23	21.65	0.32	0	1.08	5.4	0
2009	44	25.99	7.23	12.31	6.45	13.46	12.27	1.01	18.26	-0.27	0	-1.01	9.81	0
2010	44	28.72	9.07	11.12	8.53	21.88	12.27	0.8	24.82	1.11	0	3.51	5.42	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.05	7.78	12.06	7.2	16.13	12.27	0.9	20.29	0.07	0	0.38	8.8	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--02-88\Bur 15 yr--02-88.spw
File Creation Date : Sep 17, 2008 10:06:57
File Last Modified Date : Sep 17, 2008 10:06:57
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--02-88
Simulation Start Date : Jan 01, 2002
Simulation End Date : Dec 31, 2016
Simulation Run Date : Sep 17, 2008 10:06
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--02-88
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--02-88\Bur 15 yr--02-88.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 02-88 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0288 - Jan 01, 2002 to Dec 31, 2016
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Air Temperature : SD0288 - Jan 01, 2002 to Dec 31, 2016
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\02-88.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2002	44	24.22	6.57	10.95	6.7	13.11	12.27	0.31	18.37	0.12	0	0.73	43.83	0
2003	44	26	6.89	11.71	7.41	14.69	12.27	0.25	19.31	0.21	0	0.5	19.56	0
2004	44.04	24.32	6.38	10.98	6.96	12.18	12.27	0.21	17.27	-0.13	0	0.05	27.1	0
2005	44	27.13	7.66	12.32	7.14	20.16	12.27	2.21	23.08	0.97	0	2.13	5.8	0
2006	44	26.34	7.18	12.49	6.67	13.22	12.27	0.13	18.69	-0.24	0	-0.73	5.62	0
2007	44	26.48	7.54	12.12	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.63	9.74	0
2008	44.04	27.36	7.6	12.63	7.13	16.74	12.27	0.23	21.65	0.33	0	1.09	5.49	0
2009	44	25.98	7.23	12.3	6.45	13.46	12.27	1.01	18.26	-0.26	0	-1	9.97	0
2010	44	28.71	9.06	11.13	8.53	21.88	12.27	0.78	24.84	1.12	0	3.54	5.47	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	26.78	7.7	11.95	7.14	15.78	12.27	0.88	20.02	0.07	0	0.31	11.36	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--03-89\Bur 15 yr--03-89.spw
File Creation Date : Sep 17, 2008 10:08:04
File Last Modified Date : Sep 17, 2008 10:08:04
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--03-89
Simulation Start Date : Jan 01, 2003
Simulation End Date : Dec 31, 2017
Simulation Run Date : Sep 17, 2008 10:08
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--03-89
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--03-89\Bur 15 yr--03-89.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 03-89 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0289 - Jan 01, 2003 to Dec 31, 2017
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Air Temperature : SD0289 - Jan 01, 2003 to Dec 31, 2017
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\03-89.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2003	44	25.56	6.81	11.34	7.41	14.69	12.27	0.37	19.19	0.15	0	0.88	29.95	0
2004	44.04	23.99	6.31	10.71	6.96	12.18	12.27	0.21	17.27	-0.01	0	0.25	32.73	0
2005	44	27.09	7.63	12.33	7.14	20.16	12.27	2.1	23.18	1	0	2.23	6.14	0
2006	44	26.33	7.17	12.48	6.67	13.22	12.27	0.13	18.69	-0.24	0	-0.72	5.75	0
2007	44	26.46	7.54	12.11	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.62	9.89	0
2008	44.04	27.35	7.59	12.63	7.13	16.74	12.27	0.23	21.65	0.34	0	1.1	5.53	0
2009	44	25.97	7.22	12.3	6.45	13.46	12.27	1.01	18.26	-0.26	0	-0.99	10.03	0
2010	44	28.71	9.05	11.13	8.53	21.88	12.27	0.77	24.85	1.12	0	3.55	5.49	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
2017	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	26.87	7.7	11.98	7.18	15.94	12.27	0.87	20.16	0.08	0	0.39	9.97	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--04-90\Bur 15 yr--04-90.spw
File Creation Date : Sep 17, 2008 10:09:17
File Last Modified Date : Sep 17, 2008 10:09:17
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--04-90
Simulation Start Date : Jan 01, 2004
Simulation End Date : Dec 31, 2018
Simulation Run Date : Sep 17, 2008 10:09
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--04-90
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--04-90\Bur 15 yr--04-90.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 04-90 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0490 - Jan 01, 2004 to Dec 31, 2018
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Air Temperature : SD0490 - Jan 01, 2004 to Dec 31, 2018
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\04-90.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2004	44.04	23.22	6.22	10.06	6.95	12.16	12.27	0.21	17.27	0.08	0	0.92	51.85	0
2005	44	27.04	7.58	12.33	7.14	20.16	12.27	1.95	23.33	1.05	0	2.38	6.76	0
2006	44	26.31	7.16	12.48	6.67	13.22	12.27	0.13	18.69	-0.24	0	-0.71	5.94	0
2007	44	26.44	7.53	12.09	6.82	14.33	12.27	0.99	18.79	-0.24	0	-0.6	10.12	0
2008	44.04	27.33	7.57	12.63	7.13	16.74	12.27	0.23	21.65	0.34	0	1.11	5.59	0
2009	44	25.97	7.22	12.29	6.45	13.46	12.27	1.01	18.26	-0.26	0	-0.99	10.13	0
2010	44	28.7	9.05	11.13	8.53	21.88	12.27	0.76	24.86	1.13	0	3.56	5.52	0
2011	44	27.95	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
2017	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
2018	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.05	7.87	11.98	7.19	16.24	12.27	0.89	20.41	0.1	0	0.46	9.58	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--05-91\Bur 15 yr--05-91.spw
File Creation Date : Sep 17, 2008 10:10:49
File Last Modified Date : Sep 17, 2008 10:10:50
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--05-91
Simulation Start Date : Jan 01, 2005
Simulation End Date : Dec 31, 2019
Simulation Run Date : Sep 17, 2008 10:10
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--05-91
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--05-91\Bur 15 yr--05-91.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 05-91 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0591 - Jan 01, 2005 to Dec 31, 2019
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Air Temperature : SD0591 - Jan 01, 2005 to Dec 31, 2019
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\05-91.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2005	44	26.85	7.41	12.3	7.14	20.16	12.27	1.58	23.7	1.04	0	2.96	13.1	0
2006	44	26.21	7.08	12.45	6.67	13.22	12.27	0.13	18.69	-0.21	0	-0.63	7.03	0
2007	44	26.32	7.49	12.02	6.82	14.33	12.27	0.99	18.79	-0.23	0	-0.49	11.37	0
2008	44.04	27.26	7.49	12.64	7.13	16.74	12.27	0.23	21.65	0.38	0	1.15	5.9	0
2009	44	25.92	7.2	12.27	6.45	13.46	12.27	1.01	18.26	-0.25	0	-0.95	10.62	0
2010	44	28.68	9.01	11.14	8.53	21.88	12.27	0.69	24.93	1.15	0	3.63	5.67	0
2011	44	27.94	8.39	12.08	7.48	16.16	12.27	2.29	18.66	-0.54	0	-1.26	4.19	0
2012	44.04	29.1	9.24	11.78	8.07	16.89	12.27	1.08	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
2017	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
2018	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
2019	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.3	7.97	12.12	7.21	16.27	12.27	1	20.34	0.07	0	0.18	7.21	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--06-92\Bur 15 yr--06-92.spw
File Creation Date : Sep 17, 2008 10:11:54
File Last Modified Date : Sep 17, 2008 10:11:55
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--06-92
Simulation Start Date : Jan 01, 2006
Simulation End Date : Dec 31, 2020
Simulation Run Date : Sep 17, 2008 10:11
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--06-92
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--06-92\Bur 15 yr--06-92.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 06-92 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0692 - Jan 01, 2006 to Dec 31, 2020
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Air Temperature : SD0692 - Jan 01, 2006 to Dec 31, 2020
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\06-92.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2006	44	24.64	6.78	11.25	6.61	13.13	12.27	0.13	18.66	0.05	0	0.58	44.59	0
2007	44	25.11	7.22	11.07	6.82	14.33	12.27	0.99	18.79	0.12	0	0.38	28.93	0
2008	44.04	26.89	7.21	12.55	7.13	16.74	12.27	0.23	21.65	0.58	0	1.31	8.83	0
2009	44	25.62	7.12	12.05	6.45	13.46	12.27	1.01	18.26	-0.23	0	-0.68	14.47	0
2010	44	28.44	8.7	11.21	8.53	21.88	12.27	0.38	25.24	1.31	0	4.01	6.89	0
2011	44	27.9	8.33	12.09	7.48	16.16	12.27	2.24	18.71	-0.52	0	-1.19	4.2	0
2012	44.04	29.09	9.24	11.78	8.07	16.89	12.27	1.07	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
2017	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
2018	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
2019	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
2020	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.02	7.87	11.95	7.2	15.86	12.27	0.89	20.04	0.06	0	0.16	11.06	0

SUMMARY OF ANNUAL VALUES FROM SPAW SIMULATION

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--07-93\Bur 15 yr--07-93.spw
File Creation Date : Sep 17, 2008 10:13:01
File Last Modified Date : Sep 17, 2008 10:13:01
Description : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--07-93
Simulation Start Date : Jan 01, 2007
Simulation End Date : Dec 31, 2021
Simulation Run Date : Sep 17, 2008 10:13
SPAW Interface Version : 6.02.75
Field Model Version : 6.02.71
Soil Equations : Saxton et al. 2005

DATABASE FILES USED: DESCRIPTION/FILE (DATE)
Field : Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--07-93
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--07-93\Bur 15 yr--07-93.fld (Sep 17, 200800:00)
Climate : Dewey Burdock 07-93 climatic data
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.clm (Sep 16, 2008 00:00)
Evaporation Defaults: Dewey-Burdock Evap. Defaults
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\Defaults\Dewey-Burdock.evpd (Aug 23, 2008 00:00)
Precipitation : SD0793 - Jan 01, 2007 to Dec 31, 2021
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Air Temperature : SD0793 - Jan 01, 2007 to Dec 31, 2021
C:\Program Files\SPAW Hydrology\SPAW\Database\Climates\15-yr\07-93.txt (Sep 16, 2008 00:00)
Management : 0.45 in every 5 days--assumes 500 acres total irrigated area
C:\Program Files\SPAW Hydrology\SPAW\Database\Managements\DBM--0_45.mgmt (Aug 29, 2008 00:00)
Crop (1) : Irrigated alfalfa, two cuttings per year
C:\Program Files\SPAW Hydrology\SPAW\Database\Crops\DBC--2 cuts.crop (Aug 20, 2008 00:00)
Soil : Burdock TP8, TP9, TP10 Revised Soils Composite
C:\Program Files\SPAW Hydrology\SPAW\Database\Soils\BRev 8-9-10.soil (Sep 16, 2008 00:00)

NUMBER OF SOIL LAYERS: 7
THICKNESS OF SOIL LAYERS: (IN) 1.00 5.00 11.00 11.00 8.00 12.00 24.00

ACCUMULATIVE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

YEAR	PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
	in	in	in	in	in	in	in	in	in	in	in	in		
2007	44	24.65	7.09	10.74	6.82	14.33	12.27	0.99	18.79	0.13	0	0.83	38.98	0
2008	44.04	26.84	7.18	12.53	7.13	16.74	12.27	0.23	21.65	0.6	0	1.34	9.43	0
2009	44	25.58	7.11	12.02	6.45	13.46	12.27	1.01	18.26	-0.22	0	-0.64	15.06	0
2010	44	28.42	8.67	11.22	8.53	21.88	12.27	0.35	25.27	1.33	0	4.05	7.11	0
2011	44	27.89	8.32	12.09	7.48	16.16	12.27	2.24	18.72	-0.52	0	-1.18	4.2	0
2012	44.04	29.09	9.24	11.78	8.07	16.89	12.27	1.07	20.01	-0.13	0	-0.88	4.52	0
2013	44	25.63	7.08	12.06	6.49	11.75	12.27	1.02	16.51	-0.62	0	-2.01	12.26	0
2014	44	28.86	8.98	11.54	8.34	23.59	12.27	1.38	26.14	1.31	0	4.31	3.65	0
2015	44	27.75	8.83	12.54	6.38	12.36	12.27	0.94	17.32	-0.9	0	-3.15	6.41	0
2016	44.04	25.79	6.88	12.52	6.4	13.79	12.27	0.42	19.23	0.01	0	-0.17	6.67	0
2017	44	26.4	6.85	12.18	7.36	15.58	12.27	0.04	20.45	0.15	0	1.27	6.3	0
2018	44	29.03	9.46	12	7.57	19.14	12.27	0.96	22.88	0.4	0	1.02	3.68	0
2019	44	27.63	8.1	12.24	7.29	15.03	12.27	2.19	17.82	-0.54	0	-1.98	6.6	0
2020	44.04	26.43	7.25	12.07	7.11	14.08	12.27	0.28	18.96	-0.02	0	-0.34	7.85	0
2021	44	28.93	8.83	11.09	9.01	22.31	12.27	2.63	22.94	0.46	0	2.56	3.58	0

AVERAGE ANNUAL VALUES OF SOIL HYDROLOGIC BUDGET

PET	AET	EVAP	TRAN	INT	PRECIP	IRRIG	RUNOFF	INFIL	PERC	DEEPDRN	DLT-SM	STRESS	YLDRED
in	in	in	in	in	in	in	in	in	in	in	in		
44.04	27.27	7.99	11.91	7.36	16.47	12.27	1.05	20.33	0.1	0	0.33	9.09	0

POWERTECH (USA) INC.

SPAW MODEL RESULTS

BURDOCK POND

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--80-94\Burd 80-94.pnd
File Creation Date : Sep 17, 2008 11:52:36
File Last Modified Date : Sep 17, 2008 11:52:36
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1980-1994
Simulation Start Date : Jan 01, 1980
Simulation End Date : Dec 31, 1994
Simulation Run Date : Sep 17, 2008 11:52
SPAW Interface Version : Sep 17, 2008 11:52:36
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--80-94 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--80-94\Bur 15 yr--80-94.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--80-94 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--80-94\Bur 15 yr--80-94.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.16	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1980	544.74	397.01	147.73	16.33	26.99	10.83	5.45	0	501.47	0	0	0	0	0	71.1	0	0	325.91	185.34	0	0
1981	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
1982	555.05	571.78	-16.73	21.88	37.96	11.67	5.32	0	500.1	0	0	0	0	0	75.03	0	0	496.75	14.5	0	0
1983	620.19	587.11	33.08	16.16	28.21	87.92	3.96	0	500.1	0	0	0	0	0	75.86	0	0	511.25	0	0	0
1984	579.21	587.99	-8.78	16.9	30.45	44.17	3.12	0	501.47	0	0	0	0	0	76.74	0	0	511.25	0	0	0
1985	565.29	587.31	-22.02	11.75	20.78	42.08	2.32	0	500.1	0	0	0	0	0	76.06	0	0	511.25	0	0	0
1986	605.18	584.11	21.07	23.59	40.81	57.5	6.77	0	500.1	0	0	0	0	0	75.46	0	0	508.65	2.6	0	0
1987	563.48	587.08	-23.59	12.37	21.96	38.75	2.66	0	500.1	0	0	0	0	0	75.83	0	0	511.25	0	0	0
1988	546.74	559.35	-12.62	13.79	24.04	17.5	3.73	0	501.47	0	0	0	0	0	74.62	0	0	484.73	26.52	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
1991	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
1992	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
574.85	563.56	11.29	16.29	28.44	40.89	4.06	0	501.47	0	0	0	0	0	75.27	0	0	488.3	22.95	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--81-95\Burd 81-95.pnd
File Creation Date : Sep 17, 2008 11:54:21
File Last Modified Date : Sep 17, 2008 11:54:21
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1981-1995
Simulation Start Date : Jan 01, 1981
Simulation End Date : Dec 31, 1995
Simulation Run Date : Sep 17, 2008 11:54
SPAW Interface Version : Sep 17, 2008 11:54:21
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--81-95	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--81-95\Bur 15 yr--81-95.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--81-95	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--81-95\Bur 15 yr--81-95.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1981	568.58	395.15	173.44	13.46	22.15	42.08	4.25	0	500.1	0	0	0	0	0	71.13	0	0	324.01	187.24	0	0
1982	555.05	571.78	-16.73	21.88	37.96	11.67	5.32	0	500.1	0	0	0	0	0	75.03	0	0	496.75	14.5	0	0
1983	605.14	586.77	18.37	16.16	28.1	72.92	4.02	0	500.1	0	0	0	0	0	75.52	0	0	511.25	0	0	0
1984	578.27	587.41	-9.14	16.9	30.23	43.33	3.23	0	501.47	0	0	0	0	0	76.16	0	0	511.25	0	0	0
1985	565.22	585.14	-19.92	11.75	20.63	42.08	2.4	0	500.1	0	0	0	0	0	75.51	0	0	509.64	1.61	0	0
1986	605.12	571.06	34.05	23.59	40.62	57.5	6.9	0	500.1	0	0	0	0	0	75.07	0	0	495.99	15.26	0	0
1987	563.48	587.08	-23.59	12.37	21.96	38.75	2.66	0	500.1	0	0	0	0	0	75.83	0	0	511.25	0	0	0
1988	546.74	559.35	-12.62	13.79	24.04	17.5	3.73	0	501.47	0	0	0	0	0	74.62	0	0	484.73	26.52	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
1991	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
1992	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
574.68	562.1	12.58	16.42	28.63	40.53	4.04	0	501.47	0	0	0	0	0	75.15	0	0	486.94	24.31	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--82-96\Burd 82-96.pnd
File Creation Date : Sep 17, 2008 11:55:58
File Last Modified Date : Sep 17, 2008 11:56:59
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1982-1996
Simulation Start Date : Jan 01, 1982
Simulation End Date : Dec 31, 1996
Simulation Run Date : Sep 17, 2008 11:56
SPAW Interface Version : Sep 17, 2008 11:56:59
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--82-96 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--82-96\Bur 15 yr--82-96.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--82-96 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--82-96\Bur 15 yr--82-96.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1982	554	397.29	156.71	21.83	35.72	11.67	6.51	0	500.1	0	0	0	0	0	70.95	0	0	326.35	184.9	0	0
1983	593.44	586.51	6.93	16.16	28.02	61.25	4.07	0	500.1	0	0	0	0	0	75.26	0	0	511.25	0	0	0
1984	577.35	586.95	-9.6	16.9	30.06	42.5	3.31	0	501.47	0	0	0	0	0	75.7	0	0	511.25	0	0	0
1985	565.17	573.2	-8.02	11.75	20.54	42.08	2.45	0	500.1	0	0	0	0	0	75.16	0	0	498.04	13.21	0	0
1986	605.12	571.06	34.05	23.59	40.62	57.5	6.9	0	500.1	0	0	0	0	0	75.07	0	0	495.99	15.26	0	0
1987	563.48	587.08	-23.59	12.37	21.96	38.75	2.66	0	500.1	0	0	0	0	0	75.83	0	0	511.25	0	0	0
1988	546.74	559.35	-12.62	13.79	24.04	17.5	3.73	0	501.47	0	0	0	0	0	74.62	0	0	484.73	26.52	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
1991	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
1992	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
573.59	562.4	11.19	16.69	29.04	38.94	4.14	0	501.47	0	0	0	0	0	75.1	0	0	487.29	23.96	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--83-97\Burd 83-97.pnd
File Creation Date : Sep 17, 2008 11:58:19
File Last Modified Date : Sep 17, 2008 11:58:19
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1983-1997
Simulation Start Date : Jan 01, 1983
Simulation End Date : Dec 31, 1997
Simulation Run Date : Sep 17, 2008 11:58
SPAW Interface Version : Sep 17, 2008 11:58:19
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--83-97 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--83-97\Bur 15 yr--83-97.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--83-97 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--83-97\Bur 15 yr--83-97.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1983	544.65	392.99	151.66	16.08	26.18	13.33	5.04	0	500.1	0	0	0	0	0	70.87	0	0	322.12	189.13	0	0
1984	553.01	558.71	-5.69	16.9	29.77	18.33	3.44	0	501.47	0	0	0	0	0	74.81	0	0	483.9	27.35	0	0
1985	565.14	565.1	0.04	11.75	20.47	42.08	2.49	0	500.1	0	0	0	0	0	74.92	0	0	490.18	21.07	0	0
1986	598.85	564.8	34.05	23.59	40.58	51.25	6.91	0	500.1	0	0	0	0	0	74.96	0	0	489.83	21.42	0	0
1987	559.72	586.97	-27.25	12.37	21.94	35	2.67	0	500.1	0	0	0	0	0	75.72	0	0	511.25	0	0	0
1988	546.73	555.69	-8.96	13.79	24	17.5	3.75	0	501.47	0	0	0	0	0	74.52	0	0	481.17	30.08	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
1991	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
1992	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofl ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
573.19	559.08	14.11	16.42	28.59	39.08	4.04	0	501.47	0	0	0	0	0	75.06	0	0	484.02	27.23	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--84-98\Burd 84-98.pnd
File Creation Date : Sep 17, 2008 11:59:48
File Last Modified Date : Sep 17, 2008 11:59:49
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1984-1998
Simulation Start Date : Jan 01, 1984
Simulation End Date : Dec 31, 1998
Simulation Run Date : Sep 17, 2008 11:59
SPAW Interface Version : Sep 17, 2008 11:59:48
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--84-98 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--84-98\Bur 15 yr--84-98.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--84-98 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--84-98\Bur 15 yr--84-98.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1984	549.55	403.58	145.97	15.65	25.94	18.33	3.81	0	501.47	0	0	0	0	0	71.16	0	0	332.42	178.83	0	0
1985	565.14	565.1	0.04	11.75	20.47	42.08	2.49	0	500.1	0	0	0	0	0	74.92	0	0	490.18	21.07	0	0
1986	598.85	564.8	34.05	23.59	40.58	51.25	6.91	0	500.1	0	0	0	0	0	74.96	0	0	489.83	21.42	0	0
1987	548.85	583.1	-34.25	12.37	21.89	24.17	2.7	0	500.1	0	0	0	0	0	75.43	0	0	507.67	3.58	0	0
1988	546.7	548.66	-1.96	13.79	23.93	17.5	3.8	0	501.47	0	0	0	0	0	74.32	0	0	474.34	36.91	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	577.84	575.99	1.86	19.14	33.22	39.17	5.35	0	500.1	0	0	0	0	0	74.78	0	0	501.21	10.04	0	0
1991	621.09	587.54	33.55	15.03	26.87	90.83	3.28	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0
1992	540.28	581.25	-40.97	14.07	24.83	11.25	2.72	0	501.47	0	0	0	0	0	75.45	0	0	505.79	5.46	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
579.73	561.01	18.72	16.88	29.48	44.64	4.14	0	501.47	0	0	0	0	0	75.26	0	0	485.75	25.5	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--85-99\Burd 85-99.pnd
File Creation Date : Sep 17, 2008 14:35:30
File Last Modified Date : Sep 17, 2008 14:35:30
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1985-1999
Simulation Start Date : Jan 01, 1985
Simulation End Date : Dec 31, 1999
Simuletion Run Date : Sep 17, 2008 14:35
SPAW Interface Version : Sep 17, 2008 14:35:30
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--85-99	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--85-99\Bur 15 yr--85-99.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--85-99	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--85-99\Bur 15 yr--85-99.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1985	564.68	418.67	146.01	11.75	19.44	42.08	3.06	0	500.1	0	0	0	0	0	71.38	0	0	347.3	163.95	0	0
1986	598.85	564.8	34.05	23.59	40.58	51.25	6.91	0	500.1	0	0	0	0	0	74.96	0	0	489.83	21.42	0	0
1987	545.51	579.76	-34.25	12.37	21.87	20.83	2.7	0	500.1	0	0	0	0	0	75.36	0	0	504.4	6.85	0	0
1988	546.7	548.66	-1.96	13.79	23.93	17.5	3.8	0	501.47	0	0	0	0	0	74.32	0	0	474.34	36.91	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	577.43	575.57	1.86	19.14	33.22	38.75	5.35	0	500.1	0	0	0	0	0	74.77	0	0	500.8	10.45	0	0
1991	621.09	587.54	33.55	15.03	26.87	90.83	3.28	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0
1992	540.28	581.25	-40.97	14.07	24.83	11.25	2.72	0	501.47	0	0	0	0	0	75.45	0	0	505.79	5.46	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
589.17	563.66	25.51	16.98	29.86	53.72	4.11	0	501.47	0	0	0	0	0	75.76	0	0	487.9	23.35	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--86-00\Burd 86-00.pnd
File Creation Date : Sep 17, 2008 14:37:09
File Last Modified Date : Sep 17, 2008 14:37:09
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1986-2000
Simulation Start Date : Jan 01, 1986
Simulation End Date : Dec 31, 2000
Simulation Run Date : Sep 17, 2008 14:37
SPAW Interface Version : Sep 17, 2008 14:37:09
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--86-00 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--86-00\Bur 15 yr--86-00.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (OATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--86-00 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--86-00\Bur 15 yr--86-00.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1986	594.88	414.81	180.07	22.02	36.14	51.25	7.38	0	500.1	0	0	0	0	0	71.36	0	0	343.45	167.8	0	0
1987	528.8	563.05	-34.25	12.37	21.81	4.17	2.72	0	500.1	0	0	0	0	0	75.03	0	0	488.02	23.23	0	0
1988	546.7	548.66	-1.96	13.79	23.93	17.5	3.8	0	501.47	0	0	0	0	0	74.32	0	0	474.34	36.91	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	574.92	573.06	1.86	19.14	33.2	36.25	5.36	0	500.1	0	0	0	0	0	74.72	0	0	498.35	12.9	0	0
1991	619.42	587.49	31.93	15.03	26.86	89.17	3.29	0	500.1	0	0	0	0	0	76.24	0	0	511.25	0	0	0
1992	540.27	579.62	-39.34	14.07	24.81	11.25	2.73	0	501.47	0	0	0	0	0	75.41	0	0	504.21	7.04	0	0
1993	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0
1994	531.44	587.25	-55.81	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	76	0	0	511.25	0	0	0
1995	557.33	539.3	18.03	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.55	0	0	464.75	46.5	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0
2000	592.36	595.05	-2.69	14.51	28.32	60.83	1.73	0	501.47	0	0	0	0	0	83.8	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
589.27	564.03	25.24	17.06	30.15	53.58	4.06	0	501.47	0	0	0	0	0	76.31	0	0	487.71	23.54	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--87-01\Burd 87-01.pnd
File Creation Date : Sep 17, 2008 14:38:50
File Last Modified Date : Sep 17, 2008 14:38:50
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1987-2001
Simulation Start Date : Jan 01, 1987
Simulation End Date : Dec 31, 2001
Simulation Run Date : Sep 17, 2008 14:38
SPAW Interface Version : Sep 17, 2008 14:38:50
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--87-01	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--87-01\Bur 15 yr--87-01.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--87-01	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--87-01\Bur 15 yr--87-01.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1987	527.35	381.54	145.81	12.37	20.28	3.33	3.63	0	500.1	0	0	0	0	0	70.88	0	0	310.66	200.59	0	0
1988	546.7	548.66	-1.96	13.79	23.93	17.5	3.8	0	501.47	0	0	0	0	0	74.32	0	0	474.34	36.91	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	565.73	563.87	1.86	19.14	33.15	27.08	5.39	0	500.1	0	0	0	0	0	74.54	0	0	489.33	21.92	0	0
1991	598.94	586.92	12.02	15.03	26.73	68.75	3.36	0	500.1	0	0	0	0	0	75.67	0	0	511.25	0	0	0
1992	540.16	559.6	-19.44	14.07	24.59	11.25	2.84	0	501.47	0	0	0	0	0	74.83	0	0	484.77	26.48	0	0
1993	654.25	587.72	66.53	22.3	39.53	109.17	5.45	0	500.1	0	0	0	0	0	76.47	0	0	511.25	0	0	0
1994	531.43	587.23	-55.8	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	75.98	0	0	511.25	0	0	0
1995	557.32	538.9	18.42	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.54	0	0	464.36	46.89	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0
2000	592.36	595.05	-2.69	14.51	28.32	60.83	1.73	0	501.47	0	0	0	0	0	83.8	0	0	511.25	0	0	0
2001	588.67	594.18	-5.51	18.1	34.92	50.83	2.81	0	500.1	0	0	0	0	0	82.93	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
586.74	561.87	24.87	16.8	29.94	51.5	3.83	0	501.47	0	0	0	0	0	76.72	0	0	485.15	26.1	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--88-02\Burd 88-02.pnd
File Creation Date : Sep 17, 2008 14:41:30
File Last Modified Date : Sep 17, 2008 14:41:30
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1988-2002
Simulation Start Date : Jan 01, 1988
Simulation End Date : Dec 31, 2002
Simulation Run Date : Sep 17, 2008 14:41
SPAW Interface Version : Sep 17, 2008 14:41:30
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--88-02	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--88-02\Bur 15 yr--88-02.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--88-02	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--88-02\Bur 15 yr--88-02.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac·ft	Outflow ac·ft	Change ac·ft	Precip in	Precip Vol ac·ft	WS Runoff ac·ft	Bank Runc ac·ft	Interflow ac·ft	Ext Input ac·ft	Seep In ac·ft	Supply In ac·ft	Drwdwn In ac·ft	Pipe In ac·ft	Spill In ac·ft	Vol Evap ac·ft	Vol Infil ac·ft	Vol Seep ac·ft	Irrig ac·ft	Irrig Def ac·ft	Sup Pump ac·ft	Sup Pump ac·ft
1988	545.43	401.57	143.86	13.4	21.89	17.5	4.56	0	501.47	0	0	0	0	0	70.95	0	0	330.62	180.63	0	0
1989	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
1990	565.73	563.87	1.86	19.14	33.15	27.08	5.39	0	500.1	0	0	0	0	0	74.54	0	0	489.33	21.92	0	0
1991	596.43	586.85	9.58	15.03	26.71	66.25	3.36	0	500.1	0	0	0	0	0	75.6	0	0	511.25	0	0	0
1992	540.15	557.14	-17	14.07	24.57	11.25	2.86	0	501.47	0	0	0	0	0	74.76	0	0	482.39	28.86	0	0
1993	654.25	587.72	66.53	22.3	39.53	109.17	5.45	0	500.1	0	0	0	0	0	76.47	0	0	511.25	0	0	0
1994	531.43	587.23	-55.8	12	21.16	7.5	2.67	0	500.1	0	0	0	0	0	75.98	0	0	511.25	0	0	0
1995	557.32	538.9	18.42	18.32	31.76	21.25	4.21	0	500.1	0	0	0	0	0	74.54	0	0	464.36	46.89	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0
2000	592.36	595.05	-2.69	14.51	28.32	60.83	1.73	0	501.47	0	0	0	0	0	83.8	0	0	511.25	0	0	0
2001	588.67	594.18	-5.51	18.1	34.92	50.83	2.81	0	500.1	0	0	0	0	0	82.93	0	0	511.25	0	0	0
2002	539.2	592.74	-53.54	13.1	24.63	12.5	1.96	0	500.1	0	0	0	0	0	81.49	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac·ft	Outflow ac·ft	Change ac·ft	Precip in	Precip Vol ac·ft	WS Runoff ac·ft	Bank Runc ac·ft	Interflow ac·ft	Ext Input ac·ft	Seep In ac·ft	Supply In ac·ft	Drwdwn In ac·ft	Pipe In ac·ft	Spill In ac·ft	Vol Evap ac·ft	Vol Infil ac·ft	Vol Seep ac·ft	Irrig ac·ft	Irrig Def ac·ft	Sup Pump ac·ft	Sup Pump ac·ft
587.28	565.97	21.31	16.82	30.09	51.94	3.77	0	501.47	0	0	0	0	0	77.19	0	0	488.78	22.47	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--89-03\Burd 89-03.pnd
File Creation Date : Sep 17, 2008 14:43:40
File Last Modified Date : Sep 17, 2008 14:43:41
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1989-2003
Simulation Start Date : Jan 01, 1989
Simulation End Date : Dec 31, 2003
Simulation Run Date : Sep 17, 2008 14:43
SPAW Interface Version : Sep 17, 2008 14:43:40
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--89-03 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--89-03\Bur 15 yr--89-03.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--89-03 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--89-03\Bur 15 yr--89-03.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1989	531.5	381.97	149.53	15.49	25.19	1.25	4.96	0	500.1	0	0	0	0	0	70.86	0	0	311.11	200.14	0	0
1990	565.73	563.87	1.86	19.14	33.15	27.08	5.39	0	500.1	0	0	0	0	0	74.54	0	0	489.33	21.92	0	0
1991	588.49	586.63	1.86	15.03	26.66	58.33	3.39	0	500.1	0	0	0	0	0	75.38	0	0	511.25	0	0	0
1992	540.1	549.38	-9.28	14.07	24.48	11.25	2.9	0	501.47	0	0	0	0	0	74.54	0	0	474.84	36.41	0	0
1993	653.83	587.71	66.12	22.3	39.52	108.75	5.46	0	500.1	0	0	0	0	0	76.46	0	0	511.25	0	0	0
1994	531.43	587.22	-55.79	12	21.15	7.5	2.67	0	500.1	0	0	0	0	0	75.97	0	0	511.25	0	0	0
1995	557.32	538.51	18.82	18.32	31.75	21.25	4.21	0	500.1	0	0	0	0	0	74.53	0	0	463.97	47.28	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0
2000	592.36	595.05	-2.69	14.51	28.32	60.83	1.73	0	501.47	0	0	0	0	0	83.8	0	0	511.25	0	0	0
2001	588.67	594.18	-5.51	18.1	34.92	50.83	2.81	0	500.1	0	0	0	0	0	82.93	0	0	511.25	0	0	0
2002	539.2	592.74	-53.54	13.1	24.63	12.5	1.96	0	500.1	0	0	0	0	0	81.49	0	0	511.25	0	0	0
2003	540.1	591.03	-50.92	14.69	27.39	10	2.6	0	500.1	0	0	0	0	0	79.78	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
586.41	568.41	18	16.9	30.37	50.89	3.68	0	501.47	0	0	0	0	0	77.55	0	0	490.87	20.38	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--90-04\Burd 90-04.pnd
File Creation Date : Sep 17, 2008 14:46:05
File Last Modified Date : Sep 17, 2008 14:46:06
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1990-2004
Simulation Start Date : Jan 01, 1990
Simulation End Date : Dec 31, 2004
Simulation Run Date : Sep 17, 2008 14:46
SPAW Interface Version : Sep 17, 2008 14:46:05
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--90-04 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--90-04\Bur 15 yr--90-04.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--90-04 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--90-04\Bur 15 yr--90-04.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1990	564.96	413.58	151.39	19.11	31.34	27.08	6.43	0	500.1	0	0	0	0	0	70.98	0	0	342.59	168.66	0	0
1991	540.05	546.08	-6.03	15.03	26.47	10	3.48	0	500.1	0	0	0	0	0	74.43	0	0	471.65	39.6	0	0
1992	540.06	541.45	-1.39	14.07	24.39	11.25	2.94	0	501.47	0	0	0	0	0	74.32	0	0	467.13	44.12	0	0
1993	640.86	587.39	53.47	22.3	39.41	95.83	5.52	0	500.1	0	0	0	0	0	76.14	0	0	511.25	0	0	0
1994	531.38	579.65	-48.27	12	21.05	7.5	2.73	0	500.1	0	0	0	0	0	75.55	0	0	504.1	7.15	0	0
1995	557.29	533.34	23.95	18.32	31.7	21.25	4.24	0	500.1	0	0	0	0	0	74.39	0	0	458.95	52.3	0	0
1996	567.39	586.89	-19.5	17.59	30.86	30.83	4.22	0	501.47	0	0	0	0	0	75.64	0	0	511.25	0	0	0
1997	631.18	587.4	43.78	17.73	31.38	95.83	3.87	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
1998	658.42	589.29	69.13	24.29	43.4	108.75	6.17	0	500.1	0	0	0	0	0	78.04	0	0	511.25	0	0	0
1999	693.95	593.46	100.5	17.17	32.73	158.33	2.79	0	500.1	0	0	0	0	0	82.21	0	0	511.25	0	0	0
2000	592.36	595.05	-2.69	14.51	28.32	60.83	1.73	0	501.47	0	0	0	0	0	83.8	0	0	511.25	0	0	0
2001	588.67	594.18	-5.51	18.1	34.92	50.83	2.81	0	500.1	0	0	0	0	0	82.93	0	0	511.25	0	0	0
2002	539.2	592.74	-53.54	13.1	24.63	12.5	1.96	0	500.1	0	0	0	0	0	81.49	0	0	511.25	0	0	0
2003	540.1	591.03	-50.92	14.69	27.39	10	2.6	0	500.1	0	0	0	0	0	79.78	0	0	511.25	0	0	0
2004	533.92	588.75	-54.84	12.19	21.43	8.75	2.26	0	501.47	0	0	0	0	0	77.5	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
582.66	568.07	14.59	16.84	30.25	47.31	3.63	0	501.47	0	0	0	0	0	77.61	0	0	490.46	20.79	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--91-05\Burd 91-05.pnd
File Creation Date : Sep 17, 2008 14:47:30
File Last Modified Date : Sep 17, 2008 14:47:31
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1991-2005
Simulation Start Date : Jan 01, 1991
Simulation End Date : Dec 31, 2005
Simulation Run Date : Sep 17, 2008 14:47
SPAW Interface Version : Sep 17, 2008 14:47:30
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--91-05	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--91-05\Bur 15 yr--91-05.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--91-05	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--91-05\Bur 15 yr--91-05.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1991	539.32	393.96	145.36	14.99	24.82	10	4.4	0	500.1	0	0	0	0	0	70.96	0	0	323	188.25	0	0
1992	540.06	541.45	-1.39	14.07	24.39	11.25	2.94	0	501.47	0	0	0	0	0	74.32	0	0	467.13	44.12	0	0
1993	590.66	580.34	10.33	22.3	39.01	45.83	5.72	0	500.1	0	0	0	0	0	74.94	0	0	505.39	5.86	0	0
1994	531.22	536.35	-5.13	12	20.73	7.5	2.89	0	500.1	0	0	0	0	0	74.33	0	0	462.02	49.23	0	0
1995	557.29	533.34	23.95	18.32	31.7	21.25	4.24	0	500.1	0	0	0	0	0	74.39	0	0	458.95	52.3	0	0
1996	566.13	586.86	-20.72	17.59	30.84	29.58	4.23	0	501.47	0	0	0	0	0	75.61	0	0	511.25	0	0	0
1997	630.75	587.34	43.41	17.73	31.35	95.42	3.88	0	500.1	0	0	0	0	0	76.09	0	0	511.25	0	0	0
1998	658.41	589.23	69.18	24.29	43.36	108.75	6.19	0	500.1	0	0	0	0	0	77.98	0	0	511.25	0	0	0
1999	693.94	593.4	100.54	17.17	32.71	158.33	2.8	0	500.1	0	0	0	0	0	82.15	0	0	511.25	0	0	0
2000	592.36	595	-2.64	14.51	28.31	60.83	1.74	0	501.47	0	0	0	0	0	83.75	0	0	511.25	0	0	0
2001	588.66	594.12	-5.47	18.1	34.9	50.83	2.82	0	500.1	0	0	0	0	0	82.87	0	0	511.25	0	0	0
2002	539.19	592.69	-53.5	13.1	24.62	12.5	1.97	0	500.1	0	0	0	0	0	81.44	0	0	511.25	0	0	0
2003	540.1	590.98	-50.88	14.69	27.38	10	2.61	0	500.1	0	0	0	0	0	79.73	0	0	511.25	0	0	0
2004	533.91	588.7	-54.79	12.19	21.42	8.75	2.27	0	501.47	0	0	0	0	0	77.45	0	0	511.25	0	0	0
2005	652.85	589.89	62.96	20.16	36.94	111.25	4.56	0	500.1	0	0	0	0	0	78.64	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
585	566.3	18.7	16.9	30.45	49.47	3.6	0	501.47	0	0	0	0	0	77.7	0	0	488.6	22.65	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--92-06\Burd 92-06.pnd
File Creation Date : Sep 17, 2008 14:52:08
File Last Modified Date : Sep 17, 2008 14:52:09
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1992-2006
Simulation Start Date : Jan 01, 1992
Simulation End Date : Dec 31, 2006
Simulation Run Date : Sep 17, 2008 14:52
SPAW Interface Version : Sep 17, 2008 14:52:08
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--92-06 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--92-06\Bur 15 yr--92-06.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--92-06 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--92-06\Bur 15 yr--92-06.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1992	539.38	395.41	143.97	14.07	22.97	11.25	3.69	0	501.47	0	0	0	0	0	71.01	0	0	324.4	186.85	0	0
1993	570.19	559.86	10.33	22.3	38.89	25.42	5.77	0	500.1	0	0	0	0	0	74.6	0	0	485.26	25.99	0	0
1994	531.22	536.35	-5.13	12	20.73	7.5	2.89	0	500.1	0	0	0	0	0	74.33	0	0	462.02	49.23	0	0
1995	557.29	533.34	23.95	18.32	31.7	21.25	4.24	0	500.1	0	0	0	0	0	74.39	0	0	458.95	52.3	0	0
1996	564.46	586.81	-22.35	17.59	30.83	27.92	4.24	0	501.47	0	0	0	0	0	75.56	0	0	511.25	0	0	0
1997	629.07	587.24	41.83	17.73	31.31	93.75	3.9	0	500.1	0	0	0	0	0	75.99	0	0	511.25	0	0	0
1998	658.39	589.11	69.28	24.29	43.3	108.75	6.23	0	500.1	0	0	0	0	0	77.86	0	0	511.25	0	0	0
1999	693.92	593.29	100.64	17.17	32.66	158.33	2.83	0	500.1	0	0	0	0	0	82.04	0	0	511.25	0	0	0
2000	592.34	594.89	-2.55	14.51	28.27	60.83	1.76	0	501.47	0	0	0	0	0	83.64	0	0	511.25	0	0	0
2001	588.64	594.02	-5.38	18.1	34.86	50.83	2.85	0	500.1	0	0	0	0	0	82.77	0	0	511.25	0	0	0
2002	539.18	592.59	-53.41	13.1	24.59	12.5	1.99	0	500.1	0	0	0	0	0	81.34	0	0	511.25	0	0	0
2003	540.08	590.87	-50.79	14.69	27.34	10	2.63	0	500.1	0	0	0	0	0	79.62	0	0	511.25	0	0	0
2004	533.89	588.6	-54.71	12.19	21.39	8.75	2.28	0	501.47	0	0	0	0	0	77.35	0	0	511.25	0	0	0
2005	652.84	589.79	63.05	20.16	36.9	111.25	4.59	0	500.1	0	0	0	0	0	78.54	0	0	511.25	0	0	0
2006	532.22	589.06	-56.84	13.22	23.97	5.42	2.73	0	500.1	0	0	0	0	0	77.81	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
582.88	568.13	14.75	16.79	30.27	47.58	3.56	0	501.47	0	0	0	0	0	77.84	0	0	490.29	20.96	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--93-07\Burd 93-07.pnd
File Creation Date : Sep 17, 2008 14:53:47
File Last Modified Date : Sep 17, 2008 14:53:47
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1993-2007
Simulation Start Date : Jan 01, 1993
Simulation End Date : Dec 31, 2007
Simulation Run Date : Sep 17, 2008 14:53
SPAW Interface Version : Sep 17, 2008 14:53:47
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--93-07 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--93-07\Bur 15 yr--93-07.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--93-07 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--93-07\Bur 15 yr--93-07.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1993	555.41	401.11	154.3	21.42	35.2	13.33	6.77	0	500.1	0	0	0	0	0	71.04	0	0	330.07	181.18	0	0
1994	531.22	536.35	-5.13	12	20.73	7.5	2.89	0	500.1	0	0	0	0	0	74.33	0	0	462.02	49.23	0	0
1995	557.29	533.34	23.95	18.32	31.7	21.25	4.24	0	500.1	0	0	0	0	0	74.39	0	0	458.95	52.3	0	0
1996	556.93	581	-24.06	17.59	30.78	20.42	4.26	0	501.47	0	0	0	0	0	75.39	0	0	505.61	5.64	0	0
1997	623.61	587.02	36.59	17.73	31.24	88.33	3.94	0	500.1	0	0	0	0	0	75.77	0	0	511.25	0	0	0
1998	658.33	588.85	69.48	24.29	43.15	108.75	6.33	0	500.1	0	0	0	0	0	77.6	0	0	511.25	0	0	0
1999	693.89	593.04	100.84	17.17	32.57	158.33	2.88	0	500.1	0	0	0	0	0	81.79	0	0	511.25	0	0	0
2000	592.31	594.65	-2.35	14.51	28.19	60.83	1.81	0	501.47	0	0	0	0	0	83.4	0	0	511.25	0	0	0
2001	588.61	593.79	-5.18	18.1	34.76	50.83	2.91	0	500.1	0	0	0	0	0	82.54	0	0	511.25	0	0	0
2002	539.14	592.36	-53.22	13.1	24.52	12.5	2.02	0	500.1	0	0	0	0	0	81.11	0	0	511.25	0	0	0
2003	540.05	590.66	-50.61	14.69	27.27	10	2.67	0	500.1	0	0	0	0	0	79.41	0	0	511.25	0	0	0
2004	533.86	588.39	-54.53	12.19	21.33	8.75	2.3	0	501.47	0	0	0	0	0	77.14	0	0	511.25	0	0	0
2005	652.81	589.59	63.22	20.16	36.8	111.25	4.65	0	500.1	0	0	0	0	0	78.34	0	0	511.25	0	0	0
2006	532.19	588.86	-56.67	13.22	23.91	5.42	2.76	0	500.1	0	0	0	0	0	77.61	0	0	511.25	0	0	0
2007	570.49	587.66	-17.18	14.34	25.28	41.67	3.44	0	500.1	0	0	0	0	0	76.41	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
583.33	569.84	13.49	16.82	30.25	47.94	3.66	0	501.47	0	0	0	0	0	77.81	0	0	492.03	19.22	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--94-80\Burd 94-80.pnd
File Creation Date : Sep 17, 2008 14:55:27
File Last Modified Date : Sep 17, 2008 14:55:27
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1994-1980
Simulation Start Date : Jan 01, 1994
Simulation End Date : Dec 31, 2008
Simulation Run Date : Sep 17, 2008 14:55
SPAW Interface Version : Sep 17, 2008 14:55:27
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--94-80	500.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--94-80\Bur 15 yr--94-80.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--94-80	500.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--94-80\Bur 15 yr--94-80.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
1994	530.71	381.54	149.17	12	19.64	7.5	3.47	0	500.1	0	0	0	0	0	70.9	0	0	310.64	200.61	0	0
1995	557.29	533.34	23.95	18.32	31.7	21.25	4.24	0	500.1	0	0	0	0	0	74.39	0	0	458.95	52.3	0	0
1996	556.51	580.58	-24.06	17.59	30.78	20	4.26	0	501.47	0	0	0	0	0	75.38	0	0	505.2	6.05	0	0
1997	582.21	585.57	-3.35	17.73	30.95	47.08	4.08	0	500.1	0	0	0	0	0	74.79	0	0	510.78	0.47	0	0
1998	657.2	587.34	69.86	24.29	42.31	107.92	6.87	0	500.1	0	0	0	0	0	76.09	0	0	511.25	0	0	0
1999	693.66	591.6	102.05	17.17	32	158.33	3.22	0	500.1	0	0	0	0	0	80.35	0	0	511.25	0	0	0
2000	592.12	593.27	-1.16	14.51	27.74	60.83	2.07	0	501.47	0	0	0	0	0	82.02	0	0	511.25	0	0	0
2001	588.4	592.45	-4.04	18.1	34.21	50.83	3.26	0	500.1	0	0	0	0	0	81.2	0	0	511.25	0	0	0
2002	538.95	591.05	-52.1	13.1	24.13	12.5	2.22	0	500.1	0	0	0	0	0	79.8	0	0	511.25	0	0	0
2003	539.87	589.37	-49.5	14.69	26.84	10	2.92	0	500.1	0	0	0	0	0	78.12	0	0	511.25	0	0	0
2004	533.65	587.12	-53.46	12.19	20.97	8.75	2.46	0	501.47	0	0	0	0	0	75.87	0	0	511.25	0	0	0
2005	652.62	588.37	64.25	20.16	36.25	111.25	5.02	0	500.1	0	0	0	0	0	77.12	0	0	511.25	0	0	0
2006	532.04	587.67	-55.64	13.22	23.55	5.42	2.97	0	500.1	0	0	0	0	0	76.42	0	0	511.25	0	0	0
2007	570.33	584.91	-14.57	14.34	24.9	41.67	3.66	0	500.1	0	0	0	0	0	75.27	0	0	509.63	1.62	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
579.34	568.21	11.14	16.43	29.3	44.83	3.74	0	501.47	0	0	0	0	0	76.87	0	0	491.33	19.92	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--95-81\Burd 95-81.pnd
File Creation Date : Sep 17, 2008 15:05:41
File Last Modified Date : Sep 17, 2008 15:05:41
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1995-1981
Simulation Start Date : Jan 01, 1995
Simulation End Date : Dec 31, 2009
Simulation Run Date : Sep 17, 2008 15:05
SPAW Interface Version : Sep 17, 2008 15:05:41
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--95-81	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--95-81\Bur 15 yr--95-81.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--95-81	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--95-81\Bur 15 yr--95-81.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
1995	556.04	382.91	173.12	18.14	29.89	21.25	4.8	0	500.1	0	0	0	0	0	71.07	0	0	311.84	199.41	0	0
1996	556.51	580.58	-24.06	17.59	30.78	20	4.26	0	501.47	0	0	0	0	0	75.38	0	0	505.2	6.05	0	0
1997	573.03	576.39	-3.35	17.73	30.92	37.92	4.09	0	500.1	0	0	0	0	0	74.69	0	0	501.7	9.55	0	0
1998	657.2	587.34	69.86	24.29	42.31	107.92	6.87	0	500.1	0	0	0	0	0	76.09	0	0	511.25	0	0	0
1999	693.66	591.6	102.05	17.17	32	158.33	3.22	0	500.1	0	0	0	0	0	80.35	0	0	511.25	0	0	0
2000	592.12	593.27	-1.16	14.51	27.74	60.83	2.07	0	501.47	0	0	0	0	0	82.02	0	0	511.25	0	0	0
2001	588.4	592.45	-4.04	18.1	34.21	50.83	3.26	0	500.1	0	0	0	0	0	81.2	0	0	511.25	0	0	0
2002	538.95	591.05	-52.1	13.1	24.13	12.5	2.22	0	500.1	0	0	0	0	0	79.8	0	0	511.25	0	0	0
2003	539.87	589.37	-49.5	14.69	26.84	10	2.92	0	500.1	0	0	0	0	0	78.12	0	0	511.25	0	0	0
2004	533.65	587.12	-53.46	12.19	20.97	8.75	2.46	0	501.47	0	0	0	0	0	75.87	0	0	511.25	0	0	0
2005	652.62	588.37	64.25	20.16	36.25	111.25	5.02	0	500.1	0	0	0	0	0	77.12	0	0	511.25	0	0	0
2006	532.04	587.67	-55.64	13.22	23.55	5.42	2.97	0	500.1	0	0	0	0	0	76.42	0	0	511.25	0	0	0
2007	570.33	584.91	-14.57	14.34	24.9	41.67	3.66	0	500.1	0	0	0	0	0	75.27	0	0	509.63	1.62	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac·ft	ac·ft	ac·ft	in	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft	ac·ft
581.21	568.36	12.85	16.52	29.43	46.53	3.78	0	501.47	0	0	0	0	0	76.89	0	0	491.47	19.78	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--96-82\Burd 96-82.pnd
File Creation Date : Sep 17, 2008 15:07:33
File Last Modified Date : Sep 17, 2008 15:07:33
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1996-1982
Simulation Start Date : Jan 01, 1996
Simulation End Date : Dec 31, 2010
Simulation Run Date : Sep 17, 2008 15:07
SPAW Interface Version : Sep 17, 2008 15:07:33
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--96-82	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--96-82\Bur 15 yr--96-82.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--96-82	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--96-82\Bur 15 yr--96-82.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1996	555.77	406.71	149.06	17.59	29.02	20	5.27	0	501.47	0	0	0	0	0	71.2	0	0	335.51	175.74	0	0
1997	553.02	556.37	-3.35	17.73	30.9	17.92	4.1	0	500.1	0	0	0	0	0	74.51	0	0	481.86	29.39	0	0
1998	632.5	586.73	45.77	24.29	42	83.33	7.07	0	500.1	0	0	0	0	0	75.48	0	0	511.25	0	0	0
1999	693.51	590.72	102.79	17.17	31.65	158.33	3.42	0	500.1	0	0	0	0	0	79.47	0	0	511.25	0	0	0
2000	592	592.43	-0.43	14.51	27.46	60.83	2.24	0	501.47	0	0	0	0	0	81.18	0	0	511.25	0	0	0
2001	588.28	591.62	-3.34	18.1	33.87	50.83	3.47	0	500.1	0	0	0	0	0	80.37	0	0	511.25	0	0	0
2002	538.83	590.24	-51.42	13.1	23.89	12.5	2.34	0	500.1	0	0	0	0	0	78.99	0	0	511.25	0	0	0
2003	539.75	588.58	-48.83	14.69	26.58	10	3.07	0	500.1	0	0	0	0	0	77.33	0	0	511.25	0	0	0
2004	533.55	567.72	-34.17	12.19	20.81	8.75	2.52	0	501.47	0	0	0	0	0	75.25	0	0	492.47	18.78	0	0
2005	652.61	588.33	64.29	20.16	36.22	111.25	5.03	0	500.1	0	0	0	0	0	77.08	0	0	511.25	0	0	0
2006	532.03	587.63	-55.6	13.22	23.54	5.42	2.98	0	500.1	0	0	0	0	0	76.38	0	0	511.25	0	0	0
2007	570.33	583.72	-13.39	14.34	24.89	41.67	3.67	0	500.1	0	0	0	0	0	75.24	0	0	508.48	2.77	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.76	586.51	-9.74	21.88	38.05	33.33	5.27	0	500.1	0	0	0	0	0	75.26	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
579.51	567.31	12.2	16.77	29.72	44.36	3.96	0	501.47	0	0	0	0	0	76.51	0	0	490.8	20.45	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--97-83\Burd 97-83.pnd
File Creation Date : Sep 17, 2008 15:09:06
File Last Modified Date : Sep 17, 2008 15:09:06
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1997-1983
Simulation Start Date : Jan 01, 1997
Simulation End Date : Dec 31, 2011
Simulation Run Date : Sep 17, 2008 15:09
SPAW Interface Version : Sep 17, 2008 15:09:06
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--97-83 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--97-83\Bur 15 yr--97-83.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--97-83 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--97-83\Bur 15 yr--97-83.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1997	552.19	406.49	145.7	17.73	29.02	17.92	5.15	0	500.1	0	0	0	0	0	70.99	0	0	335.49	175.76	0	0
1998	589.89	559.46	30.44	24.29	41.72	40.83	7.24	0	500.1	0	0	0	0	0	74.77	0	0	484.69	26.56	0	0
1999	692.59	590.13	102.45	17.17	31.43	157.5	3.56	0	500.1	0	0	0	0	0	78.88	0	0	511.25	0	0	0
2000	591.92	591.86	0.07	14.51	27.27	60.83	2.35	0	501.47	0	0	0	0	0	80.61	0	0	511.25	0	0	0
2001	588.2	591.07	-2.87	18.1	33.64	50.83	3.62	0	500.1	0	0	0	0	0	79.82	0	0	511.25	0	0	0
2002	538.75	589.7	-50.96	13.1	23.72	12.5	2.42	0	500.1	0	0	0	0	0	78.45	0	0	511.25	0	0	0
2003	539.68	588.05	-48.37	14.69	26.4	10	3.17	0	500.1	0	0	0	0	0	76.8	0	0	511.25	0	0	0
2004	533.49	553.86	-20.38	12.19	20.7	8.75	2.56	0	501.47	0	0	0	0	0	74.86	0	0	479	32.25	0	0
2005	652.61	588.33	64.29	20.16	36.22	111.25	5.03	0	500.1	0	0	0	0	0	77.08	0	0	511.25	0	0	0
2006	532.03	587.63	-55.6	13.22	23.54	5.42	2.98	0	500.1	0	0	0	0	0	76.38	0	0	511.25	0	0	0
2007	570.33	583.72	-13.39	14.34	24.89	41.67	3.67	0	500.1	0	0	0	0	0	75.24	0	0	508.48	2.77	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.76	586.51	-9.74	21.88	38.05	33.33	5.27	0	500.1	0	0	0	0	0	75.26	0	0	511.25	0	0	0
2011	627.76	587.54	40.22	16.16	28.36	95.42	3.87	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
581.57	566.45	15.12	16.74	29.58	46.5	4.01	0	501.47	0	0	0	0	0	76.36	0	0	490.09	21.16	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--98-84\Burd 98-84.pnd
File Creation Date : Sep 17, 2008 15:13:03
File Last Modified Date : Sep 17, 2008 15:13:03
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1998-1984
Simulation Start Date : Jan 01, 1998
Simulation End Date : Dec 31, 2012
Simulation Run Date : Sep 17, 2008 15:13
SPAW Interface Version : Sep 17, 2008 15:13:03
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--98-84	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--98-84\Bur 15 yr--98-84.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--98-84	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--98-84\Bur 15 yr--98-84.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac·ft	Outflow ac·ft	Change ac·ft	Precip in	Precip Vol ac·ft	WS Runoff ac·ft	Bank Runc ac·ft	Interflow ac·ft	Ext Input ac·ft	Seep In ac·ft	Supply In ac·ft	Drwdwn In ac·ft	Pipe In ac·ft	Spill In ac·ft	Vol Evap ac·ft	Vol Infil ac·ft	Vol Seep ac·ft	Irrig ac·ft	Irrig Def ac·ft	Sup Pump ac·ft	Sup Pump ac·ft
1998	589.16	413.02	176.14	24.29	39.83	40.83	8.39	0	500.1	0	0	0	0	0	71.29	0	0	341.73	169.52	0	0
1999	679.21	589.78	89.43	17.17	31.32	144.17	3.62	0	500.1	0	0	0	0	0	78.53	0	0	511.25	0	0	0
2000	591.86	591.38	0.48	14.51	27.11	60.83	2.44	0	501.47	0	0	0	0	0	80.13	0	0	511.25	0	0	0
2001	588.13	590.6	-2.48	18.1	33.45	50.83	3.74	0	500.1	0	0	0	0	0	79.35	0	0	511.25	0	0	0
2002	538.68	589.25	-50.57	13.1	23.59	12.5	2.49	0	500.1	0	0	0	0	0	78	0	0	511.25	0	0	0
2003	539.61	587.6	-47.99	14.69	26.25	10	3.26	0	500.1	0	0	0	0	0	76.35	0	0	511.25	0	0	0
2004	533.43	542.36	-8.92	12.19	20.62	8.75	2.59	0	501.47	0	0	0	0	0	74.54	0	0	467.81	43.44	0	0
2005	652.61	588.33	64.29	20.16	36.22	111.25	5.03	0	500.1	0	0	0	0	0	77.08	0	0	511.25	0	0	0
2006	532.03	587.63	-55.6	13.22	23.54	5.42	2.98	0	500.1	0	0	0	0	0	76.38	0	0	511.25	0	0	0
2007	570.33	583.72	-13.39	14.34	24.89	41.67	3.67	0	500.1	0	0	0	0	0	75.24	0	0	508.48	2.77	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.76	586.51	-9.74	21.88	38.05	33.33	5.27	0	500.1	0	0	0	0	0	75.26	0	0	511.25	0	0	0
2011	627.76	587.54	40.22	16.16	28.36	95.42	3.87	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0
2012	579.73	588.53	-8.8	16.9	30.66	44.58	3.02	0	501.47	0	0	0	0	0	77.28	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac·ft	Outflow ac·ft	Change ac·ft	Precip in	Precip Vol ac·ft	WS Runoff ac·ft	Bank Runc ac·ft	Interflow ac·ft	Ext Input ac·ft	Seep In ac·ft	Supply In ac·ft	Drwdwn In ac·ft	Pipe In ac·ft	Spill In ac·ft	Vol Evap ac·ft	Vol Infil ac·ft	Vol Seep ac·ft	Irrig ac·ft	Irrig Def ac·ft	Sup Pump ac·ft	Sup Pump ac·ft
582.2	567.9	14.3	16.62	29.38	47.39	3.95	0	501.47	0	0	0	0	0	76.37	0	0	491.53	19.72	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--99-85\Burd 99-85.pnd
File Creation Date : Sep 17, 2008 15:14:35
File Last Modified Date : Sep 17, 2008 15:14:35
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 1999-1985
Simulation Start Date : Jan 01, 1999
Simulation End Date : Dec 31, 2013
Simulation Run Date : Sep 17, 2008 15:14
SPAW Interface Version : Sep 17, 2008 15:14:35
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--99-85 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--99-85\Bur 15 yr--99-85.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--99-85 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--99-85\Bur 15 yr--99-85.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
1999	565.05	420.95	144.1	17.17	28.31	31.25	5.39	0	500.1	0	0	0	0	0	71.06	0	0	349.89	161.36	0	0
2000	591.23	586.87	4.37	14.51	25.62	60.83	3.31	0	501.47	0	0	0	0	0	75.62	0	0	511.25	0	0	0
2001	556.59	556.74	-0.15	18.1	31.56	20	4.92	0	500.1	0	0	0	0	0	74.56	0	0	482.18	29.07	0	0
2002	538.09	541.31	-3.22	13.1	22.4	12.5	3.09	0	500.1	0	0	0	0	0	74.08	0	0	467.23	44.02	0	0
2003	539.3	539.32	-0.03	14.69	25.5	10	3.7	0	500.1	0	0	0	0	0	74.23	0	0	465.1	46.15	0	0
2004	533.35	522.33	11.01	12.19	20.49	8.75	2.63	0	501.47	0	0	0	0	0	74.01	0	0	448.33	62.92	0	0
2005	648.85	588.23	60.62	20.16	36.2	107.5	5.05	0	500.1	0	0	0	0	0	76.98	0	0	511.25	0	0	0
2006	532.01	587.49	-55.48	13.22	23.49	5.42	3	0	500.1	0	0	0	0	0	76.24	0	0	511.25	0	0	0
2007	570.31	580.16	-9.85	14.34	24.86	41.67	3.69	0	500.1	0	0	0	0	0	75.13	0	0	505.02	6.23	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.76	586.51	-9.74	21.88	38.05	33.33	5.27	0	500.1	0	0	0	0	0	75.26	0	0	511.25	0	0	0
2011	627.76	587.54	40.22	16.16	28.36	95.42	3.87	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0
2012	579.73	588.53	-8.8	16.9	30.66	44.58	3.02	0	501.47	0	0	0	0	0	77.28	0	0	511.25	0	0	0
2013	565.36	587.84	-22.48	11.75	20.92	42.08	2.25	0	500.1	0	0	0	0	0	76.59	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
570.54	557.74	12.8	15.78	27.55	37.64	3.88	0	501.47	0	0	0	0	0	75.15	0	0	482.59	28.66	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--00-86\Burd 00-86.pnd
File Creation Date : Sep 17, 2008 15:16:36
File Last Modified Date : Sep 17, 2008 15:16:36
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2000-1986
Simulation Start Date : Jan 01, 2000
Simulation End Date : Dec 31, 2014
Simulation Run Date : Sep 17, 2008 15:16
SPAW Interface Version : Sep 17, 2008 15:16:36
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--00-86	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--00-86\Bur 15 yr--00-86.fpin Dec 30, 1899 00:00	

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--00-86	500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--00-86\Bur 15 yr--00-86.fpin Dec 30, 1899 00:00	

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2000	590.72	443.86	146.86	14.51	24.19	60.83	4.22	0	501.47	0	0	0	0	0	71.86	0	0	372	139.25	0	0
2001	554.49	553.03	1.46	18.1	31.54	17.92	4.93	0	500.1	0	0	0	0	0	74.49	0	0	478.54	32.71	0	0
2002	538.09	541.31	-3.22	13.1	22.4	12.5	3.09	0	500.1	0	0	0	0	0	74.08	0	0	467.23	44.02	0	0
2003	539.3	539.32	-0.03	14.69	25.5	10	3.7	0	500.1	0	0	0	0	0	74.23	0	0	465.1	46.15	0	0
2004	533.35	522.33	11.01	12.19	20.49	8.75	2.63	0	501.47	0	0	0	0	0	74.01	0	0	448.33	62.92	0	0
2005	644.25	588.11	56.14	20.16	36.16	102.92	5.07	0	500.1	0	0	0	0	0	76.86	0	0	511.25	0	0	0
2006	531.99	587.32	-55.33	13.22	23.44	5.42	3.03	0	500.1	0	0	0	0	0	76.07	0	0	511.25	0	0	0
2007	570.29	575.81	-5.51	14.34	24.81	41.67	3.71	0	500.1	0	0	0	0	0	75	0	0	500.8	10.45	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.35	586.5	-10.15	21.88	38.05	32.92	5.27	0	500.1	0	0	0	0	0	75.25	0	0	511.25	0	0	0
2011	627.76	587.53	40.23	16.16	28.36	95.42	3.88	0	500.1	0	0	0	0	0	76.28	0	0	511.25	0	0	0
2012	579.73	588.51	-8.79	16.9	30.65	44.58	3.02	0	501.47	0	0	0	0	0	77.26	0	0	511.25	0	0	0
2013	565.36	587.83	-22.47	11.75	20.92	42.08	2.25	0	500.1	0	0	0	0	0	76.58	0	0	511.25	0	0	0
2014	605.27	587.19	18.09	23.59	41.06	57.5	6.61	0	500.1	0	0	0	0	0	75.94	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
572.71	558.73	13.98	16.21	28.29	38.92	4.03	0	501.47	0	0	0	0	0	75.18	0	0	483.54	27.71	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--01-87\Burd 01-87.pnd
File Creation Date : Sep 17, 2008 15:19:00
File Last Modified Date : Sep 17, 2008 15:19:00
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2001-1987
Simulation Start Date : Jan 01, 2001
Simulation End Date : Dec 31, 2015
Simulation Run Date : Sep 17, 2008 15:19
SPAW Interface Version : Sep 17, 2008 15:19:00
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--01-87 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--01-87\Bur 15 yr--01-87.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--01-87 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--01-87\Bur 15 yr--01-87.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2001	553.86	405.55	148.32	18.1	29.69	17.92	6.15	0	500.1	0	0	0	0	0	71.02	0	0	334.52	176.73	0	0
2002	538.09	541.31	-3.22	13.1	22.4	12.5	3.09	0	500.1	0	0	0	0	0	74.08	0	0	467.23	44.02	0	0
2003	539.3	539.32	-0.03	14.69	25.5	10	3.7	0	500.1	0	0	0	0	0	74.23	0	0	465.1	46.15	0	0
2004	533.35	522.33	11.01	12.19	20.49	8.75	2.63	0	501.47	0	0	0	0	0	74.01	0	0	448.33	62.92	0	0
2005	643	588.08	54.92	20.16	36.15	101.67	5.08	0	500.1	0	0	0	0	0	76.83	0	0	511.25	0	0	0
2006	531.99	587.28	-55.29	13.22	23.43	5.42	3.04	0	500.1	0	0	0	0	0	76.03	0	0	511.25	0	0	0
2007	570.29	574.62	-4.33	14.34	24.8	41.67	3.72	0	500.1	0	0	0	0	0	74.97	0	0	499.65	11.6	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	576.35	586.5	-10.15	21.88	38.05	32.92	5.27	0	500.1	0	0	0	0	0	75.25	0	0	511.25	0	0	0
2011	627.76	587.53	40.23	16.16	28.36	95.42	3.88	0	500.1	0	0	0	0	0	76.28	0	0	511.25	0	0	0
2012	579.73	588.51	-8.79	16.9	30.65	44.58	3.02	0	501.47	0	0	0	0	0	77.26	0	0	511.25	0	0	0
2013	565.36	587.83	-22.47	11.75	20.92	42.08	2.25	0	500.1	0	0	0	0	0	76.58	0	0	511.25	0	0	0
2014	605.27	587.19	18.09	23.59	41.06	57.5	6.61	0	500.1	0	0	0	0	0	75.94	0	0	511.25	0	0	0
2015	563.53	587.46	-23.93	12.37	22.07	38.75	2.6	0	500.1	0	0	0	0	0	76.21	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
571.01	558.39	12.62	16.14	28.15	37.36	4.03	0	501.47	0	0	0	0	0	75.24	0	0	483.15	28.1	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--02-88\Burd 02-88.pnd
File Creation Date : Sep 17, 2008 15:20:55
File Last Modified Date : Sep 17, 2008 15:20:56
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2002-1988
Simulation Start Date : Jan 01, 2002
Simulation End Date : Dec 31, 2016
Simulation Run Date : Sep 17, 2008 15:20
SPAW Interface Version : Sep 17, 2008 15:20:55
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--02-88 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--02-88\Bur 15 yr--02-88.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--02-88 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--02-88\Bur 15 yr--02-88.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofi ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2002	537.58	392.49	145.1	13.1	21.39	12.5	3.59	0	500.1	0	0	0	0	0	70.83	0	0	321.65	189.6	0	0
2003	539.3	539.32	-0.03	14.69	25.5	10	3.7	0	500.1	0	0	0	0	0	74.23	0	0	465.1	46.15	0	0
2004	533.35	522.33	11.01	12.19	20.49	8.75	2.63	0	501.47	0	0	0	0	0	74.01	0	0	448.33	62.92	0	0
2005	632.97	587.82	45.14	20.16	36.07	91.67	5.13	0	500.1	0	0	0	0	0	76.57	0	0	511.25	0	0	0
2006	531.94	586.91	-54.97	13.22	23.32	5.42	3.1	0	500.1	0	0	0	0	0	75.66	0	0	511.25	0	0	0
2007	570.25	565.12	5.12	14.34	24.7	41.67	3.78	0	500.1	0	0	0	0	0	74.7	0	0	490.43	20.82	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	575.51	568.48	-10.97	21.88	38.04	32.08	5.28	0	500.1	0	0	0	0	0	75.23	0	0	511.25	0	0	0
2011	627.75	587.5	40.26	16.16	28.35	95.42	3.88	0	500.1	0	0	0	0	0	76.25	0	0	511.25	0	0	0
2012	579.72	588.48	-8.76	16.9	30.64	44.58	3.02	0	501.47	0	0	0	0	0	77.23	0	0	511.25	0	0	0
2013	565.36	587.8	-22.44	11.75	20.91	42.08	2.26	0	500.1	0	0	0	0	0	76.55	0	0	511.25	0	0	0
2014	605.27	587.16	18.11	23.59	41.05	57.5	6.62	0	500.1	0	0	0	0	0	75.91	0	0	511.25	0	0	0
2015	563.53	587.44	-23.91	12.37	22.07	38.75	2.61	0	500.1	0	0	0	0	0	76.19	0	0	511.25	0	0	0
2016	546.77	568.63	-21.86	13.79	24.14	17.5	3.66	0	501.47	0	0	0	0	0	74.89	0	0	493.74	17.51	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runofi ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
569.53	558.65	10.88	15.78	27.56	36.61	3.88	0	501.47	0	0	0	0	0	75.21	0	0	483.44	27.81	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--03-89\Burd 03-89.pnd
File Creation Date : Sep 17, 2008 15:22:40
File Last Modified Date : Sep 17, 2008 15:22:40
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2003-1989
Simulation Start Date : Jan 01, 2003
Simulation End Date : Dec 31, 2017
Simulation Run Date : Sep 17, 2008 15:22
SPAW Interface Version : Sep 17, 2008 15:22:40
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--03-89 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--03-89\Bur 15 yr--03-89.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--03-89 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--03-89\Bur 15 yr--03-89.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2003	543.78	398.71	145.07	14.69	24.26	15	4.41	0	500.1	0	0	0	0	0	71.05	0	0	327.66	183.59	0	0
2004	533.35	522.33	11.01	12.19	20.49	8.75	2.63	0	501.47	0	0	0	0	0	74.01	0	0	448.33	62.92	0	0
2005	628.37	587.7	40.67	20.16	36.03	87.08	5.15	0	500.1	0	0	0	0	0	76.45	0	0	511.25	0	0	0
2006	531.92	582.72	-50.8	13.22	23.28	5.42	3.12	0	500.1	0	0	0	0	0	75.52	0	0	507.19	4.06	0	0
2007	570.25	564.82	5.43	14.34	24.7	41.67	3.78	0	500.1	0	0	0	0	0	74.69	0	0	490.13	21.12	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	574.67	586.47	-11.79	21.88	38.04	31.25	5.28	0	500.1	0	0	0	0	0	75.22	0	0	511.25	0	0	0
2011	627.75	587.46	40.28	16.16	28.34	95.42	3.89	0	500.1	0	0	0	0	0	76.21	0	0	511.25	0	0	0
2012	579.72	588.45	-8.74	16.9	30.63	44.58	3.03	0	501.47	0	0	0	0	0	77.2	0	0	511.25	0	0	0
2013	565.35	587.77	-22.42	11.75	20.9	42.08	2.26	0	500.1	0	0	0	0	0	76.52	0	0	511.25	0	0	0
2014	605.26	587.13	18.13	23.59	41.03	57.5	6.63	0	500.1	0	0	0	0	0	75.88	0	0	511.25	0	0	0
2015	563.52	587.41	-23.88	12.37	22.06	38.75	2.61	0	500.1	0	0	0	0	0	76.16	0	0	511.25	0	0	0
2016	546.77	567.93	-21.16	13.79	24.13	17.5	3.66	0	501.47	0	0	0	0	0	74.87	0	0	493.06	18.19	0	0
2017	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
569.1	557.85	11.26	15.94	27.8	35.83	4	0	501.47	0	0	0	0	0	75.17	0	0	482.67	28.58	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--04-90\Burd 04-90.pnd
File Creation Date : Sep 17, 2008 15:24:44
File Last Modified Date : Sep 17, 2008 15:24:44
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2004-1990
Simulation Start Date : Jan 01, 2004
Simulation End Date : Dec 31, 2018
Simulation Run Date : Sep 17, 2008 15:24
SPAW Interface Version : Sep 17, 2008 15:24:44
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--04-90	500.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--04-90\Bur 15 yr--04-90.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--04-90	500.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--04-90\Bur 15 yr--04-90.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2004	532.8	376.71	156.09	12.17	19.64	8.75	2.93	0	501.47	0	0	0	0	0	70.91	0	0	305.8	205.45	0	0
2005	622.52	587.55	34.96	20.16	35.99	81.25	5.18	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
2006	531.9	576.99	-45.09	13.22	23.22	5.42	3.16	0	500.1	0	0	0	0	0	75.35	0	0	501.64	9.61	0	0
2007	570.25	564.82	5.43	14.34	24.7	41.67	3.78	0	500.1	0	0	0	0	0	74.69	0	0	490.13	21.12	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	574.25	586.46	-12.2	21.88	38.03	30.83	5.28	0	500.1	0	0	0	0	0	75.21	0	0	511.25	0	0	0
2011	627.74	587.45	40.29	16.16	28.33	95.42	3.89	0	500.1	0	0	0	0	0	76.2	0	0	511.25	0	0	0
2012	579.71	588.44	-8.73	16.9	30.62	44.58	3.03	0	501.47	0	0	0	0	0	77.19	0	0	511.25	0	0	0
2013	565.35	587.75	-22.4	11.75	20.9	42.08	2.26	0	500.1	0	0	0	0	0	76.5	0	0	511.25	0	0	0
2014	605.26	587.12	18.14	23.59	41.02	57.5	6.63	0	500.1	0	0	0	0	0	75.87	0	0	511.25	0	0	0
2015	563.52	587.4	-23.87	12.37	22.05	38.75	2.61	0	500.1	0	0	0	0	0	76.15	0	0	511.25	0	0	0
2016	546.77	567.58	-20.82	13.79	24.13	17.5	3.67	0	501.47	0	0	0	0	0	74.86	0	0	492.72	18.53	0	0
2017	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
2018	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofl	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
570.97	559.59	11.38	16.24	28.31	37.08	4.1	0	501.47	0	0	0	0	0	75.19	0	0	484.4	26.85	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--05-91\Burd 05-91.pnd
File Creation Date : Sep 17, 2008 15:26:41
File Last Modified Date : Sep 17, 2008 15:26:41
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2005-1991
Simulation Start Date : Jan 01, 2005
Simulation End Date : Dec 31, 2019
Simulation Run Date : Sep 17, 2008 15:26
SPAW Interface Version : Sep 17, 2008 15:26:41
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--05-91 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--05-91\Bur 15 yr--05-91.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--05-91 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--05-91\Bur 15 yr--05-91.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
2005	605.87	455.34	150.53	20.16	33.44	65.42	6.91	0	500.1	0	0	0	0	0	71.48	0	0	383.86	127.39	0	0
2006	531.74	536.31	-4.58	13.22	22.84	5.42	3.38	0	500.1	0	0	0	0	0	74.21	0	0	462.11	49.14	0	0
2007	570.25	564.82	5.43	14.34	24.7	41.67	3.78	0	500.1	0	0	0	0	0	74.69	0	0	490.13	21.12	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	571.33	586.39	-15.07	21.88	38.01	27.92	5.3	0	500.1	0	0	0	0	0	75.14	0	0	511.25	0	0	0
2011	627.73	587.34	40.38	16.16	28.29	95.42	3.91	0	500.1	0	0	0	0	0	76.09	0	0	511.25	0	0	0
2012	579.69	588.33	-8.64	16.9	30.58	44.58	3.05	0	501.47	0	0	0	0	0	77.08	0	0	511.25	0	0	0
2013	565.34	587.65	-22.32	11.75	20.87	42.08	2.28	0	500.1	0	0	0	0	0	76.4	0	0	511.25	0	0	0
2014	605.24	587.02	18.22	23.59	40.97	57.5	6.67	0	500.1	0	0	0	0	0	75.77	0	0	511.25	0	0	0
2015	563.51	587.3	-23.79	12.37	22.03	38.75	2.63	0	500.1	0	0	0	0	0	76.05	0	0	511.25	0	0	0
2016	546.76	565.13	-18.37	13.79	24.1	17.5	3.68	0	501.47	0	0	0	0	0	74.79	0	0	490.34	20.91	0	0
2017	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
2018	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
2019	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip in	Precip Vol ac-ft	WS Runoff ac-ft	Bank Runc ac-ft	Interflow ac-ft	Ext Input ac-ft	Seep In ac-ft	Supply In ac-ft	Drwdwn In ac-ft	Pipe In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Irrig ac-ft	Irrig Def ac-ft	Sup Pump ac-ft	Sup Pump ac-ft
575.32	561.93	13.4	16.27	28.33	41.33	4.19	0	501.47	0	0	0	0	0	75.11	0	0	486.81	24.44	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--06-92\Burd 06-92.pnd
File Creation Date : Sep 17, 2008 15:28:07
File Last Modified Date : Sep 17, 2008 15:28:07
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2006-1992
Simulation Start Date : Jan 01, 2006
Simulation End Date : Dec 31, 2020
Simulation Run Date : Sep 17, 2008 15:28
SPAW Interface Version : Sep 17, 2008 15:28:07
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--06-92 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--06-92\Bur 15 yr--06-92.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--06-92 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--06-92\Bur 15 yr--06-92.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2006	531.05	385.1	145.96	13.13	21.42	5.42	4.11	0	500.1	0	0	0	0	0	70.85	0	0	314.24	197.01	0	0
2007	570.25	564.82	5.43	14.34	24.7	41.67	3.78	0	500.1	0	0	0	0	0	74.69	0	0	490.13	21.12	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	558.8	575.53	-16.73	21.88	37.97	15.42	5.31	0	500.1	0	0	0	0	0	75.04	0	0	500.49	10.76	0	0
2011	626.04	587.24	38.8	16.16	28.25	93.75	3.93	0	500.1	0	0	0	0	0	75.99	0	0	511.25	0	0	0
2012	579.67	588.21	-8.54	16.9	30.54	44.58	3.08	0	501.47	0	0	0	0	0	76.96	0	0	511.25	0	0	0
2013	565.32	587.54	-22.21	11.75	20.84	42.08	2.29	0	500.1	0	0	0	0	0	76.29	0	0	511.25	0	0	0
2014	605.22	586.9	18.31	23.59	40.91	57.5	6.71	0	500.1	0	0	0	0	0	75.65	0	0	511.25	0	0	0
2015	563.5	587.19	-23.69	12.37	22	38.75	2.65	0	500.1	0	0	0	0	0	75.94	0	0	511.25	0	0	0
2016	546.75	562.27	-15.52	13.79	24.07	17.5	3.7	0	501.47	0	0	0	0	0	74.71	0	0	487.56	23.69	0	0
2017	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
2018	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
2019	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
2020	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runofi	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
569.86	559.31	10.55	15.86	27.64	36.78	3.97	0	501.47	0	0	0	0	0	75.1	0	0	484.21	27.04	0	0

A SUMMARY OF ACCUMULATIVE ANNUAL POND VOLUMES

SIMULATION BY:
John Dwyer
Project Engineer
Knight Piesold

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Bur 15 yr\Burd--07-93\Burd 07-93.pnd
File Creation Date : Sep 17, 2008 15:29:28
File Last Modified Date : Sep 17, 2008 15:29:28
Description : 665 AF Pond using TP8, TP9, TP10 Burd soils, 0.45 in/5th da, 500 ac, 2007-1993
Simulation Start Date : Jan 01, 2007
Simulation End Date : Dec 31, 2021
Simulation Run Date : Sep 17, 2008 15:29
SPAW Interface Version : Sep 17, 2008 15:29:28
Pond Model Version : 6.02.71

WATERSHED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--07-93 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--07-93\Bur 15 yr--07-93.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:
DESCRIPTION/FILE (DATE) AREA (AC)
Burdock TP8, TP9, TP10 Revised Soils--0.45 in/5th day--07-93 500.00
C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Bur 15-yr\Bur 15 yr--07-93\Bur 15 yr--07-93.fpin Dec 30, 1899 00:00

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	18.79	0.00
5.00	19.85	96.60
10.00	20.93	198.55
15.00	22.04	305.98
20.00	23.18	419.03
25.00	24.34	537.83
30.00	25.54	662.53
33.00	26.27	740.24

POND PROFILE
MAX AREA (AC) = 26.15
MAX DEPTH (FT) = 32.50
MAX VOLUME (AC-FT) = 727.29
IRRIGATION LIMIT (FT) = 1.00

ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Year	Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
	ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
2007	569.76	418.38	151.38	14.34	23.44	41.67	4.55	0	500.1	0	0	0	0	0	71.18	0	0	347.2	164.05	0	0
2008	544.47	548.12	-3.65	16.74	29.29	9.17	4.54	0	501.47	0	0	0	0	0	74.57	0	0	473.55	37.7	0	0
2009	569.09	543.38	25.71	13.46	23.36	42.08	3.54	0	500.1	0	0	0	0	0	74.51	0	0	468.87	42.38	0	0
2010	557.13	573.87	-16.73	21.88	37.96	13.75	5.32	0	500.1	0	0	0	0	0	75.03	0	0	498.83	12.42	0	0
2011	625.21	587.22	37.98	16.16	28.25	92.92	3.94	0	500.1	0	0	0	0	0	75.97	0	0	511.25	0	0	0
2012	579.66	588.18	-8.52	16.9	30.52	44.58	3.08	0	501.47	0	0	0	0	0	76.93	0	0	511.25	0	0	0
2013	565.32	587.51	-22.19	11.75	20.83	42.08	2.3	0	500.1	0	0	0	0	0	76.26	0	0	511.25	0	0	0
2014	605.21	586.87	18.34	23.59	40.89	57.5	6.72	0	500.1	0	0	0	0	0	75.62	0	0	511.25	0	0	0
2015	563.49	587.16	-23.67	12.37	21.99	38.75	2.65	0	500.1	0	0	0	0	0	75.91	0	0	511.25	0	0	0
2016	546.75	561.54	-14.8	13.79	24.06	17.5	3.71	0	501.47	0	0	0	0	0	74.69	0	0	486.86	24.39	0	0
2017	532.19	526.52	5.68	15.58	26.35	1.25	4.49	0	500.1	0	0	0	0	0	73.96	0	0	452.56	58.69	0	0
2018	578.68	576.82	1.86	19.14	33.23	40	5.35	0	500.1	0	0	0	0	0	74.79	0	0	502.03	9.22	0	0
2019	621.51	587.55	33.96	15.03	26.88	91.25	3.28	0	500.1	0	0	0	0	0	76.3	0	0	511.25	0	0	0
2020	540.28	581.66	-41.37	14.07	24.84	11.25	2.72	0	501.47	0	0	0	0	0	75.47	0	0	506.19	5.06	0	0
2021	654.67	587.73	66.94	22.3	39.53	109.58	5.45	0	500.1	0	0	0	0	0	76.48	0	0	511.25	0	0	0

AVERAGE ANNUAL VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Inflow	Outflow	Change	Precip	Precip Vol	WS Runoff	Bank Runc	Interflow	Ext Input	Seep In	Supply In	Drwdwn In	Pipe In	Spill In	Vol Evap	Vol Infil	Vol Seep	Irrig	Irrig Def	Sup Pump	Sup Pump
ac-ft	ac-ft	ac-ft	in	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
577.9	562.89	15.01	16.47	28.76	43.56	4.11	0	501.47	0	0	0	0	0	75.23	0	0	487.66	23.59	0	0

POWERTECH (USA) INC.

APPENDIX 5.7-C

MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT

BETWEEN POWERTECH (USA) INC.

AND THE
ARCHAEOLOGICAL RESEARCH CENTER (ARC), A PROGRAM OF THE SOUTH DAKOTA STATE HISTORICAL SOCIETY, REGARDING THE DEWEY-BURDOCK PROJECT
Located in Custer and Fall River Counties, South Dakota
Establishing Procedures to Avoid or Mitigate Potential Effects on Archeological and Historic Sites pursuant to SDCL 45-6D-14 and SDCL ch. 45-6B

WHEREAS Powertech (USA) Inc. (Powertech) plans to seek a mining permit for the Dewey-Burdock Uranium In Situ Mining Project ("Project") pursuant to the South Dakota Mined Land Reclamation Act (SDCL ch. 45-6B);

WHEREAS the Project consists of construction, operation and reclamation of uranium in situ mining and recovery facilities in Custer and Fall River Counties;

WHEREAS, Powertech has defined the Project's area of potential effect ("APE") as described in Attachment A;

WHEREAS Powertech has determined that the Project may have an affect on archaeological or historic sites that contain or are likely to contain information significant to the state or local history or prehistory, and has consulted, and will continue to consult, with the ARC Archaeologist pursuant to SDCL 45-6D-14 and SDCL ch. 45-6B;

WHEREAS, Powertech has also consulted with the South Dakota Department of Environment and Natural Resources (DENR) regarding the effects of the Project on archaeological or historic properties;

NOW, THEREFORE, Powertech and the ARC agree that the Project shall be implemented in accordance with the following stipulations in order to prevent or mitigate any effect of the Project on archeological or historic sites.

STIPULATIONS

Powertech shall ensure that the following measures are carried out:

I. Archaeological or historic sites threatened or potentially threatened by proposed ground disturbing activity in the current and projected phases of the Project will be investigated prior to the proposed activity to determine their significance or research potential.

II. Historic or archaeological sites located in the remainder of the APE that are not

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proposed to be affected, and that were previously identified in the archaeological investigation conducted by Augustana Laboratory ("Augustana") entitled, *A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota* by Kruse *et al,* that was provided to the ARC, will be avoided. If surface disturbance of a site becomes necessary, the ARC will be notified at least 30 days in advance of surface disturbance.

III. Augustana will be authorized to proceed with the evaluation of the selected sites pursuant to the scope of work described in Attachment WWW upon execution of this MOA.

IV. Each quarter during the first year and each year thereafter following the execution of this MOA until it expires or is terminated, Powertech shall provide ARC a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in Powertech's efforts to carry out the terms of this MOA.

V. DURATION

This MOA will be null and void if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, Powertech may consult with the other signatory to reconsider the terms of the MOA and amend it in accordance with Stipulation VIII below.

VI. UNANTICIPATED DISCOVERIES

If historic or archaeological sites are discovered or unanticipated effects on historic or archeological sites are found during any phase of the Project, Powertech shall temporarily halt any surface disturbing activities in the immediate vicinity and contact ARC. Powertech will not resume its activities in the area until and unless the unanticipated effects or sites are investigated and clearance to proceed is granted by ARC.

VII. REPORTING

Refer to article IV in this MOA.

VIII. DISPUTE RESOLUTION

Should either party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, Powertech and ARC shall consult to resolve the objection. If Powertech determines the objection cannot be resolved, Powertech will:

A. File a petition for a contested case hearing that includes all documentation relevant to the dispute, including Powertech's proposed resolution, with the South

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Dakota Board of Minerals and Environment (BME), which is the entity with jurisdiction over such mining activities pursuant to SDCL ch. 45-6B, and including 45-6B-33.3 to -33.8, inclusive . The BME shall timely schedule a hearing on the issues and shall notify all parties of the hearing. All parties shall be allowed to present evidence and argument to the BME at the hearing. Powertech will proceed in accordance with the final decision of the BME.

B. Powertech may not proceed until the BME has issued a final decision on the dispute.

C. Powertech's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

IX. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by both parties. The amendment will be effective on the date a copy signed by ARC.

X. TERMINATION

If either party to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VIII, above. If within thirty (30) days (or another time period agreed to by both parties) an amendment cannot be reached, either party may terminate the MOA upon written notification to the other signatories.

Execution of this MOA by Powertech and ARC and implementation of its terms constitute evidence that Powertech has taken into account the effects of this Project on potential significant historic and archaeological sites and is committed to working closely with ARC to avoid and/or mitigate any potential affects on such properties.

This MOA does not supersede any future Federal involvement in the Project and does not constitute compliance with Federal laws such as the National Historic Preservation Act or the National Environmental Policy Act.

SIGNATORIES:

Powertech (USA) Inc.	**Archaeological Research Center**
Richard E. Blubaugh Date 9/10/08	Date 9.15.08
Richard E. Blubaugh	**James Haug**
Vice President-Environmental, Health and Safety Resources	**State Archaeologist**

ATTACHMENT A

Powertech (USA) Inc.'s Dewey-Burdock Project in Custer and Fall River Counties, South Dakota is outlined by its proposed **Project Boundary** in Figure A (Confidential), following this Attachment. The Project Boundary encompasses the following sections (or portions thereof):

T6S, R1E:
Sections 20, 21, and 27 – 35

T7S, R1E:
Sections 1 – 5, 10 – 12, and 15

The **Area of Potential Effect (APE)** is defined as the areas that would potentially be affected by the surface-disturbing activities of the project and is a much smaller area than the area encompassed by the Project Boundary. The APE is based on known mining resources and is subject to change as additional resources are identified. The APE is depicted in Figure A (Confidential) and is generally described as follows:

T6S, R1E:
Sections (or portions thereof): 28, 29, 32, 33, 35

T7S, R1E:
Sections (or portions thereof): 1 – 3, 10 - 12

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FIRST AMENDMENT
TO
MEMORANDUM OF AGREEMENT
BETWEEN POWERTECH (USA) INC.
AND THE
ARCHAEOLOGICAL RESEARCH CENTER (ARC),
A PROGRAM OF THE SOUTH DAKOTA STATE HISTORICAL SOCIETY,
REGARDING THE DEWEY – BURDOCK PROJECT
Located in Custer and Fall River Counties, South Dakota
Establishing Procedures to Avoid or Mitigate Potential Effects on
Archaeological and Historic Sites
pursuant to SDCL 45-6D-14 and SDCL ch. 45-6B

RECITALS

1. The ARC and POWERTECH (USA) INC. ("Powertech") previously entered into a Memorandum of Agreement ("MOA") regarding Powertech's proposed Dewey-Burdock Uranium In-Situ Mining Project ("Project") in Custer and Fall River Counties, South Dakota.

2. The sections containing the lands enclosed within the Project Boundary were described in Attachment A to the MOA.

3. It has come to the attention of Powertech that a minor change in the Project Boundary has resulted in the inclusion of approximately 280 additional acres within the Project Boundary that are not covered by the description in said Attachment A.

4. The parties desire to amend the MOA to include the description of the section containing the additional acres.

NOW, THEREFORE, Powertech and the ARC hereby amend the MOA as follows:

1. **Description of Lands to be Added to Attachment A.** The description of the sections encompassed within the Project Boundary, as described in Attachment A to the MOA, is hereby amended to include Section 14, T7S, R1E, B.H.M., Fall River County, South Dakota.

2. **Ratification.** In all other respects, the MOA is hereby ratified and confirmed.

Dated by Powertech 2/10, 2009.

POWERTECH (USA) INC.

By: [signature]
Richard E. Blubaugh, Vice President-
Environmental, Health and Safety
Resources

Dated by the ARC 1.28.09, 2009.

ARCHAEOLOGICAL RESEARCH
CENTER

By: [signature]
James Haug, State Archaeologist

POWERTECH (USA) INC.

APPENDIX 5.7-D

MILDOS AREA SIMULATION FOR LAND APPLICATION

0

TABLE OF CONTENTS

JOINT FREQUENCY IN PERCENT, DIRECTION INDICATES WHERE WIND IS FROM FREQWS=0.46786,0.23973,0.15172,0.09302,0.03668,0.01100

MPH	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTALS
STABILITY CLASS 1																	
1.5	0.0260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0260
5.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0260	0.0000	0.0000	0.0000	0.0000	0.0260
10.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	0.0260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0260	0.0000	0.0000	0.0000	0.0000	0.0520
STABILITY CLASS 2																	
1.5	0.3930	0.2360	0.1310	0.1050	0.0790	0.1830	0.1570	0.3410	0.7340	0.7340	0.7860	0.4980	0.8650	0.8390	0.9170	0.7080	7.7060
5.5	0.0520	0.0000	0.0000	0.0260	0.0000	0.0260	0.0000	0.0520	0.0790	0.0790	0.0520	0.1050	0.2620	0.0790	0.1830	0.1050	1.1000
10.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0790	0.0000	0.0000	0.0790
15.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	0.4450	0.2360	0.1310	0.1310	0.0790	0.2090	0.1570	0.3930	0.8130	0.8130	0.8380	0.6030	1.1270	0.9970	1.1000	0.8130	8.8850
STABILITY CLASS 3																	
1.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.5	0.0520	0.0000	0.0260	0.0000	0.0260	0.0790	0.3410	0.2360	0.3140	0.0260	0.1050	0.2880	0.6290	1.1010	0.8650	0.6810	4.7690
10.0	0.0000	0.0000	0.0000	0.0000	0.1050	0.0260	0.2880	0.2360	0.0260	0.0000	0.0260	0.0260	0.1310	0.8390	0.6810	0.4450	2.8290
15.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	0.0520	0.0000	0.0260	0.0000	0.1310	0.1050	0.6290	0.4720	0.3400	0.0260	0.1310	0.3140	0.7600	1.9400	1.5460	1.1260	7.5980
STABILITY CLASS 4																	
1.5	1.7600	0.4720	0.1830	0.1570	0.2620	0.2100	0.2880	0.6290	0.8120	0.4720	0.4980	0.6550	0.5770	0.4980	0.9430	1.1790	9.5950
5.5	1.0200	0.1570	0.1570	0.3410	0.8390	0.6290	0.5240	0.6290	0.2360	0.2360	0.0260	0.1570	0.4980	1.3890	2.0960	1.8870	10.8210
10.0	0.3140	0.1050	0.1050	0.6030	1.0740	0.5240	0.5500	0.1830	0.0000	0.0000	0.1310	0.0790	0.4720	2.4630	4.1930	1.4680	12.2640
15.5	0.0260	0.0000	0.0260	0.3930	0.5770	0.1050	0.1050	0.0790	0.0000	0.0000	0.1830	0.1830	0.3140	1.7300	4.7690	0.8120	9.3020
21.5	0.0000	0.0000	0.0000	0.0520	0.0260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0790	0.1830	0.6550	2.5160	0.1570	3.6680
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0260	0.0260	0.0520	0.9700	0.0260	1.1000
ALL	3.1200	0.7340	0.4710	1.5460	2.7780	1.4680	1.4670	1.5200	1.0480	0.7080	0.8380	1.1790	2.0700	6.7870	15.4870	5.5290	46.7500
STABILITY CLASS 5																	
1.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.5	0.8120	0.0790	0.1310	0.1830	0.2100	0.1570	0.2620	0.2880	0.0260	0.0000	0.0260	0.0000	0.0520	0.2880	0.6030	0.8650	3.9820
10.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	0.8120	0.0790	0.1310	0.1830	0.2100	0.1570	0.2620	0.2880	0.0260	0.0000	0.0260	0.0000	0.0520	0.2880	0.6030	0.8650	3.9820
STABILITY CLASS 6																	
1.5	5.5600	3.3540	2.0700	1.2050	0.8650	0.8390	0.8910	1.2050	1.1270	0.7860	0.5240	0.5770	0.9430	1.4940	2.5940	5.4250	29.4590
5.5	0.7600	0.1570	0.1050	0.1050	0.1310	0.2100	0.0790	0.1310	0.1830	0.0000	0.0520	0.0260	0.1050	0.1830	0.2880	0.7600	3.2750
10.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21.5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	6.3200	3.5110	2.1750	1.3100	0.9960	1.0490	0.9700	1.3360	1.3100	0.7860	0.5760	0.6030	1.0480	1.6770	2.8820	6.1850	32.7340
ALL	10.7750	4.5600	2.9340	3.1700	4.1940	2.9880	3.4850	4.0090	3.5370	2.3330	2.4090	2.7250	5.0570	11.6890	21.6180	14.5180	100.0010

INDIVIDUAL RECEPTOR LOCATION DATA, 41 LOCATIONS INPUT THIS RUN

I	LOCATION NAMES	X(KM)	Y(KM)	Z(M)	DIST(KM)	TYPE	I	LOCATION NAMES	X(KM)	Y(KM)	Z(M)	DIST(KM)	TYPE
1	CPP N	0.07	2.84	0.00	2.84	10	22	SF SSE	-3.69	0.23	0.00	3.70	10
2	CPP NNE	1.25	2.81	0.00	3.08	10	23	SF SE	-2.79	1.26	0.00	3.06	10
3	CPP NE	1.25	1.19	0.00	1.73	10	24	SF S	-5.06	-0.34	0.00	5.07	10
4	CPP ENE	2.86	1.10	0.00	3.06	10	25	SF SSW	-5.97	1.30	0.00	6.11	10
5	CPP E	2.83	-0.07	0.00	2.83	10	26	SF SW	-6.05	2.53	0.00	6.56	10
6	CPP ESE	2.81	-1.25	0.00	3.08	10	27	SF WSW	-6.03	3.15	0.00	6.80	10
7	CPP SSE	0.96	-2.49	0.00	2.67	10	28	SF W	-6.02	3.57	0.00	7.00	10
8	CPP SE	1.99	-2.09	0.00	2.89	10	29	SF WNW	-5.39	3.71	0.00	6.54	10
9	CPP S	-0.05	-2.88	0.00	2.88	10	30	SF NW	-5.22	3.77	0.00	6.44	10
10	CPP SSW	-1.27	-2.86	0.00	3.13	10	31	SF NNW	-5.21	4.07	0.00	6.61	10
11	CPP SW	-2.13	-2.02	0.00	2.94	10	32	SF ESE	-2.81	2.60	0.00	3.83	10
12	CPP WSW	-1.27	-0.49	0.00	1.36	10	33	Daniels Ranch	2.13	0.02	0.00	2.13	10
13	CPP W	-2.07	0.04	0.00	2.07	10	34	Spencer Ranch	-2.00	1.21	0.00	2.34	10
14	CPP WNW	-2.06	0.90	0.00	2.25	10	35	BC Ranch	-6.64	3.81	0.00	7.66	10
15	CPP NW	-2.37	2.48	0.00	3.43	10	36	Puttman Ranch	-5.16	7.23	0.00	8.88	10
16	CPP NNW	-1.10	2.87	0.00	3.07	10	37	Englebert Ranch	0.30	-4.83	0.00	4.84	10
17	SF N	-4.98	4.56	0.00	6.75	10	38	Burdock School	-2.25	-1.96	0.00	2.98	10
18	SF NNE	-4.57	4.55	0.00	6.45	10	39	Heck Ranch	1.73	-6.38	0.00	6.61	10
19	SF NE	-3.98	4.54	0.00	6.04	10	40	Edgemont	11.03	-18.59	0.00	21.62	10
20	SF ENE	-3.18	4.24	0.00	5.30	10	41	Background	-5.25	-3.00	0.00	6.05	10
21	SF E	-2.79	3.48	0.00	4.46	10							

MISCELLANEOUS INPUTABLE PARAMETER VALUES

DMM	DMA	TSTART	FFORI	FHAYI	FFORP	FHAYP	FPR(1)	FPR(2)	FPR(3)	ACTRAT
100.0	100.0	2008.00	0.50	0.50	0.50	0.50	0.00	0.00	0.00	2.50

IPACT EQUALS 0, 0, 0, 0, 0, 0, 0, 1,

JC EQUALS 1, 1, 1, 1, 0, 0, 1, 0, 1, 0

TIME STEP DATA....	STEP NAMES	LENGTH, YRS	IFTODO
1		5.00	1
2		100.00	1

XRHO EQUALS 1.5, 2.5, 3.5, 4.5, 7.5, 15.0, 25.0, 35.0, 45.0, 55.0, 65.0, 75.0,

HDP EQUALS 50.0

POPULATION DISTRIBUTION

KILOMETERS	N 0.0	NNE 22.5	NE 45.0	ENE 67.5	E 90.0	ESE 112.5	SE 135.0	SSE 157.5	S 180.0	SSW 202.5	SW 225.0	WSW 247.5	W 270.0	WNW 292.5	NW 315.0	NNW 337.5
1.0- 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.0- 3.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
3.0- 4.0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
4.0- 5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-10.0	0	0	0	0	0	0	0	2	11	3	0	0	0	8	6	2
10.0-20.0	26	12	10	0	24	21	12	18	0	7	0	19	0	6	2	0
20.0-30.0	165	8	15	154	47	26	342	649	7	0	0	14	0	2	0	35
30.0-40.0	54	59	494	282	501	76	18	52	6	2	29	15	2	2	10	234
40.0-50.0	25	64	3852	21	4651	329	32	7	18	2	18	4	10	18	22	4129
50.0-60.0	25	229	391	73	278	183	12	30	2	25	21	28	0	57	30	121
60.0-70.0	39	780	1825	268	70	143	13	20	17	21	23	8	22	58	50	316
70.0-80.0	58	386	3427	539	95	136	34	30	44	48	61	9	18	33	72	77
1.0-80.0	392	1538	10014	1337	5666	914	463	808	106	108	152	103	52	184	192	4914

TOTAL 1-80 KM POPULATION IS 26943 PERSONS

NUMBER OF SOURCES= 8

NO.	KM X	KM Y	M Z	KM2 AREA	CI/YEAR U-238	Th-230	Ra-226	Pb-210	Rn-222	ID	PSIZE SET	M/SEC EXIT VEL	SOURCE NAME
1	-5.00	3.54	16.00	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E+02	1001	1	3.30E+00	SF
2	1.83	-0.56	0.00	0.9130	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E+02	2001	1	0.00E+00	CPP Wellfield
3	-3.86	3.48	0.00	0.8380	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E+02	2002	1	0.00E+00	SF Wellfield
4	-5.36	3.92	0.00	1.3600	4.24E-01	1.48E-01	8.88E-02	1.48E-02	2.77E+00	1002	1	0.00E+00	SF Land App
5	-0.37	1.26	0.00	0.8160	2.56E-01	8.88E-02	5.33E-02	8.88E-03	2.05E+00	1003	1	0.00E+00	CPP LA 1
6	-0.81	-0.75	0.00	0.2720	8.52E-02	2.96E-02	1.78E-02	2.96E-03	6.84E-01	1004	1	0.00E+00	CPP LA 2
7	-0.54	-2.46	0.00	0.2720	8.52E-02	2.96E-02	1.78E-02	2.96E-03	6.84E-01	1005	1	0.00E+00	CPP LA 3
8	0.00	0.00	16.00	0.0000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E+02	1006	1	3.30E+00	CPP

INPUT TAILS ACTIVITIES, PCI/G

SET	URANIUM	THORIUM	RADIUM	LEAD
1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AMAD AND FRACTIONAL DISTRIBUTION

SET	1.5	3.0	7.7	54.0
1	0.000	1.000	0.000	0.000
2	1.000	0.000	0.000	0.000
3	0.000	0.000	0.300	0.700

PARTICULATE SOURCE STRENGTH MULTIPLIERS BY TIME STEP, 2 TIME STEP(S) USED FOR THIS RUN

SOURCE NUMBER	TSTEP 1 5.00YRS	TSTEP 2 100.00YRS	TSTEP 3 5.00YRS	TSTEP 4 5.00YRS	TSTEP 5 5.00YRS	TSTEP 6 5.00YRS	TSTEP 7 5.00YRS	TSTEP 8 5.00YRS	TSTEP 9 5.00YRS	TSTEP10 5.00YRS
1	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
2	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
3	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
4	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
6	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

RADON SOURCE STRENGTH MULTIPLIERS BY TIME STEP, 2 TIME STEP(S) USED FOR THIS RUN

SOURCE NUMBER	TSTEP 1 5.00YRS	TSTEP 2 100.00YRS	TSTEP 3 5.00YRS	TSTEP 4 5.00YRS	TSTEP 5 5.00YRS	TSTEP 6 5.00YRS	TSTEP 7 5.00YRS	TSTEP 8 5.00YRS	TSTEP 9 5.00YRS	TSTEP10 5.00YRS
1	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
2	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
3	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
4	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
6	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	1.000E+00	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE N DIRECTION, THETA EQUALS 0.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	3.953E-02	1.372E-02	8.231E-03	8.231E-03	2.090E+01	2.052E+01	1.375E+01	9.127E+00	2.226E-05	1.249E-04
2.5	4.633E-03	1.611E-03	9.667E-04	9.667E-04	1.449E+01	1.445E+01	1.133E+01	8.489E+00	2.125E-05	1.040E-04
3.5	3.025E-03	1.052E-03	6.315E-04	6.315E-04	1.158E+01	1.156E+01	9.789E+00	7.946E+00	2.301E-05	9.117E-05
4.5	1.996E-03	6.945E-04	4.168E-04	4.168E-04	8.481E+00	8.478E+00	7.560E+00	6.493E+00	2.276E-05	7.128E-05
7.5	7.947E-04	2.766E-04	1.660E-04	1.660E-04	4.908E+00	4.910E+00	4.713E+00	4.446E+00	2.706E-05	4.553E-05
15.0	2.157E-04	7.509E-05	4.507E-05	4.507E-05	2.240E+00	2.241E+00	2.236E+00	2.218E+00	3.430E-05	2.192E-05
25.0	6.321E-05	2.201E-05	1.321E-05	1.321E-05	1.273E+00	1.274E+00	1.278E+00	1.278E+00	3.725E-05	1.256E-05
35.0	2.610E-05	9.085E-06	5.453E-06	5.453E-06	8.510E-01	8.515E-01	8.553E-01	8.577E-01	3.745E-05	8.413E-06
45.0	1.314E-05	4.574E-06	2.745E-06	2.745E-06	6.233E-01	6.236E-01	6.266E-01	6.288E-01	3.695E-05	6.165E-06
55.0	7.434E-06	2.588E-06	1.553E-06	1.553E-06	4.832E-01	4.835E-01	4.859E-01	4.876E-01	3.627E-05	4.780E-06
65.0	4.493E-06	1.564E-06	9.388E-07	9.388E-07	3.893E-01	3.895E-01	3.914E-01	3.928E-01	3.553E-05	3.851E-06
75.0	2.827E-06	9.842E-07	5.907E-07	5.907E-07	3.223E-01	3.225E-01	3.241E-01	3.252E-01	3.480E-05	3.188E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	4.120E+05	1.429E+05	8.439E+04	8.439E+04	0.000E+00	8.440E+04	8.440E+04	8.440E+04	4.636E+01
2.5	4.830E+04	1.679E+04	9.912E+03	9.912E+03	0.000E+00	9.923E+03	9.923E+03	9.923E+03	4.426E+01
3.5	3.153E+04	1.097E+04	6.475E+03	6.475E+03	0.000E+00	6.484E+03	6.484E+03	6.484E+03	4.793E+01
4.5	2.080E+04	7.237E+03	4.273E+03	4.273E+03	0.000E+00	4.280E+03	4.280E+03	4.280E+03	4.741E+01
7.5	8.284E+03	2.882E+03	1.702E+03	1.702E+03	0.000E+00	1.706E+03	1.706E+03	1.706E+03	5.636E+01
15.0	2.249E+03	7.825E+02	4.621E+02	4.621E+02	0.000E+00	4.638E+02	4.638E+02	4.638E+02	7.145E+01
25.0	6.589E+02	2.293E+02	1.354E+02	1.354E+02	0.000E+00	1.364E+02	1.364E+02	1.364E+02	7.760E+01
35.0	2.720E+02	9.467E+01	5.590E+01	5.590E+01	0.000E+00	5.658E+01	5.658E+01	5.658E+01	7.801E+01
45.0	1.370E+02	4.766E+01	2.815E+01	2.815E+01	0.000E+00	2.864E+01	2.864E+01	2.864E+01	7.698E+01
55.0	7.749E+01	2.696E+01	1.592E+01	1.592E+01	0.000E+00	1.631E+01	1.631E+01	1.631E+01	7.554E+01
65.0	4.684E+01	1.630E+01	9.625E+00	9.625E+00	0.000E+00	9.934E+00	9.934E+00	9.934E+00	7.401E+01
75.0	2.947E+01	1.026E+01	6.056E+00	6.056E+00	0.000E+00	6.312E+00	6.312E+00	6.312E+00	7.248E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	3.953E-04	1.372E-04	8.231E-05	8.237E-05
2.5	4.633E-05	1.611E-05	9.667E-06	9.731E-06
3.5	3.025E-05	1.052E-05	6.315E-06	6.384E-06
4.5	1.996E-05	6.945E-06	4.168E-06	4.236E-06
7.5	7.947E-06	2.766E-06	1.660E-06	1.741E-06
15.0	2.157E-06	7.509E-07	4.507E-07	5.536E-07
25.0	6.321E-07	2.201E-07	1.321E-07	2.438E-07
35.0	2.610E-07	9.085E-08	5.453E-08	1.669E-07
45.0	1.314E-07	4.574E-08	2.745E-08	1.383E-07
55.0	7.434E-08	2.588E-08	1.553E-08	1.243E-07
65.0	4.493E-08	1.564E-08	9.388E-09	1.160E-07
75.0	2.827E-08	9.842E-09	5.907E-09	1.103E-07

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE E DIRECTION, THETA EQUALS 90.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.481E-03	2.599E-03	1.560E-03	1.560E-03	2.830E+01	2.724E+01	1.267E+01	6.790E+00	2.446E-05	1.176E-04
2.5	4.745E-03	1.649E-03	9.897E-04	9.897E-04	2.122E+01	2.080E+01	1.106E+01	6.519E+00	2.552E-05	1.018E-04
3.5	3.134E-03	1.089E-03	6.538E-04	6.538E-04	1.381E+01	1.365E+01	9.630E+00	6.729E+00	2.855E-05	8.799E-05
4.5	2.159E-03	7.508E-04	4.506E-04	4.506E-04	1.010E+01	1.006E+01	8.132E+00	6.430E+00	3.137E-05	7.557E-05
7.5	1.128E-03	3.923E-04	2.354E-04	2.354E-04	5.018E+00	5.017E+00	4.634E+00	4.260E+00	3.430E-05	4.455E-05
15.0	4.277E-04	1.488E-04	8.933E-05	8.933E-05	2.292E+00	2.294E+00	2.237E+00	2.163E+00	3.760E-05	2.177E-05
25.0	1.753E-04	6.103E-05	3.663E-05	3.663E-05	1.270E+00	1.271E+00	1.262E+00	1.246E+00	3.722E-05	1.236E-05
35.0	8.995E-05	3.131E-05	1.879E-05	1.879E-05	8.527E-01	8.531E-01	8.530E-01	8.490E-01	3.629E-05	8.370E-06
45.0	5.216E-05	1.816E-05	1.090E-05	1.090E-05	6.287E-01	6.290E-01	6.305E-01	6.299E-01	3.530E-05	6.194E-06
55.0	3.260E-05	1.135E-05	6.810E-06	6.810E-06	4.904E-01	4.907E-01	4.924E-01	4.929E-01	3.437E-05	4.841E-06
65.0	2.142E-05	7.457E-06	4.476E-06	4.476E-06	3.973E-01	3.976E-01	3.992E-01	4.000E-01	3.351E-05	3.925E-06
75.0	1.461E-05	5.087E-06	3.053E-06	3.053E-06	3.307E-01	3.309E-01	3.324E-01	3.333E-01	3.271E-05	3.269E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.798E+04	2.708E+04	1.599E+04	1.599E+04	0.000E+00	1.601E+04	1.601E+04	1.601E+04	5.096E+01
2.5	4.946E+04	1.718E+04	1.015E+04	1.015E+04	0.000E+00	1.016E+04	1.016E+04	1.016E+04	5.316E+01
3.5	3.266E+04	1.135E+04	6.704E+03	6.704E+03	0.000E+00	6.714E+03	6.714E+03	6.714E+03	5.948E+01
4.5	2.250E+04	7.823E+03	4.620E+03	4.620E+03	0.000E+00	4.628E+03	4.628E+03	4.628E+03	6.534E+01
7.5	1.176E+04	4.088E+03	2.414E+03	2.414E+03	0.000E+00	2.418E+03	2.418E+03	2.418E+03	7.144E+01
15.0	4.458E+03	1.551E+03	9.159E+02	9.159E+02	0.000E+00	9.177E+02	9.177E+02	9.177E+02	7.832E+01
25.0	1.828E+03	6.359E+02	3.755E+02	3.755E+02	0.000E+00	3.765E+02	3.765E+02	3.765E+02	7.753E+01
35.0	9.377E+02	3.263E+02	1.927E+02	1.927E+02	0.000E+00	1.934E+02	1.934E+02	1.934E+02	7.558E+01
45.0	5.437E+02	1.892E+02	1.117E+02	1.117E+02	0.000E+00	1.122E+02	1.122E+02	1.122E+02	7.353E+01
55.0	3.398E+02	1.182E+02	6.982E+01	6.982E+01	0.000E+00	7.021E+01	7.021E+01	7.021E+01	7.159E+01
65.0	2.233E+02	7.770E+01	4.589E+01	4.589E+01	0.000E+00	4.620E+01	4.620E+01	4.620E+01	6.979E+01
75.0	1.523E+02	5.301E+01	3.130E+01	3.130E+01	0.000E+00	3.157E+01	3.157E+01	3.157E+01	6.813E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.481E-05	2.599E-05	1.560E-05	1.567E-05
2.5	4.745E-05	1.649E-05	9.897E-06	9.973E-06
3.5	3.134E-05	1.089E-05	6.538E-06	6.624E-06
4.5	2.159E-05	7.508E-06	4.506E-06	4.600E-06
7.5	1.128E-05	3.923E-06	2.354E-06	2.457E-06
15.0	4.277E-06	1.488E-06	8.933E-07	1.006E-06
25.0	1.753E-06	6.103E-07	3.663E-07	4.779E-07
35.0	8.995E-07	3.131E-07	1.879E-07	2.968E-07
45.0	5.216E-07	1.816E-07	1.090E-07	2.149E-07
55.0	3.260E-07	1.135E-07	6.810E-08	1.712E-07
65.0	2.142E-07	7.457E-08	4.476E-08	1.453E-07
75.0	1.461E-07	5.087E-08	3.053E-08	1.287E-07

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE S DIRECTION, THETA EQUALS 180.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	1.210E-02	4.205E-03	2.526E-03	2.526E-03	4.362E+01	4.322E+01	2.664E+01	1.562E+01	4.300E-05	2.379E-04
2.5	1.407E-02	4.890E-03	2.939E-03	2.939E-03	3.222E+01	3.215E+01	2.503E+01	1.819E+01	5.851E-05	2.278E-04
3.5	8.991E-03	3.125E-03	1.878E-03	1.878E-03	2.512E+01	2.512E+01	2.170E+01	1.783E+01	7.268E-05	2.024E-04
4.5	4.164E-03	1.448E-03	8.697E-04	8.697E-04	2.131E+01	2.131E+01	1.951E+01	1.725E+01	8.752E-05	1.852E-04
7.5	1.536E-03	5.345E-04	3.209E-04	3.209E-04	1.313E+01	1.313E+01	1.279E+01	1.232E+01	1.092E-04	1.243E-04
15.0	4.213E-04	1.466E-04	8.802E-05	8.802E-05	6.424E+00	6.428E+00	6.405E+00	6.346E+00	1.206E-04	6.276E-05
25.0	1.520E-04	5.293E-05	3.177E-05	3.177E-05	3.569E+00	3.571E+00	3.581E+00	3.579E+00	1.183E-04	3.518E-05
35.0	7.138E-05	2.485E-05	1.492E-05	1.492E-05	2.365E+00	2.366E+00	2.376E+00	2.381E+00	1.136E-04	2.337E-05
45.0	3.851E-05	1.341E-05	8.049E-06	8.049E-06	1.719E+00	1.720E+00	1.728E+00	1.733E+00	1.090E-04	1.700E-05
55.0	2.259E-05	7.868E-06	4.722E-06	4.722E-06	1.323E+00	1.323E+00	1.330E+00	1.334E+00	1.047E-04	1.308E-05
65.0	1.405E-05	4.893E-06	2.936E-06	2.936E-06	1.058E+00	1.058E+00	1.064E+00	1.067E+00	1.010E-04	1.046E-05
75.0	9.172E-06	3.194E-06	1.917E-06	1.917E-06	8.698E-01	8.703E-01	8.745E-01	8.776E-01	9.758E-05	8.604E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	1.261E+05	4.381E+04	2.590E+04	2.590E+04	0.000E+00	2.593E+04	2.593E+04	2.593E+04	8.956E+01
2.5	1.467E+05	5.095E+04	3.013E+04	3.013E+04	0.000E+00	3.015E+04	3.015E+04	3.015E+04	1.219E+02
3.5	9.372E+04	3.256E+04	1.925E+04	1.925E+04	0.000E+00	1.927E+04	1.927E+04	1.927E+04	1.514E+02
4.5	4.340E+04	1.509E+04	8.917E+03	8.917E+03	0.000E+00	8.934E+03	8.934E+03	8.934E+03	1.823E+02
7.5	1.601E+04	5.569E+03	3.290E+03	3.290E+03	0.000E+00	3.301E+03	3.301E+03	3.301E+03	2.274E+02
15.0	4.391E+03	1.528E+03	9.025E+02	9.025E+02	0.000E+00	9.076E+02	9.076E+02	9.076E+02	2.512E+02
25.0	1.585E+03	5.515E+02	3.257E+02	3.257E+02	0.000E+00	3.285E+02	3.285E+02	3.285E+02	2.465E+02
35.0	7.440E+02	2.590E+02	1.529E+02	1.529E+02	0.000E+00	1.548E+02	1.548E+02	1.548E+02	2.366E+02
45.0	4.014E+02	1.397E+02	8.253E+01	8.253E+01	0.000E+00	8.389E+01	8.389E+01	8.389E+01	2.270E+02
55.0	2.355E+02	8.199E+01	4.842E+01	4.842E+01	0.000E+00	4.946E+01	4.946E+01	4.946E+01	2.182E+02
65.0	1.464E+02	5.098E+01	3.011E+01	3.011E+01	0.000E+00	3.095E+01	3.095E+01	3.095E+01	2.103E+02
75.0	9.561E+01	3.328E+01	1.966E+01	1.966E+01	0.000E+00	2.034E+01	2.034E+01	2.034E+01	2.033E+02

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	1.210E-04	4.205E-05	2.526E-05	2.539E-05
2.5	1.407E-04	4.890E-05	2.939E-05	2.956E-05
3.5	8.991E-05	3.125E-05	1.878E-05	1.900E-05
4.5	4.164E-05	1.448E-05	8.697E-06	8.960E-06
7.5	1.536E-05	5.345E-06	3.209E-06	3.537E-06
15.0	4.213E-06	1.466E-06	8.802E-07	1.242E-06
25.0	1.520E-06	5.293E-07	3.177E-07	6.727E-07
35.0	7.138E-07	2.485E-07	1.492E-07	4.900E-07
45.0	3.851E-07	1.341E-07	8.049E-08	4.074E-07
55.0	2.259E-07	7.868E-08	4.722E-08	3.615E-07
65.0	1.405E-07	4.893E-08	2.936E-08	3.323E-07
75.0	9.172E-08	3.194E-08	1.917E-08	3.119E-07

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE W DIRECTION, THETA EQUALS 270.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.166E-03	2.493E-03	1.497E-03	1.497E-03	2.169E+01	2.126E+01	1.527E+01	1.141E+01	3.253E-05	1.419E-04
2.5	4.706E-03	1.639E-03	9.839E-04	9.839E-04	2.583E+01	2.568E+01	2.061E+01	1.608E+01	4.191E-05	1.909E-04
3.5	4.211E-03	1.468E-03	8.808E-04	8.808E-04	2.714E+01	2.710E+01	2.248E+01	1.763E+01	4.461E-05	2.077E-04
4.5	3.330E-03	1.161E-03	6.966E-04	6.966E-04	2.397E+01	2.395E+01	2.016E+01	1.586E+01	4.069E-05	1.860E-04
7.5	9.519E-04	3.316E-04	1.990E-04	1.990E-04	8.250E+00	8.252E+00	7.601E+00	6.713E+00	2.843E-05	7.208E-05
15.0	3.075E-04	1.071E-04	6.425E-05	6.425E-05	1.829E+00	1.830E+00	1.756E+00	1.678E+00	2.200E-05	1.705E-05
25.0	1.395E-04	4.857E-05	2.915E-05	2.915E-05	8.966E-01	8.971E-01	8.823E-01	8.591E-01	2.097E-05	8.602E-06
35.0	7.893E-05	2.748E-05	1.649E-05	1.649E-05	5.670E-01	5.673E-01	5.644E-01	5.571E-01	1.978E-05	5.524E-06
45.0	4.941E-05	1.720E-05	1.032E-05	1.032E-05	4.045E-01	4.047E-01	4.048E-01	4.026E-01	1.880E-05	3.971E-06
55.0	3.289E-05	1.145E-05	6.872E-06	6.872E-06	3.093E-01	3.095E-01	3.102E-01	3.098E-01	1.799E-05	3.047E-06
65.0	2.282E-05	7.943E-06	4.768E-06	4.768E-06	2.473E-01	2.475E-01	2.484E-01	2.486E-01	1.729E-05	2.441E-06
75.0	1.632E-05	5.682E-06	3.411E-06	3.411E-06	2.041E-01	2.042E-01	2.050E-01	2.055E-01	1.669E-05	2.016E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.470E+04	2.598E+04	1.535E+04	1.535E+04	0.000E+00	1.537E+04	1.537E+04	1.537E+04	6.776E+01
2.5	4.906E+04	1.708E+04	1.009E+04	1.009E+04	0.000E+00	1.011E+04	1.011E+04	1.011E+04	8.730E+01
3.5	4.390E+04	1.530E+04	9.031E+03	9.031E+03	0.000E+00	9.052E+03	9.052E+03	9.052E+03	9.292E+01
4.5	3.471E+04	1.210E+04	7.142E+03	7.142E+03	0.000E+00	7.161E+03	7.161E+03	7.161E+03	8.476E+01
7.5	9.922E+03	3.455E+03	2.040E+03	2.040E+03	0.000E+00	2.047E+03	2.047E+03	2.047E+03	5.923E+01
15.0	3.205E+03	1.115E+03	6.587E+02	6.587E+02	0.000E+00	6.602E+02	6.602E+02	6.602E+02	4.583E+01
25.0	1.454E+03	5.062E+02	2.989E+02	2.989E+02	0.000E+00	2.996E+02	2.996E+02	2.996E+02	4.368E+01
35.0	8.228E+02	2.863E+02	1.691E+02	1.691E+02	0.000E+00	1.696E+02	1.696E+02	1.696E+02	4.121E+01
45.0	5.150E+02	1.792E+02	1.059E+02	1.059E+02	0.000E+00	1.062E+02	1.062E+02	1.062E+02	3.916E+01
55.0	3.428E+02	1.193E+02	7.046E+01	7.046E+01	0.000E+00	7.070E+01	7.070E+01	7.070E+01	3.746E+01
65.0	2.378E+02	8.277E+01	4.888E+01	4.888E+01	0.000E+00	4.908E+01	4.908E+01	4.908E+01	3.602E+01
75.0	1.701E+02	5.921E+01	3.497E+01	3.497E+01	0.000E+00	3.513E+01	3.513E+01	3.513E+01	3.476E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.166E-05	2.493E-05	1.497E-05	1.507E-05
2.5	4.706E-05	1.639E-05	9.839E-06	9.964E-06
3.5	4.211E-05	1.468E-05	8.808E-06	8.942E-06
4.5	3.330E-05	1.161E-05	6.966E-06	7.088E-06
7.5	9.519E-06	3.316E-06	1.990E-06	2.075E-06
15.0	3.075E-06	1.071E-06	6.425E-07	7.085E-07
25.0	1.395E-06	4.857E-07	2.915E-07	3.545E-07
35.0	7.893E-07	2.748E-07	1.649E-07	2.243E-07
45.0	4.941E-07	1.720E-07	1.032E-07	1.596E-07
55.0	3.289E-07	1.145E-07	6.872E-08	1.227E-07
65.0	2.282E-07	7.943E-08	4.768E-08	9.955E-08
75.0	1.632E-07	5.682E-08	3.411E-08	8.417E-08

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE WNW DIRECTION, THETA EQUALS 292.5 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.576E-03	2.635E-03	1.582E-03	1.582E-03	2.260E+01	2.229E+01	1.594E+01	1.162E+01	2.945E-05	1.471E-04
2.5	6.107E-03	2.127E-03	1.277E-03	1.277E-03	2.739E+01	2.711E+01	2.000E+01	1.423E+01	2.940E-05	1.824E-04
3.5	6.589E-03	2.297E-03	1.378E-03	1.378E-03	3.990E+01	3.942E+01	2.705E+01	1.718E+01	2.839E-05	2.418E-04
4.5	7.683E-03	2.680E-03	1.608E-03	1.608E-03	4.933E+01	4.887E+01	3.041E+01	1.674E+01	2.361E-05	2.670E-04
7.5	2.281E-03	7.955E-04	4.773E-04	4.773E-04	9.239E+00	9.140E+00	6.617E+00	4.617E+00	1.525E-05	6.019E-05
15.0	3.802E-04	1.325E-04	7.950E-05	7.950E-05	1.907E+00	1.908E+00	1.813E+00	1.714E+00	2.026E-05	1.755E-05
25.0	1.243E-04	4.330E-05	2.598E-05	2.598E-05	8.602E-01	8.606E-01	8.515E-01	8.348E-01	2.012E-05	8.318E-06
35.0	5.860E-05	2.041E-05	1.225E-05	1.225E-05	5.303E-01	5.306E-01	5.303E-01	5.272E-01	1.923E-05	5.202E-06
45.0	3.255E-05	1.134E-05	6.803E-06	6.803E-06	3.740E-01	3.742E-01	3.753E-01	3.751E-01	1.845E-05	3.687E-06
55.0	1.980E-05	6.895E-06	4.138E-06	4.138E-06	2.837E-01	2.839E-01	2.850E-01	2.855E-01	1.775E-05	2.802E-06
65.0	1.275E-05	4.441E-06	2.666E-06	2.666E-06	2.259E-01	2.260E-01	2.270E-01	2.276E-01	1.716E-05	2.233E-06
75.0	8.550E-06	2.977E-06	1.787E-06	1.787E-06	1.856E-01	1.857E-01	1.866E-01	1.872E-01	1.664E-05	1.836E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.896E+04	2.746E+04	1.622E+04	1.622E+04	0.000E+00	1.623E+04	1.623E+04	1.623E+04	6.134E+01
2.5	6.366E+04	2.217E+04	1.309E+04	1.309E+04	0.000E+00	1.311E+04	1.311E+04	1.311E+04	6.124E+01
3.5	6.868E+04	2.394E+04	1.413E+04	1.413E+04	0.000E+00	1.416E+04	1.416E+04	1.416E+04	5.913E+01
4.5	8.009E+04	2.793E+04	1.649E+04	1.649E+04	0.000E+00	1.652E+04	1.652E+04	1.652E+04	4.918E+01
7.5	2.378E+04	8.290E+03	4.894E+03	4.894E+03	0.000E+00	4.901E+03	4.901E+03	4.901E+03	3.176E+01
15.0	3.963E+03	1.381E+03	8.151E+02	8.151E+02	0.000E+00	8.166E+02	8.166E+02	8.166E+02	4.219E+01
25.0	1.296E+03	4.512E+02	2.664E+02	2.664E+02	0.000E+00	2.671E+02	2.671E+02	2.671E+02	4.191E+01
35.0	6.108E+02	2.127E+02	1.256E+02	1.256E+02	0.000E+00	1.260E+02	1.260E+02	1.260E+02	4.006E+01
45.0	3.393E+02	1.181E+02	6.975E+01	6.975E+01	0.000E+00	7.005E+01	7.005E+01	7.005E+01	3.842E+01
55.0	2.064E+02	7.185E+01	4.243E+01	4.243E+01	0.000E+00	4.265E+01	4.265E+01	4.265E+01	3.697E+01
65.0	1.330E+02	4.628E+01	2.733E+01	2.733E+01	0.000E+00	2.751E+01	2.751E+01	2.751E+01	3.575E+01
75.0	8.912E+01	3.102E+01	1.832E+01	1.832E+01	0.000E+00	1.847E+01	1.847E+01	1.847E+01	3.466E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.576E-05	2.635E-05	1.582E-05	1.590E-05
2.5	6.107E-05	2.127E-05	1.277E-05	1.285E-05
3.5	6.589E-05	2.297E-05	1.378E-05	1.387E-05
4.5	7.683E-05	2.680E-05	1.608E-05	1.615E-05
7.5	2.281E-05	7.955E-06	4.773E-06	4.819E-06
15.0	3.802E-06	1.325E-06	7.950E-07	8.558E-07
25.0	1.243E-06	4.330E-07	2.598E-07	3.202E-07
35.0	5.860E-07	2.041E-07	1.225E-07	1.802E-07
45.0	3.255E-07	1.134E-07	6.803E-08	1.234E-07
55.0	1.980E-07	6.895E-08	4.138E-08	9.463E-08
65.0	1.275E-07	4.441E-08	2.666E-08	7.815E-08
75.0	8.550E-08	2.977E-08	1.787E-08	6.778E-08

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.465E-03	1.421E-02	2.007E-03	5.010E-04	3.115E-04	3.326E-04	3.641E-04
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.459E-03	4.572E-04	1.370E-03	7.768E-04	1.727E-03	4.097E-03	1.531E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.141E-03	9.846E-04	1.509E-02	6.777E-02	4.528E-03	1.514E-02	2.161E-02
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.601E-02	1.438E-02	6.176E-04	1.370E-03	3.443E-03	5.003E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.361E-02	1.100E-02	6.079E-02	3.321E-01	1.265E-02	2.150E-03	2.059E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.209E-02	1.305E-02	2.197E-02	6.049E-02	2.276E-02	1.255E-02	8.709E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.783E-02	2.644E-01	8.568E-03	1.024E-02	2.724E-03	2.176E-03	4.316E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.844E-03	1.927E-02	2.973E-01	1.281E-02	1.053E-03	2.968E-03	1.372E-03	1.487E-03
S	0.000E+00	1.856E-02	0.000E+00	0.000E+00	2.238E-02	0.000E+00	1.465E-03	6.149E-04	1.058E-03	7.495E-05	4.408E-04	8.470E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.213E-03	1.791E-03	0.000E+00	6.529E-05	3.650E-05	2.973E-04	1.814E-04	3.251E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.460E-04	2.077E-04	1.670E-04	1.362E-04	2.846E-04
WSW	0.000E+00	0.000E+00	2.493E-02	0.000E+00	0.000E+00	3.487E-03	1.216E-03	7.678E-04	1.336E-04	6.508E-04	1.351E-04	1.141E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.112E-04	6.657E-04	0.000E+00	6.901E-04	4.096E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.410E-02	3.020E-03	3.310E-04	1.575E-04	7.974E-04	1.563E-03	1.049E-03	4.125E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.210E-02	1.112E-03	0.000E+00	9.263E-04	1.187E-03	1.029E-03	1.153E-03	1.164E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.585E-03	0.000E+00	5.365E-03	1.687E-02	1.694E-01	3.136E-03	5.546E-03	9.606E-04

TOTAL DOSE COMMITMENT IS 1.815E+00 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.957E-02	5.765E-02	8.495E-03	2.248E-03	1.499E-03	1.728E-03	2.045E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.757E-03	1.867E-03	5.899E-03	3.602E-03	8.707E-03	2.248E-02	9.097E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.478E-03	3.985E-03	6.317E-02	2.961E-01	2.076E-02	7.310E-02	1.099E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.417E-02	5.878E-02	2.591E-03	5.941E-03	1.552E-02	2.356E-02
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.367E-02	4.370E-02	2.441E-01	1.354E+00	5.258E-02	9.154E-03	9.030E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.696E-02	5.157E-02	8.724E-02	2.417E-01	9.164E-02	5.104E-02	3.583E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.020E-02	1.045E+00	3.399E-02	4.082E-02	1.093E-02	8.787E-03	1.757E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.298E-02	7.623E-02	1.189E+00	5.198E-02	4.353E-03	1.256E-02	5.974E-03	6.691E-03
S	0.000E+00	7.277E-02	0.000E+00	0.000E+00	8.816E-02	0.000E+00	6.002E-03	2.622E-03	4.753E-03	3.582E-04	2.254E-03	4.634E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.270E-02	7.224E-03	0.000E+00	2.997E-04	1.831E-04	1.631E-03	1.079E-03	2.071E-03
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.508E-03	1.024E-03	8.819E-04	7.680E-04	1.704E-03
WSW	0.000E+00	0.000E+00	9.799E-02	0.000E+00	0.000E+00	1.386E-02	4.890E-03	3.129E-03	5.531E-04	2.742E-03	5.810E-04	5.021E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.409E-04	2.670E-03	0.000E+00	2.825E-03	1.699E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.473E-02	1.190E-02	1.312E-03	6.299E-04	3.232E-03	6.445E-03	4.421E-03	1.787E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.262E-01	4.381E-03	0.000E+00	3.701E-03	4.795E-03	4.215E-03	4.810E-03	4.967E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.409E-02	0.000E+00	2.143E-02	6.862E-02	7.055E-01	1.346E-02	2.467E-02	4.456E-03

TOTAL DOSE COMMITMENT IS 7.395E+00 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS AVG.LUNG

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.145E-02	9.572E-02	1.294E-02	3.022E-03	1.713E-03	1.621E-03	1.524E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.693E-02	3.061E-03	8.669E-03	4.497E-03	8.855E-03	1.802E-02	5.587E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.475E-02	6.648E-03	9.848E-02	4.220E-01	2.659E-02	8.293E-02	1.091E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.092E-01	9.618E-02	4.020E-03	8.604E-03	2.065E-02	2.836E-02
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.415E-02	7.559E-02	4.135E-01	2.227E+00	8.320E-02	1.378E-02	1.276E-02
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.531E-01	9.010E-02	1.510E-01	4.134E-01	1.544E-01	8.437E-02	5.784E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.235E-01	1.826E+00	5.894E-02	7.011E-02	1.855E-02	1.472E-02	2.896E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.053E-02	1.329E-01	2.030E+00	8.624E-02	6.954E-03	1.913E-02	8.573E-03	8.939E-03
S	0.000E+00	1.290E-01	0.000E+00	0.000E+00	1.550E-01	0.000E+00	9.768E-03	3.934E-03	6.377E-03	4.165E-04	2.208E-03	3.745E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.220E-02	1.214E-02	0.000E+00	3.831E-04	1.886E-04	1.308E-03	6.607E-04	9.594E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.199E-03	1.103E-03	7.902E-04	5.647E-04	1.018E-03
WSW	0.000E+00	0.000E+00	1.731E-01	0.000E+00	0.000E+00	2.394E-02	8.255E-03	5.147E-03	8.820E-04	4.217E-03	8.561E-04	7.040E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.448E-03	4.534E-03	0.000E+00	4.608E-03	2.698E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.674E-01	2.093E-02	2.281E-03	1.075E-03	5.377E-03	1.036E-02	6.795E-03	2.593E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.230E-01	7.706E-03	0.000E+00	6.334E-03	8.031E-03	6.863E-03	7.551E-03	7.442E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.490E-02	0.000E+00	3.669E-02	1.134E-01	1.111E+00	1.992E-02	3.381E-02	5.556E-03

TOTAL DOSE COMMITMENT IS 1.217E+01 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BRONCHI

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.281E-02	2.626E-01	5.744E-02	1.948E-02	1.510E-02	1.898E-02	2.337E-02
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.527E-02	9.404E-03	4.607E-02	3.644E-02	1.007E-01	2.755E-01	1.126E-01
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.821E-02	1.550E-02	3.436E-01	1.974E+00	1.561E-01	5.893E-01	9.189E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.718E-01	2.083E-01	1.132E-02	3.043E-02	8.990E-02	1.496E-01
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.877E-02	7.460E-02	5.340E-01	3.655E+00	1.704E-01	3.477E-02	3.927E-02
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.029E-02	6.049E-02	1.179E-01	3.764E-01	1.639E-01	1.045E-01	8.354E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.672E-02	1.205E+00	4.296E-02	5.692E-02	1.684E-02	1.495E-02	3.291E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.612E-02	1.486E-01	2.947E+00	1.571E-01	1.547E-02	5.134E-02	2.754E-02	3.416E-02
S	0.000E+00	4.027E-02	0.000E+00	0.000E+00	1.805E-01	0.000E+00	3.123E-02	1.774E-02	3.868E-02	3.307E-03	2.248E-02	4.784E-02
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.805E-02	4.011E-02	0.000E+00	3.603E-03	2.505E-03	2.330E-02	1.525E-02	2.804E-02
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.141E-02	1.348E-02	1.168E-02	9.948E-03	2.122E-02
WSW	0.000E+00	0.000E+00	1.439E-01	0.000E+00	0.000E+00	4.933E-02	1.733E-02	1.139E-02	2.111E-03	1.105E-02	2.477E-03	2.261E-03
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.417E-03	5.057E-03	0.000E+00	6.802E-03	4.591E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.239E-02	1.430E-02	2.150E-03	1.326E-03	8.415E-03	2.022E-02	1.638E-02	7.657E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.047E-01	5.588E-03	0.000E+00	7.317E-03	1.133E-02	1.172E-02	1.555E-02	1.849E-02
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.729E-02	0.000E+00	5.843E-02	2.455E-01	3.075E+00	6.859E-02	1.425E-01	2.851E-02

TOTAL DOSE COMMITMENT IS 2.104E+01 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS GROUND EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.379E-03	4.457E-03	6.093E-04	1.445E-04	8.370E-05	8.153E-05	7.974E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.831E-04	1.428E-04	4.102E-04	2.174E-04	4.409E-04	9.329E-04	3.048E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.819E-04	3.091E-04	4.616E-03	1.999E-02	1.275E-03	4.038E-03	5.410E-03
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.059E-03	4.477E-03	1.882E-04	4.058E-04	9.834E-04	1.366E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.343E-03	3.493E-03	1.916E-02	1.035E-01	3.882E-03	6.461E-04	6.026E-04
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.055E-03	4.157E-03	6.974E-03	1.912E-02	7.149E-03	3.914E-03	2.690E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.694E-03	8.424E-02	2.722E-03	3.240E-03	8.583E-04	6.817E-04	1.344E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.870E-03	6.143E-03	9.404E-02	4.007E-03	3.244E-04	8.968E-04	4.044E-04	4.249E-04
S	0.000E+00	5.942E-03	0.000E+00	0.000E+00	7.157E-03	0.000E+00	4.561E-04	1.855E-04	3.048E-04	2.027E-05	1.101E-04	1.926E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.027E-03	5.657E-04	0.000E+00	1.854E-05	9.423E-06	6.812E-05	3.630E-05	5.631E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.549E-04	5.467E-05	4.026E-05	2.976E-05	5.588E-05
WSW	0.000E+00	0.000E+00	7.990E-03	0.000E+00	0.000E+00	1.109E-03	3.832E-04	2.395E-04	4.116E-05	1.975E-04	4.025E-05	3.327E-05
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.696E-05	2.099E-04	0.000E+00	2.142E-04	1.257E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.725E-03	9.659E-04	1.054E-04	4.979E-05	2.497E-04	4.828E-04	3.181E-04	1.221E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.029E-02	3.557E-04	0.000E+00	2.931E-04	3.725E-04	3.193E-04	3.526E-04	3.491E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.148E-03	0.000E+00	1.700E-03	5.274E-03	5.196E-02	9.378E-04	1.605E-03	2.667E-04

TOTAL DOSE COMMITMENT IS 5.658E-01 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS CLOUD EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.321E-04	2.310E-03	5.070E-04	1.721E-04	1.334E-04	1.677E-04	2.065E-04
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.200E-04	8.274E-05	4.065E-04	3.218E-04	8.898E-04	2.434E-03	9.949E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.575E-04	1.357E-04	3.021E-03	1.740E-02	1.378E-03	5.203E-03	8.116E-03
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.497E-03	1.828E-03	9.959E-05	2.683E-04	7.932E-04	1.321E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.709E-04	6.424E-04	4.661E-03	3.209E-02	1.500E-03	3.065E-04	3.466E-04
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.056E-04	5.037E-04	1.010E-03	3.271E-03	1.435E-03	9.181E-04	7.358E-04
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.964E-04	9.882E-03	3.628E-04	4.890E-04	1.461E-04	1.306E-04	2.886E-04
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.835E-04	1.254E-03	2.554E-02	1.375E-03	1.360E-04	4.524E-04	2.430E-04	3.016E-04
S	0.000E+00	2.086E-04	0.000E+00	0.000E+00	1.491E-03	0.000E+00	2.743E-04	1.564E-04	3.415E-04	2.921E-05	1.986E-04	4.227E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.205E-04	3.509E-04	0.000E+00	3.181E-05	2.213E-05	2.059E-04	1.347E-04	2.478E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.771E-04	1.191E-04	1.031E-04	8.789E-05	1.875E-04
WSW	0.000E+00	0.000E+00	9.926E-04	0.000E+00	0.000E+00	4.227E-04	1.502E-04	9.954E-05	1.853E-05	9.729E-05	2.184E-05	1.995E-05
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.222E-05	4.411E-05	0.000E+00	5.988E-05	4.049E-05
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.267E-04	1.135E-04	1.833E-05	1.155E-05	7.393E-05	1.782E-04	1.445E-04	6.762E-05
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.952E-04	4.488E-05	0.000E+00	6.376E-05	9.951E-05	1.033E-04	1.372E-04	1.633E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.176E-04	0.000E+00	5.087E-04	2.157E-03	2.711E-02	6.054E-04	1.259E-03	2.519E-04

TOTAL DOSE COMMITMENT IS 1.821E-01 PERSON-REM/YR

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS VEG. ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN
ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
BY THE POPULATION OF THIS REGION. SEE SUMMARY
TABLE FOR THIS INFORMATION.

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS VEG. ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

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DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

SUMMARY PRINT OF POPULATION DOSES COMPUTED FOR TSTEP 1--DOSES SHOWN ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DOSES RECEIVED BY PEOPLE WITHIN 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	1.815E+00	7.395E+00	1.217E+01	5.410E-01	3.086E-01	2.104E+01
GROUND	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01
CLOUD	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTALS	2.563E+00	8.143E+00	1.292E+01	1.289E+00	1.057E+00	2.179E+01

DOSES RECEIVED BY PEOPLE BEYOND 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
GROUND	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CLOUD	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01
TOTALS	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01

TOTAL DOSES COMPUTED OVER ALL POPULATIONS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	1.815E+00	7.395E+00	1.217E+01	5.410E-01	3.086E-01	2.104E+01
GROUND	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01
CLOUD	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01
TOTALS	1.060E+01	1.178E+02	1.475E+01	9.328E+00	9.095E+00	7.295E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
1	CPP N	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1	CPP N	2	3.598E-03	1.251E-03	7.510E-04	1.248E-04	3.381E+03	1.176E+03	7.049E+02	7.049E+02
1	CPP N	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1	CPP N	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.598E-03	1.251E-03	7.510E-04	1.248E-04	3.381E+03	1.176E+03	7.049E+02	7.049E+02
2	CPP NNE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2	CPP NNE	2	2.485E-03	8.643E-04	5.188E-04	8.623E-05	2.335E+03	8.121E+02	4.870E+02	4.870E+02
2	CPP NNE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2	CPP NNE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.485E-03	8.643E-04	5.188E-04	8.623E-05	2.335E+03	8.121E+02	4.870E+02	4.870E+02
3	CPP NE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3	CPP NE	2	6.488E-03	2.254E-03	1.353E-03	2.249E-04	6.096E+03	2.118E+03	1.270E+03	1.270E+03
3	CPP NE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3	CPP NE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.488E-03	2.254E-03	1.353E-03	2.249E-04	6.096E+03	2.118E+03	1.270E+03	1.270E+03
4	CPP ENE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
4	CPP ENE	2	2.934E-03	1.020E-03	6.123E-04	1.018E-04	2.757E+03	9.585E+02	5.748E+02	5.748E+02
4	CPP ENE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
4	CPP ENE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.934E-03	1.020E-03	6.123E-04	1.018E-04	2.757E+03	9.585E+02	5.748E+02	5.748E+02
5	CPP E	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	CPP E	2	4.175E-03	1.451E-03	8.709E-04	1.447E-04	3.923E+03	1.363E+03	8.174E+02	8.174E+02
5	CPP E	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	CPP E	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.175E-03	1.451E-03	8.709E-04	1.447E-04	3.923E+03	1.363E+03	8.174E+02	8.174E+02
6	CPP ESE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
6	CPP ESE	2	4.177E-03	1.452E-03	8.717E-04	1.448E-04	3.925E+03	1.364E+03	8.182E+02	8.182E+02
6	CPP ESE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
6	CPP ESE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.177E-03	1.452E-03	8.717E-04	1.448E-04	3.925E+03	1.364E+03	8.182E+02	8.182E+02
7	CPP SSE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	CPP SSE	2	7.375E-03	2.564E-03	1.540E-03	2.558E-04	6.930E+03	2.409E+03	1.446E+03	1.446E+03
7	CPP SSE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	CPP SSE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		7.375E-03	2.564E-03	1.540E-03	2.558E-04	6.930E+03	2.409E+03	1.446E+03	1.446E+03
8	CPP SE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	CPP SE	2	4.915E-03	1.709E-03	1.026E-03	1.704E-04	4.618E+03	1.605E+03	9.630E+02	9.630E+02
8	CPP SE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	CPP SE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.915E-03	1.709E-03	1.026E-03	1.704E-04	4.618E+03	1.605E+03	9.630E+02	9.630E+02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
9	CPP S	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9	CPP S	2	1.633E-02	5.676E-03	3.412E-03	5.663E-04	1.535E+04	5.333E+03	3.203E+03	3.203E+03
9	CPP S	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9	CPP S	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.633E-02	5.676E-03	3.412E-03	5.663E-04	1.535E+04	5.333E+03	3.203E+03	3.203E+03
10	CPP SSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10	CPP SSW	2	4.991E-03	1.736E-03	1.043E-03	1.732E-04	4.690E+03	1.631E+03	9.790E+02	9.790E+02
10	CPP SSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10	CPP SSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.991E-03	1.736E-03	1.043E-03	1.732E-04	4.690E+03	1.631E+03	9.790E+02	9.790E+02
11	CPP SW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
11	CPP SW	2	3.546E-03	1.234E-03	7.413E-04	1.232E-04	3.332E+03	1.160E+03	6.959E+02	6.959E+02
11	CPP SW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
11	CPP SW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.546E-03	1.234E-03	7.413E-04	1.232E-04	3.332E+03	1.160E+03	6.959E+02	6.959E+02
12	CPP WSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
12	CPP WSW	2	9.320E-03	3.241E-03	1.947E-03	3.233E-04	8.758E+03	3.045E+03	1.828E+03	1.828E+03
12	CPP WSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
12	CPP WSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		9.320E-03	3.241E-03	1.947E-03	3.233E-04	8.758E+03	3.045E+03	1.828E+03	1.828E+03
13	CPP W	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
13	CPP W	2	5.325E-03	1.854E-03	1.113E-03	1.850E-04	5.003E+03	1.742E+03	1.045E+03	1.045E+03
13	CPP W	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
13	CPP W	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.325E-03	1.854E-03	1.113E-03	1.850E-04	5.003E+03	1.742E+03	1.045E+03	1.045E+03
14	CPP WNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
14	CPP WNW	2	6.027E-03	2.099E-03	1.260E-03	2.094E-04	5.664E+03	1.972E+03	1.183E+03	1.183E+03
14	CPP WNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
14	CPP WNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.027E-03	2.099E-03	1.260E-03	2.094E-04	5.664E+03	1.972E+03	1.183E+03	1.183E+03
15	CPP NW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15	CPP NW	2	6.095E-03	2.124E-03	1.275E-03	2.119E-04	5.727E+03	1.996E+03	1.196E+03	1.196E+03
15	CPP NW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15	CPP NW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.095E-03	2.124E-03	1.275E-03	2.119E-04	5.727E+03	1.996E+03	1.196E+03	1.196E+03
16	CPP NNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
16	CPP NNW	2	4.579E-03	1.593E-03	9.563E-04	1.590E-04	4.303E+03	1.497E+03	8.977E+02	8.977E+02
16	CPP NNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
16	CPP NNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.579E-03	1.593E-03	9.563E-04	1.590E-04	4.303E+03	1.497E+03	8.977E+02	8.977E+02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
17	SF N	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
17	SF N	2	4.344E-03	1.515E-03	9.093E-04	1.512E-04	4.081E+03	1.424E+03	8.535E+02	8.535E+02
17	SF N	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
17	SF N	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.344E-03	1.515E-03	9.093E-04	1.512E-04	4.081E+03	1.424E+03	8.535E+02	8.535E+02
18	SF NNE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
18	SF NNE	2	4.870E-03	1.699E-03	1.020E-03	1.695E-04	4.576E+03	1.596E+03	9.570E+02	9.570E+02
18	SF NNE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
18	SF NNE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.870E-03	1.699E-03	1.020E-03	1.695E-04	4.576E+03	1.596E+03	9.570E+02	9.570E+02
19	SF NE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
19	SF NE	2	4.651E-03	1.622E-03	9.734E-04	1.618E-04	4.370E+03	1.524E+03	9.137E+02	9.137E+02
19	SF NE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
19	SF NE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.651E-03	1.622E-03	9.734E-04	1.618E-04	4.370E+03	1.524E+03	9.137E+02	9.137E+02
20	SF ENE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
20	SF ENE	2	3.961E-03	1.381E-03	8.288E-04	1.378E-04	3.722E+03	1.298E+03	7.779E+02	7.779E+02
20	SF ENE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
20	SF ENE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.961E-03	1.381E-03	8.288E-04	1.378E-04	3.722E+03	1.298E+03	7.779E+02	7.779E+02
21	SF E	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
21	SF E	2	5.309E-03	1.851E-03	1.111E-03	1.847E-04	4.989E+03	1.739E+03	1.043E+03	1.043E+03
21	SF E	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
21	SF E	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.309E-03	1.851E-03	1.111E-03	1.847E-04	4.989E+03	1.739E+03	1.043E+03	1.043E+03
22	SF SSE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
22	SF SSE	2	4.467E-03	1.557E-03	9.347E-04	1.554E-04	4.198E+03	1.463E+03	8.774E+02	8.774E+02
22	SF SSE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
22	SF SSE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.467E-03	1.557E-03	9.347E-04	1.554E-04	4.198E+03	1.463E+03	8.774E+02	8.774E+02
23	SF SE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
23	SF SE	2	6.510E-03	2.269E-03	1.362E-03	2.264E-04	6.117E+03	2.132E+03	1.278E+03	1.278E+03
23	SF SE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
23	SF SE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.510E-03	2.269E-03	1.362E-03	2.264E-04	6.117E+03	2.132E+03	1.278E+03	1.278E+03
24	SF S	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
24	SF S	2	2.502E-03	8.724E-04	5.236E-04	8.703E-05	2.351E+03	8.197E+02	4.914E+02	4.914E+02
24	SF S	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
24	SF S	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.502E-03	8.724E-04	5.236E-04	8.703E-05	2.351E+03	8.197E+02	4.914E+02	4.914E+02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
25	SF SSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
25	SF SSW	2	3.258E-03	1.136E-03	6.817E-04	1.133E-04	3.061E+03	1.067E+03	6.399E+02	6.399E+02
25	SF SSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
25	SF SSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.258E-03	1.136E-03	6.817E-04	1.133E-04	3.061E+03	1.067E+03	6.399E+02	6.399E+02
26	SF SW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
26	SF SW	2	5.429E-03	1.894E-03	1.137E-03	1.890E-04	5.102E+03	1.780E+03	1.067E+03	1.067E+03
26	SF SW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
26	SF SW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.429E-03	1.894E-03	1.137E-03	1.890E-04	5.102E+03	1.780E+03	1.067E+03	1.067E+03
27	SF WSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
27	SF WSW	2	6.451E-03	2.251E-03	1.351E-03	2.246E-04	6.062E+03	2.115E+03	1.268E+03	1.268E+03
27	SF WSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
27	SF WSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.451E-03	2.251E-03	1.351E-03	2.246E-04	6.062E+03	2.115E+03	1.268E+03	1.268E+03
28	SF W	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
28	SF W	2	1.066E-02	3.719E-03	2.231E-03	3.710E-04	1.001E+04	3.494E+03	2.094E+03	2.094E+03
28	SF W	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
28	SF W	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.066E-02	3.719E-03	2.231E-03	3.710E-04	1.001E+04	3.494E+03	2.094E+03	2.094E+03
29	SF WNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
29	SF WNW	2	3.903E-02	1.362E-02	8.173E-03	1.359E-03	3.667E+04	1.280E+04	7.672E+03	7.672E+03
29	SF WNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
29	SF WNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.903E-02	1.362E-02	8.173E-03	1.359E-03	3.667E+04	1.280E+04	7.672E+03	7.672E+03
30	SF NW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
30	SF NW	2	4.013E-02	1.400E-02	8.403E-03	1.397E-03	3.770E+04	1.316E+04	7.887E+03	7.887E+03
30	SF NW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
30	SF NW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.013E-02	1.400E-02	8.403E-03	1.397E-03	3.770E+04	1.316E+04	7.887E+03	7.887E+03
31	SF NNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
31	SF NNW	2	3.917E-02	1.367E-02	8.202E-03	1.364E-03	3.680E+04	1.284E+04	7.699E+03	7.699E+03
31	SF NNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
31	SF NNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.917E-02	1.367E-02	8.202E-03	1.364E-03	3.680E+04	1.284E+04	7.699E+03	7.699E+03
32	SF ESE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
32	SF ESE	2	6.571E-03	2.291E-03	1.375E-03	2.286E-04	6.174E+03	2.153E+03	1.291E+03	1.291E+03
32	SF ESE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
32	SF ESE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.571E-03	2.291E-03	1.375E-03	2.286E-04	6.174E+03	2.153E+03	1.291E+03	1.291E+03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
33	Daniels Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
33	Daniels Ranch	2	5.421E-03	1.883E-03	1.131E-03	1.879E-04	5.093E+03	1.770E+03	1.061E+03	1.061E+03
33	Daniels Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
33	Daniels Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.421E-03	1.883E-03	1.131E-03	1.879E-04	5.093E+03	1.770E+03	1.061E+03	1.061E+03
34	Spencer Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
34	Spencer Ranch	2	6.126E-03	2.133E-03	1.280E-03	2.128E-04	5.756E+03	2.004E+03	1.202E+03	1.202E+03
34	Spencer Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
34	Spencer Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.126E-03	2.133E-03	1.280E-03	2.128E-04	5.756E+03	2.004E+03	1.202E+03	1.202E+03
35	BC Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
35	BC Ranch	2	4.235E-03	1.478E-03	8.866E-04	1.474E-04	3.980E+03	1.388E+03	8.322E+02	8.322E+02
35	BC Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
35	BC Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.235E-03	1.478E-03	8.866E-04	1.474E-04	3.980E+03	1.388E+03	8.322E+02	8.322E+02
36	Puttman Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
36	Puttman Ranch	2	1.675E-03	5.840E-04	3.505E-04	5.826E-05	1.574E+03	5.488E+02	3.290E+02	3.290E+02
36	Puttman Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
36	Puttman Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.675E-03	5.840E-04	3.505E-04	5.826E-05	1.574E+03	5.488E+02	3.290E+02	3.290E+02
37	Englebert Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
37	Englebert Ranch	2	3.672E-03	1.277E-03	7.672E-04	1.274E-04	3.450E+03	1.200E+03	7.201E+02	7.201E+02
37	Englebert Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
37	Englebert Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.672E-03	1.277E-03	7.672E-04	1.274E-04	3.450E+03	1.200E+03	7.201E+02	7.201E+02
38	Burdock School	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
38	Burdock School	2	3.359E-03	1.170E-03	7.023E-04	1.167E-04	3.156E+03	1.099E+03	6.593E+02	6.593E+02
38	Burdock School	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
38	Burdock School	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.359E-03	1.170E-03	7.023E-04	1.167E-04	3.156E+03	1.099E+03	6.593E+02	6.593E+02
39	Heck Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
39	Heck Ranch	2	2.292E-03	7.971E-04	4.788E-04	7.952E-05	2.153E+03	7.490E+02	4.494E+02	4.494E+02
39	Heck Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
39	Heck Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.292E-03	7.971E-04	4.788E-04	7.952E-05	2.153E+03	7.490E+02	4.494E+02	4.494E+02
40	Edgemont	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
40	Edgemont	2	5.689E-04	1.979E-04	1.188E-04	1.975E-05	5.345E+02	1.860E+02	1.116E+02	1.116E+02
40	Edgemont	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
40	Edgemont	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.689E-04	1.979E-04	1.188E-04	1.975E-05	5.345E+02	1.860E+02	1.116E+02	1.116E+02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

			AIRBORNE CONCENTRATIONS, PCI/M3				GROUND CONCENTRATIONS, PCI/M2			
NO.	NAME	PTSZ	U-238	Th-230	Ra-226	Pb-210	U-238	Th-230	Ra-226	Pb-210
41	Background	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
41	Background	2	1.215E-03	4.234E-04	2.541E-04	4.224E-05	1.141E+03	3.979E+02	2.386E+02	2.386E+02
41	Background	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
41	Background	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.215E-03	4.234E-04	2.541E-04	4.224E-05	1.141E+03	3.979E+02	2.386E+02	2.386E+02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

INDIVIDUAL RECEPTOR RADON AND RADON DAUGHTER CONCENTRATIONS

	AIRBORNE CONCENTRATIONS, PCI/M3								GROUND CONCENTRATIONS, PCI/M2			
NO.	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	Bi-210	Po-210	WL	Po-218	Pb-214	Bi-214	Pb-210
1	1.279E+01	1.277E+01	1.037E+01	8.044E+00	2.128E-05	6.198E-08	5.088E-12	9.570E-05	1.011E+01	1.011E+01	1.011E+01	9.022E+00
2	1.050E+01	1.050E+01	8.838E+00	7.092E+00	2.235E-05	8.076E-08	8.457E-12	8.207E-05	8.313E+00	8.313E+00	8.313E+00	9.475E+00
3	1.774E+01	1.761E+01	1.199E+01	7.841E+00	2.317E-05	9.676E-08	1.183E-11	1.082E-04	1.395E+01	1.395E+01	1.395E+01	9.823E+00
4	1.171E+01	1.168E+01	8.757E+00	6.270E+00	2.417E-05	1.309E-07	2.061E-11	7.982E-05	9.249E+00	9.249E+00	9.249E+00	1.025E+01
5	1.985E+01	1.935E+01	1.089E+01	6.586E+00	2.617E-05	1.551E-07	2.627E-11	9.971E-05	1.532E+01	1.532E+01	1.532E+01	1.110E+01
6	4.158E+01	3.988E+01	1.970E+01	1.020E+01	3.339E-05	2.030E-07	3.667E-11	1.790E-04	3.159E+01	3.159E+01	3.159E+01	1.416E+01
7	3.771E+01	3.759E+01	2.757E+01	1.876E+01	5.589E-05	2.778E-07	4.444E-11	2.485E-04	2.977E+01	2.977E+01	2.977E+01	2.370E+01
8	4.922E+01	4.840E+01	2.912E+01	1.671E+01	4.677E-05	2.554E-07	4.434E-11	2.598E-04	3.833E+01	3.833E+01	3.833E+01	1.983E+01
9	2.796E+01	2.791E+01	2.282E+01	1.763E+01	6.335E-05	3.136E-07	4.731E-11	2.102E-04	2.211E+01	2.211E+01	2.211E+01	2.686E+01
10	2.010E+01	2.010E+01	1.782E+01	1.522E+01	6.789E-05	3.418E-07	4.817E-11	1.678E-04	1.592E+01	1.592E+01	1.592E+01	2.878E+01
11	1.911E+01	1.910E+01	1.692E+01	1.456E+01	5.958E-05	2.574E-07	3.032E-11	1.598E-04	1.512E+01	1.512E+01	1.512E+01	2.526E+01
12	2.142E+01	2.108E+01	1.519E+01	1.133E+01	3.562E-05	1.268E-07	1.251E-11	1.409E-04	1.670E+01	1.670E+01	1.670E+01	1.510E+01
13	2.352E+01	2.332E+01	1.816E+01	1.401E+01	3.733E-05	1.071E-07	8.437E-12	1.683E-04	1.847E+01	1.847E+01	1.847E+01	1.583E+01
14	2.475E+01	2.450E+01	1.815E+01	1.313E+01	2.860E-05	6.902E-08	4.668E-12	1.662E-04	1.940E+01	1.940E+01	1.940E+01	1.213E+01
15	2.841E+01	2.761E+01	1.656E+01	9.609E+00	1.570E-05	3.589E-08	2.695E-12	1.482E-04	2.187E+01	2.187E+01	2.187E+01	6.657E+00
16	1.584E+01	1.569E+01	1.174E+01	8.515E+00	1.899E-05	4.766E-08	3.404E-12	1.074E-04	1.242E+01	1.242E+01	1.242E+01	8.049E+00
17	2.109E+01	2.067E+01	1.003E+01	4.668E+00	1.171E-05	6.336E-08	1.046E-11	8.957E-05	1.637E+01	1.637E+01	1.637E+01	4.965E+00
18	2.017E+01	1.982E+01	9.654E+00	4.445E+00	1.134E-05	6.001E-08	9.505E-12	8.594E-05	1.570E+01	1.570E+01	1.570E+01	4.806E+00
19	2.118E+01	2.077E+01	1.010E+01	4.720E+00	1.179E-05	5.779E-08	8.489E-12	9.022E-05	1.645E+01	1.645E+01	1.645E+01	4.998E+00
20	1.810E+01	1.780E+01	9.266E+00	4.881E+00	1.271E-05	5.396E-08	6.846E-12	8.352E-05	1.410E+01	1.410E+01	1.410E+01	5.387E+00
21	2.620E+01	2.490E+01	1.223E+01	6.224E+00	1.259E-05	4.187E-08	4.399E-12	1.109E-04	1.972E+01	1.972E+01	1.972E+01	5.339E+00
22	2.937E+01	2.932E+01	2.388E+01	1.818E+01	4.228E-05	1.075E-07	7.768E-12	2.191E-04	2.322E+01	2.322E+01	2.322E+01	1.793E+01
23	3.458E+01	3.415E+01	2.403E+01	1.595E+01	2.844E-05	6.041E-08	3.896E-12	2.165E-04	2.705E+01	2.705E+01	2.705E+01	1.206E+01
24	1.982E+01	1.982E+01	1.738E+01	1.437E+01	4.313E-05	1.393E-07	1.289E-11	1.621E-04	1.570E+01	1.570E+01	1.570E+01	1.828E+01
25	1.716E+01	1.715E+01	1.358E+01	9.642E+00	2.239E-05	7.637E-08	9.284E-12	1.225E-04	1.358E+01	1.358E+01	1.358E+01	9.493E+00
26	1.626E+01	1.615E+01	1.035E+01	6.095E+00	1.482E-05	6.873E-08	1.066E-11	9.184E-05	1.279E+01	1.279E+01	1.279E+01	6.285E+00
27	1.464E+01	1.409E+01	7.815E+00	4.407E+00	1.260E-05	6.663E-08	1.099E-11	7.058E-05	1.116E+01	1.116E+01	1.116E+01	5.343E+00
28	1.466E+01	1.362E+01	6.918E+00	3.894E+00	1.203E-05	6.672E-08	1.132E-11	6.363E-05	1.079E+01	1.079E+01	1.079E+01	5.100E+00
29	1.965E+01	1.597E+01	6.255E+00	3.248E+00	1.069E-05	5.957E-08	9.638E-12	6.028E-05	1.265E+01	1.265E+01	1.265E+01	4.532E+00
30	2.435E+01	1.782E+01	6.274E+00	3.144E+00	1.044E-05	5.810E-08	9.283E-12	6.189E-05	1.411E+01	1.411E+01	1.411E+01	4.425E+00
31	2.470E+01	2.198E+01	7.945E+00	3.565E+00	1.080E-05	6.063E-08	9.897E-12	7.622E-05	1.741E+01	1.741E+01	1.741E+01	4.580E+00
32	4.020E+01	3.868E+01	1.976E+01	9.736E+00	1.421E-05	3.506E-08	3.038E-12	1.763E-04	3.064E+01	3.064E+01	3.064E+01	6.023E+00
33	2.198E+01	2.153E+01	1.093E+01	6.370E+00	2.489E-05	1.377E-07	2.131E-11	1.013E-04	1.705E+01	1.705E+01	1.705E+01	1.055E+01
34	2.533E+01	2.501E+01	1.806E+01	1.272E+01	2.604E-05	5.987E-08	3.899E-12	1.648E-04	1.981E+01	1.981E+01	1.981E+01	1.104E+01
35	1.024E+01	1.000E+01	6.369E+00	4.098E+00	1.347E-05	7.748E-08	1.406E-11	5.788E-05	7.924E+00	7.924E+00	7.924E+00	5.711E+00
36	7.573E+00	7.573E+00	6.621E+00	5.521E+00	2.323E-05	1.340E-07	2.492E-11	6.196E-05	5.998E+00	5.998E+00	5.998E+00	9.847E+00
37	2.022E+01	2.022E+01	1.863E+01	1.664E+01	8.878E-05	5.541E-07	1.021E-10	1.773E-04	1.602E+01	1.602E+01	1.602E+01	3.764E+01
38	1.892E+01	1.890E+01	1.678E+01	1.448E+01	5.890E-05	2.511E-07	2.911E-11	1.586E-04	1.497E+01	1.497E+01	1.497E+01	2.497E+01
39	1.707E+01	1.708E+01	1.611E+01	1.499E+01	1.036E-04	7.856E-07	1.732E-10	1.552E-04	1.353E+01	1.353E+01	1.353E+01	4.393E+01
40	4.033E+00	4.035E+00	3.967E+00	3.873E+00	9.921E-05	2.362E-06	1.446E-09	3.872E-05	3.196E+00	3.196E+00	3.196E+00	4.206E+01
41	1.155E+01	1.155E+01	1.106E+01	1.042E+01	5.927E-05	3.173E-07	4.421E-11	1.069E-04	9.150E+00	9.150E+00	9.150E+00	2.513E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 1 NAME=CPP N X= 0.1KM, Y= 2.8KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.01E+01	2.05E+01	1.58E+02	5.64E-01	6.24E-01	0.00E+00
INFANT	GROUND	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
INFANT	CLOUD	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.02E+01	2.05E+01	1.58E+02	5.77E-01	6.37E-01	1.28E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.83E+00	1.77E+01	7.58E+01	2.36E-01	2.39E-01	0.00E+00
CHILD	GROUND	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
CHILD	CLOUD	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07
CHILD	VEG. ING	7.96E-02	1.04E+00	6.35E-02	6.35E-02	2.51E-01	0.00E+00
CHILD	MEAT ING	7.84E-03	1.08E-01	1.06E-02	1.06E-02	2.32E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.93E+00	1.89E+01	7.59E+01	3.23E-01	5.27E-01	1.28E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.49E+00	1.88E+01	3.95E+01	1.12E-01	1.31E-01	0.00E+00
TEENAGE	GROUND	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
TEENAGE	CLOUD	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07
TEENAGE	VEG. ING	1.32E-01	1.72E+00	1.05E-01	1.05E-01	4.16E-01	0.00E+00
TEENAGE	MEAT ING	1.27E-02	1.75E-01	1.72E-02	1.72E-02	3.77E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.64E+00	2.07E+01	3.96E+01	2.46E-01	5.98E-01	1.28E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.67E+00	1.82E+01	3.29E+01	9.37E-02	1.04E-01	0.00E+00
ADULT	GROUND	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02	1.28E-02
ADULT	CLOUD	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07	4.01E-07
ADULT	VEG. ING	1.82E-01	2.37E+00	1.45E-01	1.45E-01	5.74E-01	0.00E+00
ADULT	MEAT ING	2.22E-02	3.06E-01	3.01E-02	3.01E-02	6.59E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.88E+00	2.09E+01	3.31E+01	2.81E-01	7.57E-01	1.28E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 1 NAME=CPP N X= 0.1KM, Y= 2.8KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.11E+01	2.05E+01	1.58E+02	6.24E-01	6.47E-01	1.60E+01
INFANT	GROUND	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
INFANT	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.13E+01	2.07E+01	1.58E+02	8.56E-01	8.79E-01	1.62E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.08E+01	1.77E+01	7.58E+01	2.63E-01	2.50E-01	1.60E+01
CHILD	GROUND	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
CHILD	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
CHILD	VEG. ING	8.04E-02	1.05E+00	6.62E-02	6.62E-02	2.54E-01	0.00E+00
CHILD	MEAT ING	7.97E-03	1.09E-01	1.10E-02	1.10E-02	2.36E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+01	1.91E+01	7.61E+01	5.72E-01	7.59E-01	1.62E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.45E+00	1.88E+01	3.95E+01	1.23E-01	1.37E-01	1.60E+01
TEENAGE	GROUND	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
TEENAGE	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
TEENAGE	VEG. ING	1.33E-01	1.73E+00	1.09E-01	1.09E-01	4.20E-01	0.00E+00
TEENAGE	MEAT ING	1.29E-02	1.77E-01	1.79E-02	1.79E-02	3.83E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.83E+00	2.10E+01	3.99E+01	4.82E-01	8.26E-01	1.62E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.63E+00	1.82E+01	3.29E+01	1.03E-01	1.09E-01	1.60E+01
ADULT	GROUND	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
ADULT	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
ADULT	VEG. ING	1.84E-01	2.39E+00	1.51E-01	1.51E-01	5.79E-01	0.00E+00
ADULT	MEAT ING	2.26E-02	3.10E-01	3.13E-02	3.13E-02	6.69E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.07E+00	2.12E+01	3.33E+01	5.17E-01	9.87E-01	1.62E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 2 NAME=CPP NNE X= 1.3KM, Y= 2.8KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.39E+01	1.42E+01	1.09E+02	3.90E-01	4.31E-01	0.00E+00
INFANT	GROUND	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03
INFANT	CLOUD	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.39E+01	1.42E+01	1.09E+02	3.99E-01	4.40E-01	8.83E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.79E+00	1.22E+01	5.24E+01	1.63E-01	1.65E-01	0.00E+00
CHILD	GROUND	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03
CHILD	CLOUD	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07
CHILD	VEG. ING	5.50E-02	7.18E-01	4.39E-02	4.39E-02	1.74E-01	0.00E+00
CHILD	MEAT ING	5.42E-03	7.45E-02	7.33E-03	7.33E-03	1.60E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	6.86E+00	1.30E+01	5.24E+01	2.23E-01	3.64E-01	8.83E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.79E+00	1.30E+01	2.73E+01	7.71E-02	9.05E-02	0.00E+00
TEENAGE	GROUND	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03
TEENAGE	CLOUD	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07
TEENAGE	VEG. ING	9.10E-02	1.19E+00	7.24E-02	7.24E-02	2.87E-01	0.00E+00
TEENAGE	MEAT ING	8.79E-03	1.21E-01	1.19E-02	1.19E-02	2.60E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.90E+00	1.43E+01	2.74E+01	1.70E-01	4.13E-01	8.83E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.22E+00	1.26E+01	2.27E+01	6.47E-02	7.18E-02	0.00E+00
ADULT	GROUND	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03	8.83E-03
ADULT	CLOUD	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07	2.77E-07
ADULT	VEG. ING	1.26E-01	1.64E+00	9.99E-02	9.99E-02	3.97E-01	0.00E+00
ADULT	MEAT ING	1.54E-02	2.11E-01	2.08E-02	2.08E-02	4.55E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.37E+00	1.44E+01	2.28E+01	1.94E-01	5.23E-01	8.83E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 2 NAME=CPP NNE X= 1.3KM, Y= 2.8KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.47E+01	1.42E+01	1.09E+02	4.52E-01	4.55E-01	1.31E+01
INFANT	GROUND	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02
INFANT	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.49E+01	1.43E+01	1.09E+02	6.30E-01	6.33E-01	1.33E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	7.58E+00	1.22E+01	5.24E+01	1.91E-01	1.77E-01	1.31E+01
CHILD	GROUND	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02
CHILD	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
CHILD	VEG. ING	5.58E-02	7.27E-01	4.67E-02	4.67E-02	1.76E-01	0.00E+00
CHILD	MEAT ING	5.55E-03	7.60E-02	7.78E-03	7.78E-03	1.64E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	7.82E+00	1.32E+01	5.26E+01	4.23E-01	5.47E-01	1.33E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.58E+00	1.30E+01	2.73E+01	8.90E-02	9.63E-02	1.31E+01
TEENAGE	GROUND	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02
TEENAGE	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
TEENAGE	VEG. ING	9.23E-02	1.20E+00	7.70E-02	7.70E-02	2.91E-01	0.00E+00
TEENAGE	MEAT ING	9.00E-03	1.23E-01	1.26E-02	1.26E-02	2.66E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.86E+00	1.45E+01	2.76E+01	3.56E-01	5.91E-01	1.33E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.01E+00	1.26E+01	2.27E+01	7.47E-02	7.66E-02	1.31E+01
ADULT	GROUND	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02	9.74E-02
ADULT	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
ADULT	VEG. ING	1.27E-01	1.66E+00	1.06E-01	1.06E-01	4.02E-01	0.00E+00
ADULT	MEAT ING	1.57E-02	2.16E-01	2.21E-02	2.21E-02	4.65E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.33E+00	1.47E+01	2.30E+01	3.81E-01	7.03E-01	1.33E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 3 NAME=CPP NE X= 1.3KM, Y= 1.2KM, Z= 0.0M, DIST= 1.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.63E+01	3.69E+01	2.85E+02	1.02E+00	1.12E+00	0.00E+00
INFANT	GROUND	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02
INFANT	CLOUD	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.64E+01	3.69E+01	2.85E+02	1.04E+00	1.15E+00	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.77E+01	3.19E+01	1.37E+02	4.26E-01	4.31E-01	0.00E+00
CHILD	GROUND	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02
CHILD	CLOUD	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07
CHILD	VEG. ING	1.44E-01	1.87E+00	1.14E-01	1.14E-01	4.53E-01	0.00E+00
CHILD	MEAT ING	1.41E-02	1.94E-01	1.91E-02	1.91E-02	4.19E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.79E+01	3.40E+01	1.37E+02	5.82E-01	9.50E-01	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.89E+00	3.38E+01	7.12E+01	2.01E-01	2.36E-01	0.00E+00
TEENAGE	GROUND	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02
TEENAGE	CLOUD	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07
TEENAGE	VEG. ING	2.37E-01	3.10E+00	1.89E-01	1.89E-01	7.50E-01	0.00E+00
TEENAGE	MEAT ING	2.29E-02	3.16E-01	3.10E-02	3.10E-02	6.79E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.02E+01	3.73E+01	7.15E+01	4.44E-01	1.08E+00	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.41E+00	3.28E+01	5.93E+01	1.69E-01	1.87E-01	0.00E+00
ADULT	GROUND	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02	2.30E-02
ADULT	CLOUD	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07	7.22E-07
ADULT	VEG. ING	3.28E-01	4.28E+00	2.61E-01	2.61E-01	1.04E+00	0.00E+00
ADULT	MEAT ING	4.01E-02	5.52E-01	5.42E-02	5.42E-02	1.19E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.80E+00	3.77E+01	5.96E+01	5.07E-01	1.36E+00	2.31E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 3 NAME=CPP NE X= 1.3KM, Y= 1.2KM, Z= 0.0M, DIST= 1.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.77E+01	3.69E+01	2.85E+02	1.08E+00	1.15E+00	2.22E+01
INFANT	GROUND	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01
INFANT	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.80E+01	3.73E+01	2.85E+02	1.43E+00	1.49E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.91E+01	3.19E+01	1.37E+02	4.55E-01	4.43E-01	2.22E+01
CHILD	GROUND	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01
CHILD	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
CHILD	VEG. ING	1.44E-01	1.88E+00	1.17E-01	1.17E-01	4.56E-01	0.00E+00
CHILD	MEAT ING	1.43E-02	1.96E-01	1.96E-02	1.96E-02	4.22E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.96E+01	3.43E+01	1.37E+02	9.36E-01	1.29E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.12E+01	3.39E+01	7.12E+01	2.13E-01	2.42E-01	2.22E+01
TEENAGE	GROUND	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01
TEENAGE	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
TEENAGE	VEG. ING	2.39E-01	3.11E+00	1.94E-01	1.94E-01	7.54E-01	0.00E+00
TEENAGE	MEAT ING	2.32E-02	3.18E-01	3.18E-02	3.18E-02	6.86E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.18E+01	3.76E+01	7.18E+01	7.83E-01	1.41E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.75E+00	3.28E+01	5.93E+01	1.79E-01	1.92E-01	2.22E+01
ADULT	GROUND	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01	2.53E-01
ADULT	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
ADULT	VEG. ING	3.30E-01	4.30E+00	2.67E-01	2.67E-01	1.04E+00	0.00E+00
ADULT	MEAT ING	4.05E-02	5.56E-01	5.56E-02	5.56E-02	1.20E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.05E+01	3.80E+01	5.99E+01	8.46E-01	1.70E+00	2.25E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 4 NAME=CPP ENE X= 2.9KM, Y= 1.1KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.64E+01	1.67E+01	1.29E+02	4.60E-01	5.09E-01	0.00E+00
INFANT	GROUND	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02
INFANT	CLOUD	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.64E+01	1.67E+01	1.29E+02	4.71E-01	5.19E-01	1.04E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.02E+00	1.44E+01	6.18E+01	1.93E-01	1.95E-01	0.00E+00
CHILD	GROUND	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02
CHILD	CLOUD	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07
CHILD	VEG. ING	6.49E-02	8.47E-01	5.18E-02	5.18E-02	2.05E-01	0.00E+00
CHILD	MEAT ING	6.39E-03	8.80E-02	8.65E-03	8.65E-03	1.89E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	8.10E+00	1.54E+01	6.19E+01	2.64E-01	4.30E-01	1.04E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.47E+00	1.53E+01	3.22E+01	9.10E-02	1.07E-01	0.00E+00
TEENAGE	GROUND	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02
TEENAGE	CLOUD	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07
TEENAGE	VEG. ING	1.07E-01	1.40E+00	8.54E-02	8.54E-02	3.39E-01	0.00E+00
TEENAGE	MEAT ING	1.04E-02	1.43E-01	1.40E-02	1.40E-02	3.07E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.60E+00	1.69E+01	3.23E+01	2.01E-01	4.87E-01	1.04E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.81E+00	1.49E+01	2.68E+01	7.64E-02	8.48E-02	0.00E+00
ADULT	GROUND	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02
ADULT	CLOUD	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07	3.27E-07
ADULT	VEG. ING	1.48E-01	1.93E+00	1.18E-01	1.18E-01	4.68E-01	0.00E+00
ADULT	MEAT ING	1.81E-02	2.50E-01	2.45E-02	2.45E-02	5.37E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.98E+00	1.71E+01	2.70E+01	2.29E-01	6.17E-01	1.04E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 4 NAME=CPP ENE X= 2.9KM, Y= 1.1KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.73E+01	1.67E+01	1.29E+02	5.28E-01	5.35E-01	1.46E+01
INFANT	GROUND	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
INFANT	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.75E+01	1.69E+01	1.29E+02	7.15E-01	7.22E-01	1.48E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.90E+00	1.44E+01	6.18E+01	2.23E-01	2.08E-01	1.46E+01
CHILD	GROUND	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
CHILD	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
CHILD	VEG. ING	6.58E-02	8.58E-01	5.48E-02	5.48E-02	2.08E-01	0.00E+00
CHILD	MEAT ING	6.54E-03	8.96E-02	9.14E-03	9.14E-03	1.93E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.16E+00	1.56E+01	6.21E+01	4.74E-01	6.21E-01	1.48E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.35E+00	1.53E+01	3.22E+01	1.04E-01	1.13E-01	1.46E+01
TEENAGE	GROUND	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
TEENAGE	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
TEENAGE	VEG. ING	1.09E-01	1.42E+00	9.04E-02	9.04E-02	3.43E-01	0.00E+00
TEENAGE	MEAT ING	1.06E-02	1.45E-01	1.48E-02	1.48E-02	3.14E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.66E+00	1.71E+01	3.25E+01	3.96E-01	6.75E-01	1.48E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.69E+00	1.49E+01	2.68E+01	8.71E-02	9.00E-02	1.46E+01
ADULT	GROUND	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
ADULT	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
ADULT	VEG. ING	1.50E-01	1.96E+00	1.25E-01	1.25E-01	4.74E-01	0.00E+00
ADULT	MEAT ING	1.85E-02	2.54E-01	2.59E-02	2.59E-02	5.48E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.04E+00	1.73E+01	2.71E+01	4.25E-01	8.06E-01	1.48E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 5 NAME=CPP E X= 2.8KM, Y= -0.1KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.34E+01	2.38E+01	1.83E+02	6.54E-01	7.24E-01	0.00E+00
INFANT	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
INFANT	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.34E+01	2.38E+01	1.83E+02	6.69E-01	7.39E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.14E+01	2.05E+01	8.80E+01	2.74E-01	2.78E-01	0.00E+00
CHILD	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
CHILD	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
CHILD	VEG. ING	9.24E-02	1.21E+00	7.36E-02	7.36E-02	2.92E-01	0.00E+00
CHILD	MEAT ING	9.10E-03	1.25E-01	1.23E-02	1.23E-02	2.69E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.15E+01	2.19E+01	8.81E+01	3.75E-01	6.11E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.36E+00	2.18E+01	4.58E+01	1.29E-01	1.52E-01	0.00E+00
TEENAGE	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
TEENAGE	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
TEENAGE	VEG. ING	1.53E-01	1.99E+00	1.21E-01	1.21E-01	4.83E-01	0.00E+00
TEENAGE	MEAT ING	1.48E-02	2.03E-01	2.00E-02	2.00E-02	4.37E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.55E+00	2.40E+01	4.60E+01	2.86E-01	6.93E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.41E+00	2.11E+01	3.81E+01	1.09E-01	1.21E-01	0.00E+00
ADULT	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
ADULT	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
ADULT	VEG. ING	2.11E-01	2.75E+00	1.68E-01	1.68E-01	6.66E-01	0.00E+00
ADULT	MEAT ING	2.58E-02	3.55E-01	3.49E-02	3.49E-02	7.64E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.67E+00	2.43E+01	3.84E+01	3.26E-01	8.78E-01	1.48E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 5 NAME=CPP E X= 2.8KM, Y= -0.1KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.49E+01	2.38E+01	1.83E+02	7.28E-01	7.52E-01	2.48E+01
INFANT	GROUND	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01
INFANT	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.51E+01	2.40E+01	1.83E+02	9.69E-01	9.94E-01	2.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.29E+01	2.05E+01	8.80E+01	3.07E-01	2.91E-01	2.48E+01
CHILD	GROUND	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01
CHILD	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
CHILD	VEG. ING	9.33E-02	1.22E+00	7.69E-02	7.69E-02	2.94E-01	0.00E+00
CHILD	MEAT ING	9.25E-03	1.27E-01	1.28E-02	1.28E-02	2.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.32E+01	2.21E+01	8.83E+01	6.38E-01	8.55E-01	2.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.86E+00	2.18E+01	4.58E+01	1.43E-01	1.59E-01	2.48E+01
TEENAGE	GROUND	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01
TEENAGE	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
TEENAGE	VEG. ING	1.54E-01	2.01E+00	1.27E-01	1.27E-01	4.87E-01	0.00E+00
TEENAGE	MEAT ING	1.50E-02	2.06E-01	2.08E-02	2.08E-02	4.44E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.27E+00	2.43E+01	4.62E+01	5.33E-01	9.32E-01	2.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.90E+00	2.11E+01	3.81E+01	1.20E-01	1.26E-01	2.48E+01
ADULT	GROUND	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01
ADULT	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
ADULT	VEG. ING	2.13E-01	2.78E+00	1.75E-01	1.75E-01	6.73E-01	0.00E+00
ADULT	MEAT ING	2.62E-02	3.60E-01	3.64E-02	3.64E-02	7.76E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.39E+00	2.45E+01	3.86E+01	5.74E-01	1.12E+00	2.51E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 6 NAME=CPP ESE X= 2.8KM, Y= -1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.34E+01	2.38E+01	1.83E+02	6.55E-01	7.24E-01	0.00E+00
INFANT	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
INFANT	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.34E+01	2.38E+01	1.83E+02	6.70E-01	7.39E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.14E+01	2.05E+01	8.80E+01	2.74E-01	2.78E-01	0.00E+00
CHILD	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
CHILD	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
CHILD	VEG. ING	9.24E-02	1.21E+00	7.37E-02	7.37E-02	2.92E-01	0.00E+00
CHILD	MEAT ING	9.10E-03	1.25E-01	1.23E-02	1.23E-02	2.70E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.15E+01	2.19E+01	8.81E+01	3.75E-01	6.12E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.37E+00	2.18E+01	4.59E+01	1.29E-01	1.52E-01	0.00E+00
TEENAGE	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
TEENAGE	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
TEENAGE	VEG. ING	1.53E-01	2.00E+00	1.22E-01	1.22E-01	4.83E-01	0.00E+00
TEENAGE	MEAT ING	1.48E-02	2.03E-01	2.00E-02	2.00E-02	4.37E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.55E+00	2.40E+01	4.60E+01	2.86E-01	6.94E-01	1.48E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.42E+00	2.11E+01	3.82E+01	1.09E-01	1.21E-01	0.00E+00
ADULT	GROUND	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02	1.48E-02
ADULT	CLOUD	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07	4.65E-07
ADULT	VEG. ING	2.11E-01	2.75E+00	1.68E-01	1.68E-01	6.67E-01	0.00E+00
ADULT	MEAT ING	2.58E-02	3.55E-01	3.49E-02	3.49E-02	7.65E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.67E+00	2.43E+01	3.84E+01	3.26E-01	8.79E-01	1.48E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 6 NAME=CPP ESE X= 2.8KM, Y= -1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.65E+01	2.38E+01	1.83E+02	7.48E-01	7.61E-01	5.20E+01
INFANT	GROUND	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
INFANT	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.68E+01	2.41E+01	1.84E+02	1.04E+00	1.05E+00	5.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.45E+01	2.05E+01	8.80E+01	3.16E-01	2.95E-01	5.20E+01
CHILD	GROUND	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
CHILD	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
CHILD	VEG. ING	9.37E-02	1.22E+00	7.79E-02	7.79E-02	2.95E-01	0.00E+00
CHILD	MEAT ING	9.30E-03	1.27E-01	1.30E-02	1.30E-02	2.75E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.49E+01	2.22E+01	8.84E+01	6.98E-01	9.09E-01	5.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.49E+00	2.18E+01	4.59E+01	1.47E-01	1.61E-01	5.20E+01
TEENAGE	GROUND	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
TEENAGE	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
TEENAGE	VEG. ING	1.55E-01	2.02E+00	1.29E-01	1.29E-01	4.89E-01	0.00E+00
TEENAGE	MEAT ING	1.51E-02	2.07E-01	2.11E-02	2.11E-02	4.46E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.95E+00	2.44E+01	4.63E+01	5.88E-01	9.86E-01	5.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.54E+00	2.12E+01	3.82E+01	1.24E-01	1.28E-01	5.20E+01
ADULT	GROUND	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01	1.67E-01
ADULT	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
ADULT	VEG. ING	2.14E-01	2.79E+00	1.77E-01	1.77E-01	6.75E-01	0.00E+00
ADULT	MEAT ING	2.64E-02	3.62E-01	3.68E-02	3.68E-02	7.80E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.07E+00	2.46E+01	3.87E+01	6.29E-01	1.17E+00	5.23E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 7 NAME=CPP SSE X= 1.0KM, Y= -2.5KM, Z= 0.0M, DIST= 2.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	4.13E+01	4.20E+01	3.24E+02	1.16E+00	1.28E+00	0.00E+00
INFANT	GROUND	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02
INFANT	CLOUD	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.13E+01	4.20E+01	3.24E+02	1.18E+00	1.31E+00	2.62E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.01E+01	3.63E+01	1.55E+02	4.84E-01	4.91E-01	0.00E+00
CHILD	GROUND	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02
CHILD	CLOUD	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07
CHILD	VEG. ING	1.63E-01	2.13E+00	1.30E-01	1.30E-01	5.15E-01	0.00E+00
CHILD	MEAT ING	1.61E-02	2.21E-01	2.18E-02	2.18E-02	4.76E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.04E+01	3.86E+01	1.56E+02	6.62E-01	1.08E+00	2.62E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.12E+01	3.85E+01	8.10E+01	2.29E-01	2.69E-01	0.00E+00
TEENAGE	GROUND	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02
TEENAGE	CLOUD	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07
TEENAGE	VEG. ING	2.70E-01	3.52E+00	2.15E-01	2.15E-01	8.53E-01	0.00E+00
TEENAGE	MEAT ING	2.61E-02	3.59E-01	3.53E-02	3.53E-02	7.72E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.16E+01	4.24E+01	8.13E+01	5.05E-01	1.22E+00	2.62E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.56E+00	3.73E+01	6.74E+01	1.92E-01	2.13E-01	0.00E+00
ADULT	GROUND	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02	2.62E-02
ADULT	CLOUD	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07	8.21E-07
ADULT	VEG. ING	3.73E-01	4.86E+00	2.96E-01	2.96E-01	1.18E+00	0.00E+00
ADULT	MEAT ING	4.56E-02	6.28E-01	6.17E-02	6.17E-02	1.35E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.00E+01	4.29E+01	6.78E+01	5.76E-01	1.55E+00	2.62E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 7 NAME=CPP SSE X= 1.0KM, Y= -2.5KM, Z= 0.0M, DIST= 2.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	4.41E+01	4.20E+01	3.24E+02	1.31E+00	1.34E+00	4.71E+01
INFANT	GROUND	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
INFANT	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.46E+01	4.25E+01	3.24E+02	1.82E+00	1.85E+00	4.76E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.30E+01	3.63E+01	1.55E+02	5.54E-01	5.19E-01	4.71E+01
CHILD	GROUND	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
CHILD	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
CHILD	VEG. ING	1.65E-01	2.15E+00	1.37E-01	1.37E-01	5.21E-01	0.00E+00
CHILD	MEAT ING	1.64E-02	2.25E-01	2.29E-02	2.29E-02	4.85E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.37E+01	3.92E+01	1.56E+02	1.22E+00	1.60E+00	4.76E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.41E+01	3.86E+01	8.10E+01	2.58E-01	2.83E-01	4.71E+01
TEENAGE	GROUND	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
TEENAGE	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
TEENAGE	VEG. ING	2.73E-01	3.56E+00	2.26E-01	2.26E-01	8.62E-01	0.00E+00
TEENAGE	MEAT ING	2.66E-02	3.65E-01	3.71E-02	3.71E-02	7.87E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.49E+01	4.30E+01	8.17E+01	1.03E+00	1.73E+00	4.76E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.24E+01	3.74E+01	6.74E+01	2.17E-01	2.25E-01	4.71E+01
ADULT	GROUND	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
ADULT	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
ADULT	VEG. ING	3.77E-01	4.92E+00	3.13E-01	3.13E-01	1.19E+00	0.00E+00
ADULT	MEAT ING	4.65E-02	6.38E-01	6.49E-02	6.49E-02	1.38E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.33E+01	4.34E+01	6.83E+01	1.10E+00	2.06E+00	4.76E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 8 NAME=CPP SE X= 2.0KM, Y= -2.1KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.75E+01	2.80E+01	2.16E+02	7.71E-01	8.52E-01	0.00E+00
INFANT	GROUND	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02
INFANT	CLOUD	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.75E+01	2.80E+01	2.16E+02	7.88E-01	8.70E-01	1.75E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.34E+01	2.42E+01	1.04E+02	3.23E-01	3.27E-01	0.00E+00
CHILD	GROUND	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02
CHILD	CLOUD	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07
CHILD	VEG. ING	1.09E-01	1.42E+00	8.67E-02	8.67E-02	3.44E-01	0.00E+00
CHILD	MEAT ING	1.07E-02	1.47E-01	1.45E-02	1.45E-02	3.17E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.36E+01	2.57E+01	1.04E+02	4.41E-01	7.20E-01	1.75E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.49E+00	2.57E+01	5.40E+01	1.52E-01	1.79E-01	0.00E+00
TEENAGE	GROUND	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02
TEENAGE	CLOUD	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07
TEENAGE	VEG. ING	1.80E-01	2.35E+00	1.43E-01	1.43E-01	5.68E-01	0.00E+00
TEENAGE	MEAT ING	1.74E-02	2.39E-01	2.35E-02	2.35E-02	5.15E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.71E+00	2.83E+01	5.41E+01	3.36E-01	8.16E-01	1.75E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.37E+00	2.49E+01	4.49E+01	1.28E-01	1.42E-01	0.00E+00
ADULT	GROUND	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02	1.75E-02
ADULT	CLOUD	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07	5.47E-07
ADULT	VEG. ING	2.48E-01	3.24E+00	1.98E-01	1.98E-01	7.85E-01	0.00E+00
ADULT	MEAT ING	3.04E-02	4.18E-01	4.11E-02	4.11E-02	9.00E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.67E+00	2.86E+01	4.52E+01	3.84E-01	1.03E+00	1.75E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 8 NAME=CPP SE X= 2.0KM, Y= -2.1KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.12E+01	2.80E+01	2.16E+02	9.02E-01	9.03E-01	6.15E+01
INFANT	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
INFANT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.16E+01	2.84E+01	2.16E+02	1.30E+00	1.30E+00	6.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.71E+01	2.42E+01	1.04E+02	3.81E-01	3.51E-01	6.15E+01
CHILD	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
CHILD	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
CHILD	VEG. ING	1.10E-01	1.44E+00	9.26E-02	9.26E-02	3.48E-01	0.00E+00
CHILD	MEAT ING	1.10E-02	1.51E-01	1.54E-02	1.54E-02	3.25E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.76E+01	2.62E+01	1.04E+02	8.86E-01	1.13E+00	6.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.12E+01	2.57E+01	5.40E+01	1.77E-01	1.91E-01	6.15E+01
TEENAGE	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
TEENAGE	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
TEENAGE	VEG. ING	1.83E-01	2.38E+00	1.53E-01	1.53E-01	5.76E-01	0.00E+00
TEENAGE	MEAT ING	1.78E-02	2.44E-01	2.50E-02	2.50E-02	5.27E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.18E+01	2.87E+01	5.45E+01	7.52E-01	1.22E+00	6.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.01E+01	2.49E+01	4.49E+01	1.49E-01	1.52E-01	6.15E+01
ADULT	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
ADULT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
ADULT	VEG. ING	2.52E-01	3.29E+00	2.11E-01	2.11E-01	7.96E-01	0.00E+00
ADULT	MEAT ING	3.12E-02	4.27E-01	4.38E-02	4.38E-02	9.21E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.07E+01	2.90E+01	4.56E+01	8.00E-01	1.44E+00	6.19E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 9 NAME=CPP S X= -0.1KM, Y= -2.9KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.15E+01	9.30E+01	7.17E+02	2.56E+00	2.83E+00	0.00E+00
INFANT	GROUND	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02
INFANT	CLOUD	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	9.15E+01	9.30E+01	7.17E+02	2.62E+00	2.89E+00	5.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.46E+01	8.03E+01	3.44E+02	1.07E+00	1.09E+00	0.00E+00
CHILD	GROUND	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02
CHILD	CLOUD	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06
CHILD	VEG. ING	3.62E-01	4.72E+00	2.88E-01	2.88E-01	1.14E+00	0.00E+00
CHILD	MEAT ING	3.56E-02	4.90E-01	4.82E-02	4.82E-02	1.05E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.51E+01	8.55E+01	3.45E+02	1.47E+00	2.39E+00	5.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.49E+01	8.52E+01	1.79E+02	5.06E-01	5.95E-01	0.00E+00
TEENAGE	GROUND	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02
TEENAGE	CLOUD	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06
TEENAGE	VEG. ING	5.98E-01	7.80E+00	4.75E-01	4.75E-01	1.89E+00	0.00E+00
TEENAGE	MEAT ING	5.78E-02	7.95E-01	7.82E-02	7.82E-02	1.71E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.56E+01	9.39E+01	1.80E+02	1.12E+00	2.71E+00	5.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.12E+01	8.27E+01	1.49E+02	4.25E-01	4.72E-01	0.00E+00
ADULT	GROUND	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02	5.80E-02
ADULT	CLOUD	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06	1.82E-06
ADULT	VEG. ING	8.25E-01	1.08E+01	6.56E-01	6.56E-01	2.61E+00	0.00E+00
ADULT	MEAT ING	1.01E-01	1.39E+00	1.37E-01	1.37E-01	2.99E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.22E+01	9.49E+01	1.50E+02	1.28E+00	3.44E+00	5.80E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 9 NAME=CPP S X= -0.1KM, Y= -2.9KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.36E+01	9.30E+01	7.17E+02	2.74E+00	2.90E+00	3.50E+01
INFANT	GROUND	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01
INFANT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	9.44E+01	9.38E+01	7.17E+02	3.57E+00	3.74E+00	3.58E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.67E+01	8.03E+01	3.44E+02	1.15E+00	1.12E+00	3.50E+01
CHILD	GROUND	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01
CHILD	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
CHILD	VEG. ING	3.64E-01	4.75E+00	2.96E-01	2.96E-01	1.15E+00	0.00E+00
CHILD	MEAT ING	3.60E-02	4.94E-01	4.94E-02	4.94E-02	1.06E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.80E+01	8.64E+01	3.45E+02	2.33E+00	3.21E+00	3.58E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.70E+01	8.53E+01	1.79E+02	5.40E-01	6.11E-01	3.50E+01
TEENAGE	GROUND	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01
TEENAGE	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
TEENAGE	VEG. ING	6.02E-01	7.85E+00	4.89E-01	4.89E-01	1.90E+00	0.00E+00
TEENAGE	MEAT ING	5.84E-02	8.02E-01	8.02E-02	8.02E-02	1.73E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.85E+01	9.48E+01	1.81E+02	1.94E+00	3.52E+00	3.58E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.33E+01	8.27E+01	1.49E+02	4.53E-01	4.86E-01	3.50E+01
ADULT	GROUND	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01	6.35E-01
ADULT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
ADULT	VEG. ING	8.31E-01	1.08E+01	6.75E-01	6.75E-01	2.62E+00	0.00E+00
ADULT	MEAT ING	1.02E-01	1.40E+00	1.40E-01	1.40E-01	3.02E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.51E+01	9.58E+01	1.51E+02	2.10E+00	4.24E+00	3.58E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 10 NAME=CPP SSW X= -1.3KM, Y= -2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.80E+01	2.84E+01	2.19E+02	7.83E-01	8.66E-01	0.00E+00
INFANT	GROUND	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02
INFANT	CLOUD	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.80E+01	2.84E+01	2.19E+02	8.01E-01	8.83E-01	1.77E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.36E+01	2.45E+01	1.05E+02	3.28E-01	3.32E-01	0.00E+00
CHILD	GROUND	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02
CHILD	CLOUD	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07
CHILD	VEG. ING	1.11E-01	1.44E+00	8.81E-02	8.81E-02	3.49E-01	0.00E+00
CHILD	MEAT ING	1.09E-02	1.50E-01	1.47E-02	1.47E-02	3.22E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.38E+01	2.62E+01	1.05E+02	4.49E-01	7.31E-01	1.77E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.61E+00	2.61E+01	5.48E+01	1.55E-01	1.82E-01	0.00E+00
TEENAGE	GROUND	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02
TEENAGE	CLOUD	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07
TEENAGE	VEG. ING	1.83E-01	2.39E+00	1.45E-01	1.45E-01	5.77E-01	0.00E+00
TEENAGE	MEAT ING	1.77E-02	2.43E-01	2.39E-02	2.39E-02	5.23E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.83E+00	2.87E+01	5.50E+01	3.42E-01	8.29E-01	1.77E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.47E+00	2.53E+01	4.56E+01	1.30E-01	1.44E-01	0.00E+00
ADULT	GROUND	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02	1.77E-02
ADULT	CLOUD	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07
ADULT	VEG. ING	2.52E-01	3.29E+00	2.01E-01	2.01E-01	7.97E-01	0.00E+00
ADULT	MEAT ING	3.09E-02	4.25E-01	4.18E-02	4.18E-02	9.14E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.77E+00	2.90E+01	4.59E+01	3.90E-01	1.05E+00	1.77E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 10 NAME=CPP SSW X= -1.3KM, Y= -2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.95E+01	2.85E+01	2.19E+02	9.73E-01	9.40E-01	2.51E+01
INFANT	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
INFANT	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.98E+01	2.88E+01	2.19E+02	1.34E+00	1.31E+00	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.51E+01	2.46E+01	1.05E+02	4.12E-01	3.67E-01	2.51E+01
CHILD	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
CHILD	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
CHILD	VEG. ING	1.13E-01	1.47E+00	9.67E-02	9.67E-02	3.56E-01	0.00E+00
CHILD	MEAT ING	1.13E-02	1.54E-01	1.61E-02	1.61E-02	3.33E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.56E+01	2.66E+01	1.06E+02	8.91E-01	1.12E+00	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.12E+00	2.61E+01	5.48E+01	1.91E-01	1.99E-01	2.51E+01
TEENAGE	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
TEENAGE	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
TEENAGE	VEG. ING	1.87E-01	2.43E+00	1.59E-01	1.59E-01	5.89E-01	0.00E+00
TEENAGE	MEAT ING	1.83E-02	2.50E-01	2.61E-02	2.61E-02	5.41E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.70E+00	2.92E+01	5.54E+01	7.43E-01	1.21E+00	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.99E+00	2.53E+01	4.56E+01	1.60E-01	1.59E-01	2.51E+01
ADULT	GROUND	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
ADULT	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
ADULT	VEG. ING	2.58E-01	3.36E+00	2.20E-01	2.20E-01	8.13E-01	0.00E+00
ADULT	MEAT ING	3.20E-02	4.38E-01	4.56E-02	4.56E-02	9.45E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.64E+00	2.95E+01	4.62E+01	7.92E-01	1.43E+00	2.55E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 11 NAME=CPP SW X= -2.1KM, Y= -2.0KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.99E+01	2.02E+01	1.56E+02	5.57E-01	6.15E-01	0.00E+00
INFANT	GROUND	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
INFANT	CLOUD	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.99E+01	2.02E+01	1.56E+02	5.69E-01	6.28E-01	1.26E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.69E+00	1.75E+01	7.47E+01	2.33E-01	2.36E-01	0.00E+00
CHILD	GROUND	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
CHILD	CLOUD	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07
CHILD	VEG. ING	7.85E-02	1.03E+00	6.27E-02	6.27E-02	2.48E-01	0.00E+00
CHILD	MEAT ING	7.74E-03	1.06E-01	1.05E-02	1.05E-02	2.29E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.79E+00	1.86E+01	7.48E+01	3.19E-01	5.19E-01	1.26E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.41E+00	1.85E+01	3.89E+01	1.10E-01	1.29E-01	0.00E+00
TEENAGE	GROUND	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
TEENAGE	CLOUD	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07
TEENAGE	VEG. ING	1.30E-01	1.70E+00	1.03E-01	1.03E-01	4.10E-01	0.00E+00
TEENAGE	MEAT ING	1.26E-02	1.73E-01	1.70E-02	1.70E-02	3.72E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.56E+00	2.04E+01	3.91E+01	2.43E-01	5.89E-01	1.26E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.60E+00	1.80E+01	3.24E+01	9.24E-02	1.03E-01	0.00E+00
ADULT	GROUND	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
ADULT	CLOUD	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07	3.95E-07
ADULT	VEG. ING	1.79E-01	2.34E+00	1.43E-01	1.43E-01	5.66E-01	0.00E+00
ADULT	MEAT ING	2.19E-02	3.02E-01	2.97E-02	2.97E-02	6.49E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.81E+00	2.06E+01	3.26E+01	2.77E-01	7.46E-01	1.26E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 11 NAME=CPP SW X= -2.1KM, Y= -2.0KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.13E+01	2.02E+01	1.56E+02	7.24E-01	6.80E-01	2.39E+01
INFANT	GROUND	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
INFANT	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.16E+01	2.05E+01	1.56E+02	1.03E+00	9.83E-01	2.42E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.11E+01	1.75E+01	7.47E+01	3.07E-01	2.67E-01	2.39E+01
CHILD	GROUND	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
CHILD	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
CHILD	VEG. ING	8.07E-02	1.05E+00	7.02E-02	7.02E-02	2.54E-01	0.00E+00
CHILD	MEAT ING	8.08E-03	1.10E-01	1.17E-02	1.17E-02	2.39E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.15E+01	1.89E+01	7.51E+01	6.92E-01	8.47E-01	2.42E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.85E+00	1.86E+01	3.89E+01	1.42E-01	1.45E-01	2.39E+01
TEENAGE	GROUND	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
TEENAGE	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
TEENAGE	VEG. ING	1.34E-01	1.74E+00	1.16E-01	1.16E-01	4.20E-01	0.00E+00
TEENAGE	MEAT ING	1.31E-02	1.79E-01	1.89E-02	1.89E-02	3.87E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.30E+00	2.08E+01	3.94E+01	5.79E-01	9.06E-01	2.42E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.04E+00	1.80E+01	3.24E+01	1.19E-01	1.15E-01	2.39E+01
ADULT	GROUND	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
ADULT	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
ADULT	VEG. ING	1.84E-01	2.40E+00	1.60E-01	1.60E-01	5.80E-01	0.00E+00
ADULT	MEAT ING	2.29E-02	3.13E-01	3.31E-02	3.31E-02	6.77E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.55E+00	2.10E+01	3.29E+01	6.14E-01	1.07E+00	2.42E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 12 NAME=CPP WSW X= -1.3KM, Y= -0.5KM, Z= 0.0M, DIST= 1.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	5.22E+01	5.31E+01	4.09E+02	1.46E+00	1.62E+00	0.00E+00
INFANT	GROUND	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02
INFANT	CLOUD	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	5.22E+01	5.31E+01	4.09E+02	1.50E+00	1.65E+00	3.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.55E+01	4.58E+01	1.96E+02	6.12E-01	6.20E-01	0.00E+00
CHILD	GROUND	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02
CHILD	CLOUD	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06
CHILD	VEG. ING	2.06E-01	2.69E+00	1.65E-01	1.65E-01	6.51E-01	0.00E+00
CHILD	MEAT ING	2.03E-02	2.80E-01	2.75E-02	2.75E-02	6.01E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.57E+01	4.88E+01	1.97E+02	8.37E-01	1.36E+00	3.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.42E+01	4.87E+01	1.02E+02	2.89E-01	3.40E-01	0.00E+00
TEENAGE	GROUND	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02
TEENAGE	CLOUD	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06
TEENAGE	VEG. ING	3.41E-01	4.45E+00	2.71E-01	2.71E-01	1.08E+00	0.00E+00
TEENAGE	MEAT ING	3.30E-02	4.54E-01	4.46E-02	4.46E-02	9.76E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.46E+01	5.36E+01	1.03E+02	6.38E-01	1.55E+00	3.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.21E+01	4.72E+01	8.52E+01	2.43E-01	2.69E-01	0.00E+00
ADULT	GROUND	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02	3.31E-02
ADULT	CLOUD	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06
ADULT	VEG. ING	4.71E-01	6.15E+00	3.75E-01	3.75E-01	1.49E+00	0.00E+00
ADULT	MEAT ING	5.76E-02	7.93E-01	7.80E-02	7.80E-02	1.71E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.27E+01	5.42E+01	8.56E+01	7.29E-01	1.96E+00	3.31E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 12 NAME=CPP WSW X= -1.3KM, Y= -0.5KM, Z= 0.0M, DIST= 1.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	5.38E+01	5.31E+01	4.09E+02	1.56E+00	1.66E+00	2.68E+01
INFANT	GROUND	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01
INFANT	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	5.43E+01	5.36E+01	4.09E+02	2.05E+00	2.15E+00	2.73E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.71E+01	4.58E+01	1.96E+02	6.57E-01	6.38E-01	2.68E+01
CHILD	GROUND	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01
CHILD	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
CHILD	VEG. ING	2.08E-01	2.71E+00	1.69E-01	1.69E-01	6.55E-01	0.00E+00
CHILD	MEAT ING	2.05E-02	2.82E-01	2.82E-02	2.82E-02	6.07E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.78E+01	4.93E+01	1.97E+02	1.35E+00	1.85E+00	2.73E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.58E+01	4.87E+01	1.02E+02	3.08E-01	3.49E-01	2.68E+01
TEENAGE	GROUND	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01
TEENAGE	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
TEENAGE	VEG. ING	3.43E-01	4.48E+00	2.79E-01	2.79E-01	1.08E+00	0.00E+00
TEENAGE	MEAT ING	3.33E-02	4.58E-01	4.58E-02	4.58E-02	9.86E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.67E+01	5.41E+01	1.03E+02	1.12E+00	2.02E+00	2.73E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.37E+01	4.72E+01	8.52E+01	2.59E-01	2.77E-01	2.68E+01
ADULT	GROUND	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01	3.63E-01
ADULT	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
ADULT	VEG. ING	4.74E-01	6.18E+00	3.85E-01	3.85E-01	1.50E+00	0.00E+00
ADULT	MEAT ING	5.82E-02	8.00E-01	8.00E-02	8.00E-02	1.72E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.47E+01	5.47E+01	8.61E+01	1.22E+00	2.44E+00	2.73E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 13 NAME=CPP W X= -2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.98E+01	3.04E+01	2.34E+02	8.36E-01	9.24E-01	0.00E+00
INFANT	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
INFANT	CLOUD	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.98E+01	3.04E+01	2.34E+02	8.55E-01	9.43E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.46E+01	2.62E+01	1.12E+02	3.50E-01	3.55E-01	0.00E+00
CHILD	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
CHILD	CLOUD	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07
CHILD	VEG. ING	1.18E-01	1.54E+00	9.41E-02	9.41E-02	3.72E-01	0.00E+00
CHILD	MEAT ING	1.16E-02	1.60E-01	1.57E-02	1.57E-02	3.44E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.47E+01	2.79E+01	1.12E+02	4.79E-01	7.80E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.12E+00	2.78E+01	5.85E+01	1.65E-01	1.94E-01	0.00E+00
TEENAGE	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
TEENAGE	CLOUD	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07
TEENAGE	VEG. ING	1.95E-01	2.55E+00	1.55E-01	1.55E-01	6.16E-01	0.00E+00
TEENAGE	MEAT ING	1.89E-02	2.59E-01	2.55E-02	2.55E-02	5.58E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.36E+00	3.07E+01	5.87E+01	3.65E-01	8.85E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.91E+00	2.70E+01	4.87E+01	1.39E-01	1.54E-01	0.00E+00
ADULT	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
ADULT	CLOUD	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07	5.93E-07
ADULT	VEG. ING	2.69E-01	3.51E+00	2.14E-01	2.14E-01	8.50E-01	0.00E+00
ADULT	MEAT ING	3.30E-02	4.53E-01	4.46E-02	4.46E-02	9.75E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.23E+00	3.10E+01	4.89E+01	4.17E-01	1.12E+00	1.89E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 13 NAME=CPP W X= -2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.16E+01	3.04E+01	2.34E+02	9.41E-01	9.65E-01	2.94E+01
INFANT	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
INFANT	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.20E+01	3.08E+01	2.34E+02	1.31E+00	1.33E+00	2.98E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.63E+01	2.62E+01	1.12E+02	3.97E-01	3.74E-01	2.94E+01
CHILD	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
CHILD	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
CHILD	VEG. ING	1.19E-01	1.56E+00	9.88E-02	9.88E-02	3.76E-01	0.00E+00
CHILD	MEAT ING	1.18E-02	1.62E-01	1.65E-02	1.65E-02	3.50E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.68E+01	2.83E+01	1.13E+02	8.80E-01	1.15E+00	2.98E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.89E+00	2.79E+01	5.85E+01	1.85E-01	2.04E-01	2.94E+01
TEENAGE	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
TEENAGE	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
TEENAGE	VEG. ING	1.97E-01	2.57E+00	1.63E-01	1.63E-01	6.22E-01	0.00E+00
TEENAGE	MEAT ING	1.92E-02	2.64E-01	2.67E-02	2.67E-02	5.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.05E+01	3.11E+01	5.90E+01	7.43E-01	1.25E+00	2.98E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.68E+00	2.70E+01	4.87E+01	1.55E-01	1.62E-01	2.94E+01
ADULT	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
ADULT	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
ADULT	VEG. ING	2.72E-01	3.55E+00	2.25E-01	2.25E-01	8.59E-01	0.00E+00
ADULT	MEAT ING	3.36E-02	4.61E-01	4.67E-02	4.67E-02	9.93E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.35E+00	3.14E+01	4.93E+01	7.95E-01	1.49E+00	2.98E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 14 NAME=CPP WNW X= -2.1KM, Y= 0.9KM, Z= 0.0M, DIST= 2.2KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.38E+01	3.44E+01	2.64E+02	9.47E-01	1.05E+00	0.00E+00
INFANT	GROUND	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02
INFANT	CLOUD	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.38E+01	3.44E+01	2.65E+02	9.68E-01	1.07E+00	2.14E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.65E+01	2.97E+01	1.27E+02	3.96E-01	4.01E-01	0.00E+00
CHILD	GROUND	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02
CHILD	CLOUD	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07
CHILD	VEG. ING	1.34E-01	1.74E+00	1.07E-01	1.07E-01	4.21E-01	0.00E+00
CHILD	MEAT ING	1.31E-02	1.81E-01	1.78E-02	1.78E-02	3.89E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.66E+01	3.16E+01	1.27E+02	5.42E-01	8.83E-01	2.14E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.19E+00	3.15E+01	6.62E+01	1.87E-01	2.20E-01	0.00E+00
TEENAGE	GROUND	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02
TEENAGE	CLOUD	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07
TEENAGE	VEG. ING	2.21E-01	2.88E+00	1.76E-01	1.76E-01	6.97E-01	0.00E+00
TEENAGE	MEAT ING	2.13E-02	2.94E-01	2.89E-02	2.89E-02	6.32E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.46E+00	3.47E+01	6.64E+01	4.13E-01	1.00E+00	2.14E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.82E+00	3.06E+01	5.51E+01	1.57E-01	1.74E-01	0.00E+00
ADULT	GROUND	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02
ADULT	CLOUD	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07	6.71E-07
ADULT	VEG. ING	3.05E-01	3.98E+00	2.43E-01	2.43E-01	9.63E-01	0.00E+00
ADULT	MEAT ING	3.73E-02	5.13E-01	5.05E-02	5.05E-02	1.10E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.18E+00	3.51E+01	5.54E+01	4.72E-01	1.27E+00	2.14E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 14 NAME=CPP WNW X= -2.1KM, Y= 0.9KM, Z= 0.0M, DIST= 2.2KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.56E+01	3.44E+01	2.64E+02	1.03E+00	1.08E+00	3.09E+01
INFANT	GROUND	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
INFANT	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.60E+01	3.48E+01	2.65E+02	1.41E+00	1.46E+00	3.13E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.83E+01	2.97E+01	1.27E+02	4.32E-01	4.16E-01	3.09E+01
CHILD	GROUND	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
CHILD	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
CHILD	VEG. ING	1.35E-01	1.75E+00	1.10E-01	1.10E-01	4.24E-01	0.00E+00
CHILD	MEAT ING	1.33E-02	1.83E-01	1.84E-02	1.84E-02	3.94E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.89E+01	3.20E+01	1.28E+02	9.48E-01	1.27E+00	3.13E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.11E+01	3.15E+01	6.62E+01	2.02E-01	2.27E-01	3.09E+01
TEENAGE	GROUND	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
TEENAGE	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
TEENAGE	VEG. ING	2.23E-01	2.90E+00	1.82E-01	1.82E-01	7.02E-01	0.00E+00
TEENAGE	MEAT ING	2.16E-02	2.97E-01	2.98E-02	2.98E-02	6.39E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.17E+01	3.51E+01	6.68E+01	8.01E-01	1.38E+00	3.13E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.68E+00	3.06E+01	5.51E+01	1.70E-01	1.80E-01	3.09E+01
ADULT	GROUND	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
ADULT	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
ADULT	VEG. ING	3.07E-01	4.01E+00	2.51E-01	2.51E-01	9.69E-01	0.00E+00
ADULT	MEAT ING	3.78E-02	5.19E-01	5.21E-02	5.21E-02	1.12E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.04E+01	3.55E+01	5.58E+01	8.60E-01	1.65E+00	3.13E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 15 NAME=CPP NW X= -2.4KM, Y= 2.5KM, Z= 0.0M, DIST= 3.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.41E+01	3.48E+01	2.67E+02	9.58E-01	1.06E+00	0.00E+00
INFANT	GROUND	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
INFANT	CLOUD	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.42E+01	3.48E+01	2.67E+02	9.80E-01	1.08E+00	2.17E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.67E+01	3.00E+01	1.28E+02	4.01E-01	4.06E-01	0.00E+00
CHILD	GROUND	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
CHILD	CLOUD	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07
CHILD	VEG. ING	1.35E-01	1.76E+00	1.08E-01	1.08E-01	4.26E-01	0.00E+00
CHILD	MEAT ING	1.33E-02	1.83E-01	1.80E-02	1.80E-02	3.94E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.68E+01	3.20E+01	1.29E+02	5.49E-01	8.93E-01	2.17E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.30E+00	3.19E+01	6.69E+01	1.89E-01	2.22E-01	0.00E+00
TEENAGE	GROUND	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
TEENAGE	CLOUD	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07
TEENAGE	VEG. ING	2.23E-01	2.91E+00	1.78E-01	1.78E-01	7.05E-01	0.00E+00
TEENAGE	MEAT ING	2.16E-02	2.97E-01	2.92E-02	2.92E-02	6.39E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.57E+00	3.51E+01	6.72E+01	4.18E-01	1.01E+00	2.17E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.91E+00	3.09E+01	5.57E+01	1.59E-01	1.76E-01	0.00E+00
ADULT	GROUND	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
ADULT	CLOUD	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07	6.79E-07
ADULT	VEG. ING	3.08E-01	4.02E+00	2.46E-01	2.46E-01	9.73E-01	0.00E+00
ADULT	MEAT ING	3.77E-02	5.19E-01	5.11E-02	5.11E-02	1.12E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.28E+00	3.55E+01	5.60E+01	4.77E-01	1.28E+00	2.17E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 15 NAME=CPP NW X= -2.4KM, Y= 2.5KM, Z= 0.0M, DIST= 3.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.63E+01	3.48E+01	2.67E+02	1.00E+00	1.08E+00	3.55E+01
INFANT	GROUND	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01
INFANT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.66E+01	3.51E+01	2.68E+02	1.36E+00	1.43E+00	3.59E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.88E+01	3.00E+01	1.28E+02	4.21E-01	4.14E-01	3.55E+01
CHILD	GROUND	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01
CHILD	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
CHILD	VEG. ING	1.36E-01	1.77E+00	1.10E-01	1.10E-01	4.28E-01	0.00E+00
CHILD	MEAT ING	1.34E-02	1.84E-01	1.83E-02	1.83E-02	3.96E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.93E+01	3.23E+01	1.29E+02	9.03E-01	1.24E+00	3.59E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.14E+01	3.19E+01	6.69E+01	1.98E-01	2.26E-01	3.55E+01
TEENAGE	GROUND	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01
TEENAGE	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
TEENAGE	VEG. ING	2.24E-01	2.93E+00	1.81E-01	1.81E-01	7.08E-01	0.00E+00
TEENAGE	MEAT ING	2.17E-02	2.99E-01	2.98E-02	2.98E-02	6.43E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.20E+01	3.55E+01	6.75E+01	7.63E-01	1.35E+00	3.59E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.00E+01	3.09E+01	5.57E+01	1.66E-01	1.80E-01	3.55E+01
ADULT	GROUND	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01	2.39E-01
ADULT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
ADULT	VEG. ING	3.10E-01	4.04E+00	2.50E-01	2.50E-01	9.77E-01	0.00E+00
ADULT	MEAT ING	3.80E-02	5.22E-01	5.20E-02	5.20E-02	1.12E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.07E+01	3.59E+01	5.64E+01	8.22E-01	1.62E+00	3.59E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 16 NAME=CPP NNW X= -1.1KM, Y= 2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.56E+01	2.61E+01	2.01E+02	7.19E-01	7.94E-01	0.00E+00
INFANT	GROUND	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
INFANT	CLOUD	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.57E+01	2.61E+01	2.01E+02	7.35E-01	8.11E-01	1.63E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.25E+01	2.25E+01	9.65E+01	3.01E-01	3.05E-01	0.00E+00
CHILD	GROUND	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
CHILD	CLOUD	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07
CHILD	VEG. ING	1.01E-01	1.32E+00	8.09E-02	8.09E-02	3.20E-01	0.00E+00
CHILD	MEAT ING	9.99E-03	1.37E-01	1.35E-02	1.35E-02	2.96E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.26E+01	2.40E+01	9.66E+01	4.12E-01	6.71E-01	1.63E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.98E+00	2.39E+01	5.03E+01	1.42E-01	1.67E-01	0.00E+00
TEENAGE	GROUND	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
TEENAGE	CLOUD	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07
TEENAGE	VEG. ING	1.68E-01	2.19E+00	1.33E-01	1.33E-01	5.29E-01	0.00E+00
TEENAGE	MEAT ING	1.62E-02	2.23E-01	2.19E-02	2.19E-02	4.80E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.18E+00	2.64E+01	5.05E+01	3.14E-01	7.61E-01	1.63E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.94E+00	2.32E+01	4.18E+01	1.19E-01	1.32E-01	0.00E+00
ADULT	GROUND	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
ADULT	CLOUD	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07	5.10E-07
ADULT	VEG. ING	2.32E-01	3.02E+00	1.84E-01	1.84E-01	7.31E-01	0.00E+00
ADULT	MEAT ING	2.83E-02	3.90E-01	3.83E-02	3.83E-02	8.39E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.22E+00	2.66E+01	4.21E+01	3.58E-01	9.64E-01	1.63E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 16 NAME=CPP NNW X= -1.1KM, Y= 2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.68E+01	2.61E+01	2.01E+02	7.72E-01	8.15E-01	1.98E+01
INFANT	GROUND	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
INFANT	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.71E+01	2.64E+01	2.01E+02	1.05E+00	1.09E+00	2.01E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.37E+01	2.25E+01	9.65E+01	3.25E-01	3.14E-01	1.98E+01
CHILD	GROUND	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
CHILD	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
CHILD	VEG. ING	1.02E-01	1.33E+00	8.33E-02	8.33E-02	3.22E-01	0.00E+00
CHILD	MEAT ING	1.01E-02	1.39E-01	1.39E-02	1.39E-02	2.99E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.41E+01	2.43E+01	9.69E+01	6.98E-01	9.43E-01	2.01E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.17E+00	2.39E+01	5.03E+01	1.52E-01	1.72E-01	1.98E+01
TEENAGE	GROUND	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
TEENAGE	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
TEENAGE	VEG. ING	1.69E-01	2.20E+00	1.37E-01	1.37E-01	5.33E-01	0.00E+00
TEENAGE	MEAT ING	1.64E-02	2.25E-01	2.26E-02	2.26E-02	4.85E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.64E+00	2.66E+01	5.07E+01	5.89E-01	1.03E+00	2.01E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.13E+00	2.32E+01	4.18E+01	1.28E-01	1.36E-01	1.98E+01
ADULT	GROUND	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01
ADULT	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
ADULT	VEG. ING	2.33E-01	3.04E+00	1.90E-01	1.90E-01	7.36E-01	0.00E+00
ADULT	MEAT ING	2.86E-02	3.93E-01	3.94E-02	3.94E-02	8.47E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.67E+00	2.69E+01	4.24E+01	6.34E-01	1.23E+00	2.01E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 17 NAME=SF N X= -5.0KM, Y= 4.6KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.43E+01	2.48E+01	1.91E+02	6.83E-01	7.55E-01	0.00E+00
INFANT	GROUND	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02
INFANT	CLOUD	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.44E+01	2.48E+01	1.91E+02	6.99E-01	7.70E-01	1.54E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.19E+01	2.14E+01	9.16E+01	2.86E-01	2.89E-01	0.00E+00
CHILD	GROUND	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02
CHILD	CLOUD	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07
CHILD	VEG. ING	9.63E-02	1.26E+00	7.69E-02	7.69E-02	3.04E-01	0.00E+00
CHILD	MEAT ING	9.49E-03	1.31E-01	1.29E-02	1.29E-02	2.81E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.20E+01	2.28E+01	9.17E+01	3.91E-01	6.37E-01	1.54E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.63E+00	2.28E+01	4.77E+01	1.35E-01	1.59E-01	0.00E+00
TEENAGE	GROUND	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02
TEENAGE	CLOUD	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07
TEENAGE	VEG. ING	1.59E-01	2.08E+00	1.27E-01	1.27E-01	5.02E-01	0.00E+00
TEENAGE	MEAT ING	1.54E-02	2.12E-01	2.09E-02	2.09E-02	4.56E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.82E+00	2.51E+01	4.79E+01	2.98E-01	7.22E-01	1.54E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.64E+00	2.21E+01	3.97E+01	1.13E-01	1.26E-01	0.00E+00
ADULT	GROUND	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02	1.54E-02
ADULT	CLOUD	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07	4.84E-07
ADULT	VEG. ING	2.20E-01	2.87E+00	1.75E-01	1.75E-01	6.94E-01	0.00E+00
ADULT	MEAT ING	2.69E-02	3.70E-01	3.65E-02	3.65E-02	7.96E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.90E+00	2.53E+01	3.99E+01	3.41E-01	9.15E-01	1.54E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 17 NAME=SF N X= -5.0KM, Y= 4.6KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.59E+01	2.48E+01	1.91E+02	7.16E-01	7.67E-01	2.64E+01
INFANT	GROUND	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
INFANT	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.62E+01	2.50E+01	1.91E+02	9.46E-01	9.97E-01	2.66E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.35E+01	2.14E+01	9.16E+01	3.01E-01	2.95E-01	2.64E+01
CHILD	GROUND	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
CHILD	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
CHILD	VEG. ING	9.67E-02	1.26E+00	7.84E-02	7.84E-02	3.05E-01	0.00E+00
CHILD	MEAT ING	9.56E-03	1.31E-01	1.31E-02	1.31E-02	2.83E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.38E+01	2.31E+01	9.19E+01	6.22E-01	8.58E-01	2.66E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.21E+00	2.28E+01	4.77E+01	1.41E-01	1.62E-01	2.64E+01
TEENAGE	GROUND	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
TEENAGE	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
TEENAGE	VEG. ING	1.60E-01	2.09E+00	1.29E-01	1.29E-01	5.04E-01	0.00E+00
TEENAGE	MEAT ING	1.55E-02	2.13E-01	2.12E-02	2.12E-02	4.59E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.62E+00	2.53E+01	4.81E+01	5.21E-01	9.41E-01	2.66E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.22E+00	2.21E+01	3.97E+01	1.19E-01	1.28E-01	2.64E+01
ADULT	GROUND	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
ADULT	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
ADULT	VEG. ING	2.21E-01	2.88E+00	1.79E-01	1.79E-01	6.97E-01	0.00E+00
ADULT	MEAT ING	2.71E-02	3.73E-01	3.71E-02	3.71E-02	8.02E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.70E+00	2.56E+01	4.02E+01	5.64E-01	1.13E+00	2.66E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 18 NAME=SF NNE X= -4.6KM, Y= 4.6KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.73E+01	2.78E+01	2.14E+02	7.66E-01	8.46E-01	0.00E+00
INFANT	GROUND	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02
INFANT	CLOUD	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.73E+01	2.78E+01	2.14E+02	7.84E-01	8.64E-01	1.73E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.33E+01	2.40E+01	1.03E+02	3.21E-01	3.25E-01	0.00E+00
CHILD	GROUND	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02
CHILD	CLOUD	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07
CHILD	VEG. ING	1.08E-01	1.41E+00	8.62E-02	8.62E-02	3.41E-01	0.00E+00
CHILD	MEAT ING	1.06E-02	1.46E-01	1.44E-02	1.44E-02	3.15E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.35E+01	2.56E+01	1.03E+02	4.39E-01	7.14E-01	1.73E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.43E+00	2.55E+01	5.35E+01	1.52E-01	1.78E-01	0.00E+00
TEENAGE	GROUND	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02
TEENAGE	CLOUD	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07
TEENAGE	VEG. ING	1.79E-01	2.33E+00	1.42E-01	1.42E-01	5.63E-01	0.00E+00
TEENAGE	MEAT ING	1.73E-02	2.38E-01	2.34E-02	2.34E-02	5.11E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.65E+00	2.81E+01	5.37E+01	3.34E-01	8.10E-01	1.73E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.32E+00	2.47E+01	4.45E+01	1.27E-01	1.41E-01	0.00E+00
ADULT	GROUND	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02	1.73E-02
ADULT	CLOUD	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07	5.42E-07
ADULT	VEG. ING	2.47E-01	3.22E+00	1.96E-01	1.96E-01	7.78E-01	0.00E+00
ADULT	MEAT ING	3.02E-02	4.15E-01	4.09E-02	4.09E-02	8.93E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.62E+00	2.84E+01	4.48E+01	3.82E-01	1.03E+00	1.73E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 18 NAME=SF NNE X= -4.6KM, Y= 4.6KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.88E+01	2.78E+01	2.14E+02	7.98E-01	8.59E-01	2.52E+01
INFANT	GROUND	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
INFANT	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.91E+01	2.81E+01	2.14E+02	1.05E+00	1.11E+00	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.48E+01	2.40E+01	1.03E+02	3.35E-01	3.30E-01	2.52E+01
CHILD	GROUND	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
CHILD	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
CHILD	VEG. ING	1.08E-01	1.41E+00	8.77E-02	8.77E-02	3.42E-01	0.00E+00
CHILD	MEAT ING	1.07E-02	1.47E-01	1.46E-02	1.46E-02	3.17E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.52E+01	2.58E+01	1.03E+02	6.84E-01	9.51E-01	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.95E+00	2.55E+01	5.35E+01	1.58E-01	1.81E-01	2.52E+01
TEENAGE	GROUND	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
TEENAGE	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
TEENAGE	VEG. ING	1.79E-01	2.34E+00	1.45E-01	1.45E-01	5.65E-01	0.00E+00
TEENAGE	MEAT ING	1.74E-02	2.39E-01	2.38E-02	2.38E-02	5.14E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.39E+00	2.83E+01	5.39E+01	5.73E-01	1.04E+00	2.55E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.84E+00	2.48E+01	4.45E+01	1.32E-01	1.43E-01	2.52E+01
ADULT	GROUND	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
ADULT	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
ADULT	VEG. ING	2.48E-01	3.23E+00	2.00E-01	2.00E-01	7.81E-01	0.00E+00
ADULT	MEAT ING	3.04E-02	4.17E-01	4.15E-02	4.15E-02	8.98E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.36E+00	2.86E+01	4.50E+01	6.21E-01	1.26E+00	2.55E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 19 NAME=SF NE X= -4.0KM, Y= 4.5KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.61E+01	2.66E+01	2.04E+02	7.32E-01	8.08E-01	0.00E+00
INFANT	GROUND	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02
INFANT	CLOUD	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.61E+01	2.66E+01	2.04E+02	7.48E-01	8.25E-01	1.65E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.27E+01	2.29E+01	9.81E+01	3.06E-01	3.10E-01	0.00E+00
CHILD	GROUND	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02
CHILD	CLOUD	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07
CHILD	VEG. ING	1.03E-01	1.35E+00	8.23E-02	8.23E-02	3.25E-01	0.00E+00
CHILD	MEAT ING	1.02E-02	1.40E-01	1.38E-02	1.38E-02	3.00E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.28E+01	2.44E+01	9.82E+01	4.19E-01	6.82E-01	1.65E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.10E+00	2.44E+01	5.11E+01	1.45E-01	1.70E-01	0.00E+00
TEENAGE	GROUND	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02
TEENAGE	CLOUD	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07
TEENAGE	VEG. ING	1.71E-01	2.23E+00	1.36E-01	1.36E-01	5.38E-01	0.00E+00
TEENAGE	MEAT ING	1.65E-02	2.27E-01	2.23E-02	2.23E-02	4.88E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.30E+00	2.68E+01	5.13E+01	3.19E-01	7.73E-01	1.65E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.04E+00	2.36E+01	4.25E+01	1.21E-01	1.35E-01	0.00E+00
ADULT	GROUND	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02	1.65E-02
ADULT	CLOUD	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07	5.18E-07
ADULT	VEG. ING	2.35E-01	3.07E+00	1.88E-01	1.88E-01	7.43E-01	0.00E+00
ADULT	MEAT ING	2.88E-02	3.96E-01	3.90E-02	3.90E-02	8.52E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.32E+00	2.71E+01	4.28E+01	3.65E-01	9.79E-01	1.65E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 19 NAME=SF NE X= -4.0KM, Y= 4.5KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.77E+01	2.66E+01	2.04E+02	7.65E-01	8.21E-01	2.65E+01
INFANT	GROUND	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
INFANT	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.79E+01	2.68E+01	2.04E+02	1.01E+00	1.06E+00	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.43E+01	2.29E+01	9.81E+01	3.21E-01	3.16E-01	2.65E+01
CHILD	GROUND	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
CHILD	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
CHILD	VEG. ING	1.04E-01	1.35E+00	8.38E-02	8.38E-02	3.26E-01	0.00E+00
CHILD	MEAT ING	1.02E-02	1.41E-01	1.40E-02	1.40E-02	3.02E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.47E+01	2.47E+01	9.84E+01	6.61E-01	9.15E-01	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.69E+00	2.44E+01	5.11E+01	1.51E-01	1.73E-01	2.65E+01
TEENAGE	GROUND	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
TEENAGE	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
TEENAGE	VEG. ING	1.71E-01	2.23E+00	1.38E-01	1.38E-01	5.40E-01	0.00E+00
TEENAGE	MEAT ING	1.66E-02	2.28E-01	2.27E-02	2.27E-02	4.91E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.12E+00	2.71E+01	5.15E+01	5.54E-01	1.00E+00	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.63E+00	2.36E+01	4.25E+01	1.27E-01	1.37E-01	2.65E+01
ADULT	GROUND	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
ADULT	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
ADULT	VEG. ING	2.36E-01	3.08E+00	1.91E-01	1.91E-01	7.46E-01	0.00E+00
ADULT	MEAT ING	2.90E-02	3.99E-01	3.97E-02	3.97E-02	8.58E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.13E+00	2.74E+01	4.30E+01	5.99E-01	1.21E+00	2.67E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 20 NAME=SF ENE X= -3.2KM, Y= 4.2KM, Z= 0.0M, DIST= 5.3KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.22E+01	2.26E+01	1.74E+02	6.23E-01	6.88E-01	0.00E+00
INFANT	GROUND	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
INFANT	CLOUD	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.22E+01	2.26E+01	1.74E+02	6.37E-01	7.02E-01	1.41E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.08E+01	1.95E+01	8.35E+01	2.61E-01	2.64E-01	0.00E+00
CHILD	GROUND	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
CHILD	CLOUD	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07
CHILD	VEG. ING	8.78E-02	1.15E+00	7.01E-02	7.01E-02	2.77E-01	0.00E+00
CHILD	MEAT ING	8.65E-03	1.19E-01	1.17E-02	1.17E-02	2.56E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.09E+01	2.08E+01	8.36E+01	3.57E-01	5.81E-01	1.41E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.04E+00	2.07E+01	4.35E+01	1.23E-01	1.45E-01	0.00E+00
TEENAGE	GROUND	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
TEENAGE	CLOUD	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07
TEENAGE	VEG. ING	1.45E-01	1.89E+00	1.16E-01	1.16E-01	4.58E-01	0.00E+00
TEENAGE	MEAT ING	1.40E-02	1.93E-01	1.90E-02	1.90E-02	4.15E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.22E+00	2.28E+01	4.37E+01	2.72E-01	6.58E-01	1.41E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.14E+00	2.01E+01	3.62E+01	1.03E-01	1.15E-01	0.00E+00
ADULT	GROUND	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
ADULT	CLOUD	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07	4.41E-07
ADULT	VEG. ING	2.00E-01	2.62E+00	1.60E-01	1.60E-01	6.33E-01	0.00E+00
ADULT	MEAT ING	2.45E-02	3.38E-01	3.32E-02	3.32E-02	7.26E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.38E+00	2.31E+01	3.64E+01	3.10E-01	8.34E-01	1.41E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 20 NAME=SF ENE X= -3.2KM, Y= 4.2KM, Z= 0.0M, DIST= 5.3KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.36E+01	2.26E+01	1.74E+02	6.59E-01	7.02E-01	2.26E+01
INFANT	GROUND	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
INFANT	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.38E+01	2.28E+01	1.74E+02	8.74E-01	9.17E-01	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.22E+01	1.95E+01	8.35E+01	2.77E-01	2.70E-01	2.26E+01
CHILD	GROUND	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
CHILD	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
CHILD	VEG. ING	8.83E-02	1.15E+00	7.17E-02	7.17E-02	2.78E-01	0.00E+00
CHILD	MEAT ING	8.72E-03	1.20E-01	1.20E-02	1.20E-02	2.58E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.25E+01	2.10E+01	8.38E+01	5.76E-01	7.90E-01	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.40E+00	2.08E+01	4.35E+01	1.30E-01	1.48E-01	2.26E+01
TEENAGE	GROUND	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
TEENAGE	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
TEENAGE	VEG. ING	1.46E-01	1.90E+00	1.18E-01	1.18E-01	4.60E-01	0.00E+00
TEENAGE	MEAT ING	1.42E-02	1.95E-01	1.94E-02	1.94E-02	4.19E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.78E+00	2.31E+01	4.39E+01	4.83E-01	8.65E-01	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.50E+00	2.01E+01	3.62E+01	1.09E-01	1.17E-01	2.26E+01
ADULT	GROUND	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01	1.56E-01
ADULT	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
ADULT	VEG. ING	2.02E-01	2.63E+00	1.63E-01	1.63E-01	6.36E-01	0.00E+00
ADULT	MEAT ING	2.47E-02	3.40E-01	3.40E-02	3.40E-02	7.32E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.94E+00	2.33E+01	3.66E+01	5.22E-01	1.04E+00	2.28E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 21 NAME=SF E X= -2.8KM, Y= 3.5KM, Z= 0.0M, DIST= 4.5KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.97E+01	3.03E+01	2.33E+02	8.35E-01	9.22E-01	0.00E+00
INFANT	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
INFANT	CLOUD	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.98E+01	3.03E+01	2.33E+02	8.54E-01	9.41E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.45E+01	2.62E+01	1.12E+02	3.50E-01	3.54E-01	0.00E+00
CHILD	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
CHILD	CLOUD	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07
CHILD	VEG. ING	1.18E-01	1.54E+00	9.40E-02	9.40E-02	3.71E-01	0.00E+00
CHILD	MEAT ING	1.16E-02	1.59E-01	1.57E-02	1.57E-02	3.43E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.47E+01	2.79E+01	1.12E+02	4.78E-01	7.78E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.10E+00	2.78E+01	5.83E+01	1.65E-01	1.94E-01	0.00E+00
TEENAGE	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
TEENAGE	CLOUD	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07
TEENAGE	VEG. ING	1.95E-01	2.54E+00	1.55E-01	1.55E-01	6.14E-01	0.00E+00
TEENAGE	MEAT ING	1.88E-02	2.59E-01	2.55E-02	2.55E-02	5.57E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.33E+00	3.06E+01	5.85E+01	3.64E-01	8.82E-01	1.89E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.89E+00	2.70E+01	4.85E+01	1.39E-01	1.54E-01	0.00E+00
ADULT	GROUND	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02
ADULT	CLOUD	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07	5.91E-07
ADULT	VEG. ING	2.69E-01	3.51E+00	2.14E-01	2.14E-01	8.48E-01	0.00E+00
ADULT	MEAT ING	3.29E-02	4.52E-01	4.45E-02	4.45E-02	9.73E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.21E+00	3.09E+01	4.88E+01	4.16E-01	1.12E+00	1.89E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 21 NAME=SF E X= -2.8KM, Y= 3.5KM, Z= 0.0M, DIST= 4.5KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.17E+01	3.03E+01	2.33E+02	8.70E-01	9.36E-01	3.28E+01
INFANT	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
INFANT	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.20E+01	3.06E+01	2.33E+02	1.16E+00	1.22E+00	3.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.65E+01	2.62E+01	1.12E+02	3.65E-01	3.60E-01	3.28E+01
CHILD	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
CHILD	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
CHILD	VEG. ING	1.18E-01	1.54E+00	9.55E-02	9.55E-02	3.73E-01	0.00E+00
CHILD	MEAT ING	1.17E-02	1.60E-01	1.60E-02	1.60E-02	3.45E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.69E+01	2.82E+01	1.12E+02	7.62E-01	1.05E+00	3.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.01E+01	2.78E+01	5.83E+01	1.72E-01	1.97E-01	3.28E+01
TEENAGE	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
TEENAGE	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
TEENAGE	VEG. ING	1.95E-01	2.55E+00	1.58E-01	1.58E-01	6.16E-01	0.00E+00
TEENAGE	MEAT ING	1.89E-02	2.60E-01	2.59E-02	2.59E-02	5.60E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.06E+01	3.09E+01	5.88E+01	6.41E-01	1.15E+00	3.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.86E+00	2.70E+01	4.85E+01	1.44E-01	1.56E-01	3.28E+01
ADULT	GROUND	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01	2.09E-01
ADULT	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
ADULT	VEG. ING	2.70E-01	3.52E+00	2.18E-01	2.18E-01	8.51E-01	0.00E+00
ADULT	MEAT ING	3.31E-02	4.55E-01	4.53E-02	4.53E-02	9.79E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.45E+00	3.12E+01	4.91E+01	6.92E-01	1.39E+00	3.30E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 22 NAME=SF SSE X= -3.7KM, Y= 0.2KM, Z= 0.0M, DIST= 3.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.50E+01	2.55E+01	1.96E+02	7.02E-01	7.76E-01	0.00E+00
INFANT	GROUND	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02
INFANT	CLOUD	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.50E+01	2.55E+01	1.96E+02	7.18E-01	7.92E-01	1.59E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.22E+01	2.20E+01	9.42E+01	2.94E-01	2.98E-01	0.00E+00
CHILD	GROUND	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02
CHILD	CLOUD	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07
CHILD	VEG. ING	9.90E-02	1.29E+00	7.91E-02	7.91E-02	3.12E-01	0.00E+00
CHILD	MEAT ING	9.75E-03	1.34E-01	1.32E-02	1.32E-02	2.89E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.23E+01	2.35E+01	9.43E+01	4.02E-01	6.55E-01	1.59E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.82E+00	2.34E+01	4.91E+01	1.39E-01	1.63E-01	0.00E+00
TEENAGE	GROUND	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02
TEENAGE	CLOUD	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07
TEENAGE	VEG. ING	1.64E-01	2.14E+00	1.30E-01	1.30E-01	5.17E-01	0.00E+00
TEENAGE	MEAT ING	1.58E-02	2.18E-01	2.14E-02	2.14E-02	4.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.01E+00	2.58E+01	4.92E+01	3.07E-01	7.42E-01	1.59E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.80E+00	2.27E+01	4.08E+01	1.17E-01	1.29E-01	0.00E+00
ADULT	GROUND	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02	1.59E-02
ADULT	CLOUD	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07	4.98E-07
ADULT	VEG. ING	2.26E-01	2.95E+00	1.80E-01	1.80E-01	7.14E-01	0.00E+00
ADULT	MEAT ING	2.77E-02	3.81E-01	3.75E-02	3.75E-02	8.19E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.07E+00	2.60E+01	4.11E+01	3.50E-01	9.41E-01	1.59E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 22 NAME=SF SSE X= -3.7KM, Y= 0.2KM, Z= 0.0M, DIST= 3.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.72E+01	2.55E+01	1.96E+02	8.21E-01	8.22E-01	3.67E+01
INFANT	GROUND	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01
INFANT	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.76E+01	2.59E+01	1.96E+02	1.20E+00	1.21E+00	3.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.44E+01	2.20E+01	9.42E+01	3.47E-01	3.19E-01	3.67E+01
CHILD	GROUND	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01
CHILD	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
CHILD	VEG. ING	1.01E-01	1.31E+00	8.44E-02	8.44E-02	3.17E-01	0.00E+00
CHILD	MEAT ING	1.00E-02	1.37E-01	1.41E-02	1.41E-02	2.95E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.49E+01	2.39E+01	9.47E+01	8.29E-01	1.05E+00	3.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.02E+00	2.34E+01	4.91E+01	1.61E-01	1.74E-01	3.67E+01
TEENAGE	GROUND	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01
TEENAGE	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
TEENAGE	VEG. ING	1.66E-01	2.17E+00	1.39E-01	1.39E-01	5.24E-01	0.00E+00
TEENAGE	MEAT ING	1.62E-02	2.22E-01	2.28E-02	2.28E-02	4.80E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.59E+00	2.62E+01	4.96E+01	7.07E-01	1.13E+00	3.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.00E+00	2.27E+01	4.08E+01	1.35E-01	1.38E-01	3.67E+01
ADULT	GROUND	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01	1.77E-01
ADULT	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
ADULT	VEG. ING	2.30E-01	2.99E+00	1.92E-01	1.92E-01	7.23E-01	0.00E+00
ADULT	MEAT ING	2.84E-02	3.89E-01	3.99E-02	3.99E-02	8.38E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.65E+00	2.65E+01	4.15E+01	7.51E-01	1.33E+00	3.71E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 23 NAME=SF SE X= -2.8KM, Y= 1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.65E+01	3.72E+01	2.86E+02	1.02E+00	1.13E+00	0.00E+00
INFANT	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
INFANT	CLOUD	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.65E+01	3.72E+01	2.86E+02	1.05E+00	1.15E+00	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.78E+01	3.21E+01	1.37E+02	4.29E-01	4.34E-01	0.00E+00
CHILD	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
CHILD	CLOUD	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07
CHILD	VEG. ING	1.44E-01	1.88E+00	1.15E-01	1.15E-01	4.55E-01	0.00E+00
CHILD	MEAT ING	1.42E-02	1.96E-01	1.92E-02	1.92E-02	4.20E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.80E+01	3.42E+01	1.37E+02	5.86E-01	9.54E-01	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.93E+00	3.41E+01	7.15E+01	2.02E-01	2.37E-01	0.00E+00
TEENAGE	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
TEENAGE	CLOUD	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07
TEENAGE	VEG. ING	2.39E-01	3.11E+00	1.90E-01	1.90E-01	7.53E-01	0.00E+00
TEENAGE	MEAT ING	2.31E-02	3.17E-01	3.12E-02	3.12E-02	6.82E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.02E+01	3.75E+01	7.18E+01	4.47E-01	1.08E+00	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.45E+00	3.30E+01	5.95E+01	1.70E-01	1.88E-01	0.00E+00
ADULT	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
ADULT	CLOUD	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07	7.25E-07
ADULT	VEG. ING	3.29E-01	4.30E+00	2.62E-01	2.62E-01	1.04E+00	0.00E+00
ADULT	MEAT ING	4.03E-02	5.55E-01	5.46E-02	5.46E-02	1.19E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.84E+00	3.79E+01	5.98E+01	5.10E-01	1.37E+00	2.31E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 23 NAME=SF SE X= -2.8KM, Y= 1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.91E+01	3.72E+01	2.86E+02	1.10E+00	1.16E+00	4.32E+01
INFANT	GROUND	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01
INFANT	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.95E+01	3.76E+01	2.86E+02	1.55E+00	1.60E+00	4.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.04E+01	3.21E+01	1.37E+02	4.64E-01	4.48E-01	4.32E+01
CHILD	GROUND	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01
CHILD	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
CHILD	VEG. ING	1.45E-01	1.89E+00	1.19E-01	1.19E-01	4.58E-01	0.00E+00
CHILD	MEAT ING	1.44E-02	1.97E-01	1.98E-02	1.98E-02	4.25E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.10E+01	3.46E+01	1.38E+02	1.04E+00	1.39E+00	4.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.25E+01	3.41E+01	7.15E+01	2.18E-01	2.45E-01	4.32E+01
TEENAGE	GROUND	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01
TEENAGE	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
TEENAGE	VEG. ING	2.40E-01	3.13E+00	1.96E-01	1.96E-01	7.58E-01	0.00E+00
TEENAGE	MEAT ING	2.33E-02	3.20E-01	3.22E-02	3.22E-02	6.90E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.32E+01	3.80E+01	7.22E+01	8.88E-01	1.51E+00	4.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.10E+01	3.31E+01	5.95E+01	1.83E-01	1.94E-01	4.32E+01
ADULT	GROUND	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01	2.56E-01
ADULT	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
ADULT	VEG. ING	3.32E-01	4.33E+00	2.70E-01	2.70E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	4.08E-02	5.60E-01	5.62E-02	5.62E-02	1.21E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.19E+01	3.84E+01	6.03E+01	9.52E-01	1.80E+00	4.37E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 24 NAME=SF S X= -5.1KM, Y= -0.3KM, Z= 0.0M, DIST= 5.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.40E+01	1.43E+01	1.10E+02	3.93E-01	4.35E-01	0.00E+00
INFANT	GROUND	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03
INFANT	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.40E+01	1.43E+01	1.10E+02	4.02E-01	4.44E-01	8.90E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.84E+00	1.23E+01	5.28E+01	1.65E-01	1.67E-01	0.00E+00
CHILD	GROUND	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03
CHILD	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
CHILD	VEG. ING	5.55E-02	7.24E-01	4.43E-02	4.43E-02	1.75E-01	0.00E+00
CHILD	MEAT ING	5.46E-03	7.52E-02	7.40E-03	7.40E-03	1.62E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	6.91E+00	1.31E+01	5.28E+01	2.25E-01	3.67E-01	8.90E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.82E+00	1.31E+01	2.75E+01	7.78E-02	9.13E-02	0.00E+00
TEENAGE	GROUND	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03
TEENAGE	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
TEENAGE	VEG. ING	9.17E-02	1.20E+00	7.30E-02	7.30E-02	2.89E-01	0.00E+00
TEENAGE	MEAT ING	8.87E-03	1.22E-01	1.20E-02	1.20E-02	2.62E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.93E+00	1.44E+01	2.76E+01	1.72E-01	4.16E-01	8.90E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.25E+00	1.27E+01	2.29E+01	6.53E-02	7.24E-02	0.00E+00
ADULT	GROUND	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03	8.90E-03
ADULT	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
ADULT	VEG. ING	1.27E-01	1.65E+00	1.01E-01	1.01E-01	4.00E-01	0.00E+00
ADULT	MEAT ING	1.55E-02	2.13E-01	2.10E-02	2.10E-02	4.59E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.40E+00	1.46E+01	2.30E+01	1.96E-01	5.27E-01	8.90E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 24 NAME=SF S X= -5.1KM, Y= -0.3KM, Z= 0.0M, DIST= 5.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.55E+01	1.43E+01	1.10E+02	5.14E-01	4.82E-01	2.48E+01
INFANT	GROUND	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02
INFANT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.58E+01	1.46E+01	1.10E+02	7.75E-01	7.43E-01	2.50E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.33E+00	1.24E+01	5.28E+01	2.18E-01	1.89E-01	2.48E+01
CHILD	GROUND	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02
CHILD	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
CHILD	VEG. ING	5.70E-02	7.42E-01	4.97E-02	4.97E-02	1.79E-01	0.00E+00
CHILD	MEAT ING	5.71E-03	7.81E-02	8.26E-03	8.26E-03	1.69E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	8.65E+00	1.34E+01	5.31E+01	5.38E-01	6.46E-01	2.50E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.31E+00	1.31E+01	2.75E+01	1.01E-01	1.02E-01	2.48E+01
TEENAGE	GROUND	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02
TEENAGE	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
TEENAGE	VEG. ING	9.43E-02	1.23E+00	8.20E-02	8.20E-02	2.97E-01	0.00E+00
TEENAGE	MEAT ING	9.28E-03	1.27E-01	1.34E-02	1.34E-02	2.74E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.67E+00	1.48E+01	2.78E+01	4.57E-01	6.88E-01	2.50E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.74E+00	1.27E+01	2.29E+01	8.45E-02	8.16E-02	2.48E+01
ADULT	GROUND	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02	9.96E-02
ADULT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
ADULT	VEG. ING	1.30E-01	1.69E+00	1.13E-01	1.13E-01	4.10E-01	0.00E+00
ADULT	MEAT ING	1.62E-02	2.21E-01	2.34E-02	2.34E-02	4.79E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.15E+00	1.49E+01	2.33E+01	4.82E-01	8.00E-01	2.50E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 25 NAME=SF SSW X= -6.0KM, Y= 1.3KM, Z= 0.0M, DIST= 6.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.83E+01	1.86E+01	1.43E+02	5.12E-01	5.66E-01	0.00E+00
INFANT	GROUND	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
INFANT	CLOUD	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.83E+01	1.86E+01	1.43E+02	5.24E-01	5.77E-01	1.16E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.91E+00	1.61E+01	6.87E+01	2.15E-01	2.17E-01	0.00E+00
CHILD	GROUND	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
CHILD	CLOUD	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07
CHILD	VEG. ING	7.22E-02	9.42E-01	5.77E-02	5.77E-02	2.28E-01	0.00E+00
CHILD	MEAT ING	7.11E-03	9.79E-02	9.63E-03	9.63E-03	2.10E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.00E+00	1.71E+01	6.88E+01	2.93E-01	4.77E-01	1.16E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.97E+00	1.71E+01	3.58E+01	1.01E-01	1.19E-01	0.00E+00
TEENAGE	GROUND	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
TEENAGE	CLOUD	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07
TEENAGE	VEG. ING	1.19E-01	1.56E+00	9.51E-02	9.51E-02	3.77E-01	0.00E+00
TEENAGE	MEAT ING	1.15E-02	1.59E-01	1.56E-02	1.56E-02	3.42E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.11E+00	1.88E+01	3.59E+01	2.24E-01	5.41E-01	1.16E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.23E+00	1.65E+01	2.98E+01	8.51E-02	9.43E-02	0.00E+00
ADULT	GROUND	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
ADULT	CLOUD	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07	3.63E-07
ADULT	VEG. ING	1.65E-01	2.15E+00	1.31E-01	1.31E-01	5.20E-01	0.00E+00
ADULT	MEAT ING	2.02E-02	2.78E-01	2.73E-02	2.73E-02	5.97E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.43E+00	1.90E+01	2.99E+01	2.55E-01	6.86E-01	1.16E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 25 NAME=SF SSW X= -6.0KM, Y= 1.3KM, Z= 0.0M, DIST= 6.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.95E+01	1.86E+01	1.43E+02	5.75E-01	5.90E-01	2.14E+01
INFANT	GROUND	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
INFANT	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.98E+01	1.89E+01	1.43E+02	8.15E-01	8.30E-01	2.17E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.02E+01	1.61E+01	6.87E+01	2.42E-01	2.29E-01	2.14E+01
CHILD	GROUND	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
CHILD	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
CHILD	VEG. ING	7.30E-02	9.52E-01	6.05E-02	6.05E-02	2.30E-01	0.00E+00
CHILD	MEAT ING	7.24E-03	9.94E-02	1.01E-02	1.01E-02	2.14E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.05E+01	1.74E+01	6.90E+01	5.52E-01	7.19E-01	2.17E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.26E+00	1.71E+01	3.58E+01	1.13E-01	1.25E-01	2.14E+01
TEENAGE	GROUND	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
TEENAGE	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
TEENAGE	VEG. ING	1.21E-01	1.57E+00	9.98E-02	9.98E-02	3.81E-01	0.00E+00
TEENAGE	MEAT ING	1.18E-02	1.61E-01	1.64E-02	1.64E-02	3.48E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.63E+00	1.91E+01	3.61E+01	4.69E-01	7.79E-01	2.17E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.52E+00	1.66E+01	2.98E+01	9.50E-02	9.91E-02	2.14E+01
ADULT	GROUND	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
ADULT	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
ADULT	VEG. ING	1.67E-01	2.17E+00	1.38E-01	1.38E-01	5.26E-01	0.00E+00
ADULT	MEAT ING	2.06E-02	2.82E-01	2.86E-02	2.86E-02	6.07E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.94E+00	1.93E+01	3.02E+01	5.01E-01	9.25E-01	2.17E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 81
METSET: DATA: DB.MIL 08/21/08
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 26 NAME=SF SW X= -6.1KM, Y= 2.5KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.04E+01	3.10E+01	2.38E+02	8.54E-01	9.43E-01	0.00E+00
INFANT	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
INFANT	CLOUD	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.04E+01	3.10E+01	2.38E+02	8.74E-01	9.63E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.48E+01	2.68E+01	1.14E+02	3.58E-01	3.62E-01	0.00E+00
CHILD	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
CHILD	CLOUD	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07
CHILD	VEG. ING	1.20E-01	1.57E+00	9.61E-02	9.61E-02	3.80E-01	0.00E+00
CHILD	MEAT ING	1.19E-02	1.63E-01	1.61E-02	1.61E-02	3.51E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.50E+01	2.85E+01	1.15E+02	4.89E-01	7.96E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.29E+00	2.84E+01	5.96E+01	1.69E-01	1.98E-01	0.00E+00
TEENAGE	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
TEENAGE	CLOUD	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07
TEENAGE	VEG. ING	1.99E-01	2.60E+00	1.59E-01	1.59E-01	6.28E-01	0.00E+00
TEENAGE	MEAT ING	1.93E-02	2.65E-01	2.61E-02	2.61E-02	5.69E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.52E+00	3.13E+01	5.99E+01	3.73E-01	9.02E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.05E+00	2.76E+01	4.96E+01	1.42E-01	1.57E-01	0.00E+00
ADULT	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
ADULT	CLOUD	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07	6.05E-07
ADULT	VEG. ING	2.75E-01	3.59E+00	2.19E-01	2.19E-01	8.67E-01	0.00E+00
ADULT	MEAT ING	3.36E-02	4.63E-01	4.56E-02	4.56E-02	9.95E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.38E+00	3.17E+01	4.99E+01	4.26E-01	1.14E+00	1.93E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 26 NAME=SF SW X= -6.1KM, Y= 2.5KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.16E+01	3.10E+01	2.38E+02	8.96E-01	9.60E-01	2.03E+01
INFANT	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
INFANT	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.19E+01	3.13E+01	2.39E+02	1.18E+00	1.24E+00	2.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.61E+01	2.68E+01	1.14E+02	3.76E-01	3.69E-01	2.03E+01
CHILD	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
CHILD	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
CHILD	VEG. ING	1.21E-01	1.58E+00	9.80E-02	9.80E-02	3.81E-01	0.00E+00
CHILD	MEAT ING	1.19E-02	1.64E-01	1.64E-02	1.64E-02	3.53E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.65E+01	2.88E+01	1.15E+02	7.76E-01	1.07E+00	2.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.51E+00	2.85E+01	5.96E+01	1.77E-01	2.02E-01	2.03E+01
TEENAGE	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
TEENAGE	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
TEENAGE	VEG. ING	2.00E-01	2.61E+00	1.62E-01	1.62E-01	6.31E-01	0.00E+00
TEENAGE	MEAT ING	1.94E-02	2.66E-01	2.66E-02	2.66E-02	5.73E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.00E+01	3.16E+01	6.01E+01	6.50E-01	1.17E+00	2.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.27E+00	2.76E+01	4.96E+01	1.48E-01	1.60E-01	2.03E+01
ADULT	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
ADULT	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
ADULT	VEG. ING	2.76E-01	3.60E+00	2.23E-01	2.23E-01	8.71E-01	0.00E+00
ADULT	MEAT ING	3.39E-02	4.66E-01	4.64E-02	4.64E-02	1.00E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.86E+00	3.19E+01	5.02E+01	7.03E-01	1.42E+00	2.06E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 27 NAME=SF WSW X= -6.0KM, Y= 3.2KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.62E+01	3.69E+01	2.83E+02	1.02E+00	1.12E+00	0.00E+00
INFANT	GROUND	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
INFANT	CLOUD	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.62E+01	3.69E+01	2.83E+02	1.04E+00	1.14E+00	2.29E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.76E+01	3.18E+01	1.36E+02	4.25E-01	4.30E-01	0.00E+00
CHILD	GROUND	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
CHILD	CLOUD	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07
CHILD	VEG. ING	1.43E-01	1.87E+00	1.14E-01	1.14E-01	4.51E-01	0.00E+00
CHILD	MEAT ING	1.41E-02	1.94E-01	1.91E-02	1.91E-02	4.17E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.78E+01	3.39E+01	1.36E+02	5.82E-01	9.46E-01	2.29E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.85E+00	3.38E+01	7.09E+01	2.01E-01	2.35E-01	0.00E+00
TEENAGE	GROUND	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
TEENAGE	CLOUD	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07
TEENAGE	VEG. ING	2.37E-01	3.09E+00	1.88E-01	1.88E-01	7.46E-01	0.00E+00
TEENAGE	MEAT ING	2.29E-02	3.15E-01	3.10E-02	3.10E-02	6.77E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.01E+01	3.72E+01	7.11E+01	4.43E-01	1.07E+00	2.29E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.38E+00	3.28E+01	5.90E+01	1.69E-01	1.87E-01	0.00E+00
ADULT	GROUND	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
ADULT	CLOUD	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07	7.19E-07
ADULT	VEG. ING	3.27E-01	4.26E+00	2.60E-01	2.60E-01	1.03E+00	0.00E+00
ADULT	MEAT ING	4.00E-02	5.50E-01	5.42E-02	5.42E-02	1.18E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.77E+00	3.76E+01	5.93E+01	5.06E-01	1.36E+00	2.29E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 27 NAME=SF WSW X= -6.0KM, Y= 3.2KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.73E+01	3.69E+01	2.83E+02	1.05E+00	1.13E+00	1.83E+01
INFANT	GROUND	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01
INFANT	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.76E+01	3.72E+01	2.83E+02	1.36E+00	1.44E+00	1.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.87E+01	3.18E+01	1.36E+02	4.41E-01	4.36E-01	1.83E+01
CHILD	GROUND	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01
CHILD	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
CHILD	VEG. ING	1.44E-01	1.87E+00	1.16E-01	1.16E-01	4.53E-01	0.00E+00
CHILD	MEAT ING	1.42E-02	1.95E-01	1.93E-02	1.93E-02	4.19E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.92E+01	3.42E+01	1.36E+02	8.81E-01	1.24E+00	1.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.09E+01	3.38E+01	7.09E+01	2.07E-01	2.39E-01	1.83E+01
TEENAGE	GROUND	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01
TEENAGE	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
TEENAGE	VEG. ING	2.37E-01	3.10E+00	1.91E-01	1.91E-01	7.48E-01	0.00E+00
TEENAGE	MEAT ING	2.30E-02	3.16E-01	3.14E-02	3.14E-02	6.80E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.15E+01	3.75E+01	7.14E+01	7.34E-01	1.36E+00	1.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.47E+00	3.28E+01	5.90E+01	1.74E-01	1.89E-01	1.83E+01
ADULT	GROUND	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01	2.52E-01
ADULT	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
ADULT	VEG. ING	3.28E-01	4.27E+00	2.64E-01	2.64E-01	1.03E+00	0.00E+00
ADULT	MEAT ING	4.02E-02	5.52E-01	5.49E-02	5.49E-02	1.19E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.01E+01	3.79E+01	5.96E+01	7.97E-01	1.65E+00	1.86E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 28 NAME=SF W X= -6.0KM, Y= 3.6KM, Z= 0.0M, DIST= 7.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	5.97E+01	6.09E+01	4.68E+02	1.68E+00	1.85E+00	0.00E+00
INFANT	GROUND	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02
INFANT	CLOUD	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	5.98E+01	6.09E+01	4.68E+02	1.72E+00	1.89E+00	3.79E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.91E+01	5.26E+01	2.25E+02	7.02E-01	7.10E-01	0.00E+00
CHILD	GROUND	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02
CHILD	CLOUD	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06
CHILD	VEG. ING	2.36E-01	3.08E+00	1.89E-01	1.89E-01	7.45E-01	0.00E+00
CHILD	MEAT ING	2.33E-02	3.20E-01	3.15E-02	3.15E-02	6.88E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.94E+01	5.60E+01	2.25E+02	9.61E-01	1.56E+00	3.79E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.63E+01	5.58E+01	1.17E+02	3.32E-01	3.89E-01	0.00E+00
TEENAGE	GROUND	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02
TEENAGE	CLOUD	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06
TEENAGE	VEG. ING	3.91E-01	5.10E+00	3.11E-01	3.11E-01	1.23E+00	0.00E+00
TEENAGE	MEAT ING	3.78E-02	5.20E-01	5.12E-02	5.12E-02	1.12E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.67E+01	6.15E+01	1.17E+02	7.32E-01	1.77E+00	3.79E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.38E+01	5.42E+01	9.74E+01	2.78E-01	3.09E-01	0.00E+00
ADULT	GROUND	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02
ADULT	CLOUD	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06	1.19E-06
ADULT	VEG. ING	5.40E-01	7.04E+00	4.30E-01	4.30E-01	1.70E+00	0.00E+00
ADULT	MEAT ING	6.60E-02	9.09E-01	8.95E-02	8.95E-02	1.95E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.45E+01	6.21E+01	9.80E+01	8.36E-01	2.24E+00	3.79E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 28 NAME=SF W X= -6.0KM, Y= 3.6KM, Z= 0.0M, DIST= 7.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	6.08E+01	6.09E+01	4.68E+02	1.71E+00	1.86E+00	1.83E+01
INFANT	GROUND	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01
INFANT	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	6.13E+01	6.14E+01	4.68E+02	2.17E+00	2.33E+00	1.88E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	3.02E+01	5.26E+01	2.25E+02	7.17E-01	7.16E-01	1.83E+01
CHILD	GROUND	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01
CHILD	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
CHILD	VEG. ING	2.37E-01	3.09E+00	1.90E-01	1.90E-01	7.46E-01	0.00E+00
CHILD	MEAT ING	2.33E-02	3.21E-01	3.18E-02	3.18E-02	6.90E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.10E+01	5.65E+01	2.25E+02	1.40E+00	1.99E+00	1.88E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.74E+01	5.58E+01	1.17E+02	3.38E-01	3.92E-01	1.83E+01
TEENAGE	GROUND	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01
TEENAGE	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
TEENAGE	VEG. ING	3.92E-01	5.11E+00	3.14E-01	3.14E-01	1.23E+00	0.00E+00
TEENAGE	MEAT ING	3.79E-02	5.21E-01	5.16E-02	5.16E-02	1.12E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.83E+01	6.19E+01	1.18E+02	1.16E+00	2.20E+00	1.88E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.49E+01	5.42E+01	9.74E+01	2.84E-01	3.11E-01	1.83E+01
ADULT	GROUND	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01	4.14E-01
ADULT	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
ADULT	VEG. ING	5.41E-01	7.05E+00	4.33E-01	4.33E-01	1.71E+00	0.00E+00
ADULT	MEAT ING	6.62E-02	9.11E-01	9.02E-02	9.02E-02	1.96E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.60E+01	6.26E+01	9.84E+01	1.27E+00	2.67E+00	1.88E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 29 NAME=SF WNW X= -5.4KM, Y= 3.7KM, Z= 0.0M, DIST= 6.5KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.19E+02	2.23E+02	1.71E+03	6.14E+00	6.78E+00	0.00E+00
INFANT	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
INFANT	CLOUD	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.19E+02	2.23E+02	1.71E+03	6.28E+00	6.92E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.07E+02	1.93E+02	8.23E+02	2.57E+00	2.60E+00	0.00E+00
CHILD	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
CHILD	CLOUD	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06
CHILD	VEG. ING	8.66E-01	1.13E+01	6.91E-01	6.91E-01	2.73E+00	0.00E+00
CHILD	MEAT ING	8.53E-02	1.17E+00	1.16E-01	1.16E-01	2.52E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.08E+02	2.05E+02	8.24E+02	3.52E+00	5.72E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.96E+01	2.05E+02	4.29E+02	1.21E+00	1.42E+00	0.00E+00
TEENAGE	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
TEENAGE	CLOUD	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06
TEENAGE	VEG. ING	1.43E+00	1.87E+01	1.14E+00	1.14E+00	4.52E+00	0.00E+00
TEENAGE	MEAT ING	1.38E-01	1.90E+00	1.88E-01	1.88E-01	4.09E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.13E+01	2.25E+02	4.30E+02	2.68E+00	6.49E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.07E+01	1.98E+02	3.57E+02	1.02E+00	1.13E+00	0.00E+00
ADULT	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
ADULT	CLOUD	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06	4.35E-06
ADULT	VEG. ING	1.98E+00	2.58E+01	1.57E+00	1.57E+00	6.24E+00	0.00E+00
ADULT	MEAT ING	2.42E-01	3.33E+00	3.28E-01	3.28E-01	7.15E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.30E+01	2.28E+02	3.59E+02	3.06E+00	8.22E+00	1.39E-01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 29 NAME=SF WNW X= -5.4KM, Y= 3.7KM, Z= 0.0M, DIST= 6.5KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.20E+02	2.23E+02	1.71E+03	6.17E+00	6.79E+00	2.46E+01
INFANT	GROUND	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00
INFANT	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.22E+02	2.25E+02	1.71E+03	7.73E+00	8.35E+00	2.61E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.08E+02	1.93E+02	8.23E+02	2.59E+00	2.61E+00	2.46E+01
CHILD	GROUND	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00
CHILD	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
CHILD	VEG. ING	8.66E-01	1.13E+01	6.93E-01	6.93E-01	2.73E+00	0.00E+00
CHILD	MEAT ING	8.53E-02	1.17E+00	1.16E-01	1.16E-01	2.52E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+02	2.07E+02	8.25E+02	4.95E+00	7.14E+00	2.61E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.10E+01	2.05E+02	4.29E+02	1.22E+00	1.43E+00	2.46E+01
TEENAGE	GROUND	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00
TEENAGE	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
TEENAGE	VEG. ING	1.43E+00	1.87E+01	1.14E+00	1.14E+00	4.52E+00	0.00E+00
TEENAGE	MEAT ING	1.39E-01	1.91E+00	1.88E-01	1.88E-01	4.10E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.42E+01	2.27E+02	4.32E+02	4.10E+00	7.91E+00	2.61E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.21E+01	1.98E+02	3.57E+02	1.02E+00	1.13E+00	2.46E+01
ADULT	GROUND	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00
ADULT	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
ADULT	VEG. ING	1.98E+00	2.58E+01	1.58E+00	1.58E+00	6.24E+00	0.00E+00
ADULT	MEAT ING	2.42E-01	3.33E+00	3.28E-01	3.28E-01	7.16E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.59E+01	2.29E+02	3.60E+02	4.48E+00	9.64E+00	2.61E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 30 NAME=SF NW X= -5.2KM, Y= 3.8KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.25E+02	2.29E+02	1.76E+03	6.32E+00	6.97E+00	0.00E+00
INFANT	GROUND	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
INFANT	CLOUD	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.25E+02	2.29E+02	1.76E+03	6.46E+00	7.12E+00	1.43E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.10E+02	1.98E+02	8.46E+02	2.65E+00	2.67E+00	0.00E+00
CHILD	GROUND	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
CHILD	CLOUD	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06
CHILD	VEG. ING	8.90E-01	1.16E+01	7.11E-01	7.11E-01	2.81E+00	0.00E+00
CHILD	MEAT ING	8.77E-02	1.21E+00	1.19E-01	1.19E-01	2.59E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+02	2.11E+02	8.47E+02	3.62E+00	5.88E+00	1.43E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.12E+01	2.10E+02	4.41E+02	1.25E+00	1.46E+00	0.00E+00
TEENAGE	GROUND	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
TEENAGE	CLOUD	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06
TEENAGE	VEG. ING	1.47E+00	1.92E+01	1.17E+00	1.17E+00	4.64E+00	0.00E+00
TEENAGE	MEAT ING	1.42E-01	1.96E+00	1.93E-01	1.93E-01	4.21E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.30E+01	2.32E+02	4.42E+02	2.76E+00	6.67E+00	1.43E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.21E+01	2.04E+02	3.67E+02	1.05E+00	1.16E+00	0.00E+00
ADULT	GROUND	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01	1.43E-01
ADULT	CLOUD	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06	4.47E-06
ADULT	VEG. ING	2.03E+00	2.65E+01	1.62E+00	1.62E+00	6.41E+00	0.00E+00
ADULT	MEAT ING	2.49E-01	3.42E+00	3.37E-01	3.37E-01	7.36E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.45E+01	2.34E+02	3.69E+02	3.15E+00	8.45E+00	1.43E-01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 30 NAME=SF NW X= -5.2KM, Y= 3.8KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.27E+02	2.29E+02	1.76E+03	6.35E+00	6.98E+00	3.04E+01
INFANT	GROUND	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00
INFANT	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.28E+02	2.31E+02	1.76E+03	7.94E+00	8.58E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.12E+02	1.98E+02	8.46E+02	2.66E+00	2.68E+00	3.04E+01
CHILD	GROUND	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00
CHILD	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
CHILD	VEG. ING	8.90E-01	1.16E+01	7.12E-01	7.12E-01	2.81E+00	0.00E+00
CHILD	MEAT ING	8.77E-02	1.21E+00	1.19E-01	1.19E-01	2.59E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.14E+02	2.12E+02	8.48E+02	5.08E+00	7.34E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.31E+01	2.10E+02	4.41E+02	1.25E+00	1.47E+00	3.04E+01
TEENAGE	GROUND	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00
TEENAGE	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
TEENAGE	VEG. ING	1.47E+00	1.92E+01	1.17E+00	1.17E+00	4.64E+00	0.00E+00
TEENAGE	MEAT ING	1.42E-01	1.96E+00	1.93E-01	1.93E-01	4.21E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.63E+01	2.33E+02	4.44E+02	4.22E+00	8.13E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.39E+01	2.04E+02	3.67E+02	1.05E+00	1.16E+00	3.04E+01
ADULT	GROUND	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00
ADULT	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
ADULT	VEG. ING	2.03E+00	2.65E+01	1.62E+00	1.62E+00	6.41E+00	0.00E+00
ADULT	MEAT ING	2.49E-01	3.42E+00	3.38E-01	3.38E-01	7.36E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.78E+01	2.36E+02	3.70E+02	4.61E+00	9.91E+00	3.20E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 31 NAME=SF NNW X= -5.2KM, Y= 4.1KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.20E+02	2.24E+02	1.72E+03	6.17E+00	6.81E+00	0.00E+00
INFANT	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
INFANT	CLOUD	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.20E+02	2.24E+02	1.72E+03	6.31E+00	6.95E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.07E+02	1.93E+02	8.26E+02	2.58E+00	2.61E+00	0.00E+00
CHILD	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
CHILD	CLOUD	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06
CHILD	VEG. ING	8.69E-01	1.13E+01	6.94E-01	6.94E-01	2.74E+00	0.00E+00
CHILD	MEAT ING	8.56E-02	1.18E+00	1.16E-01	1.16E-01	2.53E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.08E+02	2.06E+02	8.27E+02	3.53E+00	5.74E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.98E+01	2.05E+02	4.30E+02	1.22E+00	1.43E+00	0.00E+00
TEENAGE	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
TEENAGE	CLOUD	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06
TEENAGE	VEG. ING	1.44E+00	1.87E+01	1.14E+00	1.14E+00	4.53E+00	0.00E+00
TEENAGE	MEAT ING	1.39E-01	1.91E+00	1.88E-01	1.88E-01	4.11E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.15E+01	2.26E+02	4.32E+02	2.69E+00	6.51E+00	1.39E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.09E+01	1.99E+02	3.58E+02	1.02E+00	1.13E+00	0.00E+00
ADULT	GROUND	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
ADULT	CLOUD	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06
ADULT	VEG. ING	1.98E+00	2.59E+01	1.58E+00	1.58E+00	6.26E+00	0.00E+00
ADULT	MEAT ING	2.43E-01	3.34E+00	3.29E-01	3.29E-01	7.18E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.32E+01	2.28E+02	3.60E+02	3.07E+00	8.25E+00	1.39E-01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 31 NAME=SF NNW X= -5.2KM, Y= 4.1KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.21E+02	2.24E+02	1.72E+03	6.20E+00	6.82E+00	3.09E+01
INFANT	GROUND	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00
INFANT	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.23E+02	2.25E+02	1.72E+03	7.76E+00	8.38E+00	3.24E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.09E+02	1.93E+02	8.26E+02	2.60E+00	2.62E+00	3.09E+01
CHILD	GROUND	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00
CHILD	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
CHILD	VEG. ING	8.69E-01	1.13E+01	6.95E-01	6.95E-01	2.74E+00	0.00E+00
CHILD	MEAT ING	8.56E-02	1.18E+00	1.16E-01	1.16E-01	2.53E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+02	2.07E+02	8.28E+02	4.97E+00	7.17E+00	3.24E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.16E+01	2.05E+02	4.30E+02	1.22E+00	1.43E+00	3.09E+01
TEENAGE	GROUND	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00
TEENAGE	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
TEENAGE	VEG. ING	1.44E+00	1.88E+01	1.15E+00	1.15E+00	4.53E+00	0.00E+00
TEENAGE	MEAT ING	1.39E-01	1.91E+00	1.89E-01	1.89E-01	4.11E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.48E+01	2.27E+02	4.33E+02	4.12E+00	7.94E+00	3.24E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.27E+01	1.99E+02	3.58E+02	1.03E+00	1.14E+00	3.09E+01
ADULT	GROUND	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00	1.52E+00
ADULT	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
ADULT	VEG. ING	1.98E+00	2.59E+01	1.58E+00	1.58E+00	6.26E+00	0.00E+00
ADULT	MEAT ING	2.43E-01	3.34E+00	3.30E-01	3.30E-01	7.18E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.65E+01	2.30E+02	3.62E+02	4.51E+00	9.68E+00	3.24E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 32 NAME=SF ESE X= -2.8KM, Y= 2.6KM, Z= 0.0M, DIST= 3.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.68E+01	3.75E+01	2.88E+02	1.03E+00	1.14E+00	0.00E+00
INFANT	GROUND	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
INFANT	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.68E+01	3.75E+01	2.88E+02	1.06E+00	1.16E+00	2.34E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.80E+01	3.24E+01	1.39E+02	4.33E-01	4.38E-01	0.00E+00
CHILD	GROUND	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
CHILD	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
CHILD	VEG. ING	1.46E-01	1.90E+00	1.16E-01	1.16E-01	4.59E-01	0.00E+00
CHILD	MEAT ING	1.43E-02	1.97E-01	1.94E-02	1.94E-02	4.24E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.81E+01	3.45E+01	1.39E+02	5.92E-01	9.63E-01	2.34E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.00E+01	3.44E+01	7.22E+01	2.04E-01	2.40E-01	0.00E+00
TEENAGE	GROUND	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
TEENAGE	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
TEENAGE	VEG. ING	2.41E-01	3.14E+00	1.92E-01	1.92E-01	7.60E-01	0.00E+00
TEENAGE	MEAT ING	2.33E-02	3.20E-01	3.15E-02	3.15E-02	6.89E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.03E+01	3.79E+01	7.24E+01	4.51E-01	1.09E+00	2.34E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.53E+00	3.34E+01	6.01E+01	1.72E-01	1.90E-01	0.00E+00
ADULT	GROUND	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02	2.34E-02
ADULT	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
ADULT	VEG. ING	3.33E-01	4.34E+00	2.65E-01	2.65E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	4.07E-02	5.60E-01	5.51E-02	5.51E-02	1.20E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.93E+00	3.83E+01	6.04E+01	5.15E-01	1.38E+00	2.34E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 32 NAME=SF ESE X= -2.8KM, Y= 2.6KM, Z= 0.0M, DIST= 3.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.98E+01	3.75E+01	2.88E+02	1.07E+00	1.16E+00	5.03E+01
INFANT	GROUND	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01
INFANT	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.02E+01	3.79E+01	2.89E+02	1.45E+00	1.54E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.10E+01	3.24E+01	1.39E+02	4.50E-01	4.45E-01	5.03E+01
CHILD	GROUND	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01
CHILD	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
CHILD	VEG. ING	1.46E-01	1.91E+00	1.18E-01	1.18E-01	4.61E-01	0.00E+00
CHILD	MEAT ING	1.44E-02	1.98E-01	1.97E-02	1.97E-02	4.27E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.15E+01	3.49E+01	1.39E+02	9.68E-01	1.33E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.30E+01	3.44E+01	7.22E+01	2.12E-01	2.43E-01	5.03E+01
TEENAGE	GROUND	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01
TEENAGE	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
TEENAGE	VEG. ING	2.42E-01	3.15E+00	1.95E-01	1.95E-01	7.62E-01	0.00E+00
TEENAGE	MEAT ING	2.34E-02	3.22E-01	3.20E-02	3.20E-02	6.93E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.37E+01	3.83E+01	7.28E+01	8.19E-01	1.46E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.15E+01	3.34E+01	6.01E+01	1.78E-01	1.93E-01	5.03E+01
ADULT	GROUND	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01
ADULT	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
ADULT	VEG. ING	3.34E-01	4.35E+00	2.69E-01	2.69E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	4.09E-02	5.63E-01	5.59E-02	5.59E-02	1.21E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.23E+01	3.87E+01	6.08E+01	8.83E-01	1.75E+00	5.06E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 33 NAME=Daniels Ranch X= 2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.04E+01	3.08E+01	2.38E+02	8.50E-01	9.40E-01	0.00E+00
INFANT	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
INFANT	CLOUD	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.04E+01	3.09E+01	2.38E+02	8.69E-01	9.59E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.48E+01	2.66E+01	1.14E+02	3.56E-01	3.60E-01	0.00E+00
CHILD	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
CHILD	CLOUD	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07
CHILD	VEG. ING	1.20E-01	1.57E+00	9.56E-02	9.56E-02	3.79E-01	0.00E+00
CHILD	MEAT ING	1.18E-02	1.62E-01	1.60E-02	1.60E-02	3.50E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.50E+01	2.84E+01	1.14E+02	4.87E-01	7.94E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.26E+00	2.83E+01	5.95E+01	1.68E-01	1.97E-01	0.00E+00
TEENAGE	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
TEENAGE	CLOUD	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07
TEENAGE	VEG. ING	1.98E-01	2.59E+00	1.58E-01	1.58E-01	6.27E-01	0.00E+00
TEENAGE	MEAT ING	1.92E-02	2.64E-01	2.59E-02	2.59E-02	5.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.50E+00	3.12E+01	5.97E+01	3.71E-01	9.00E-01	1.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.03E+00	2.74E+01	4.95E+01	1.41E-01	1.57E-01	0.00E+00
ADULT	GROUND	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
ADULT	CLOUD	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07	6.04E-07
ADULT	VEG. ING	2.74E-01	3.57E+00	2.18E-01	2.18E-01	8.65E-01	0.00E+00
ADULT	MEAT ING	3.35E-02	4.61E-01	4.53E-02	4.53E-02	9.92E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.36E+00	3.15E+01	4.98E+01	4.23E-01	1.14E+00	1.93E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 33 NAME=Daniels Ranch X= 2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.20E+01	3.09E+01	2.38E+02	9.19E-01	9.67E-01	2.75E+01
INFANT	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
INFANT	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.23E+01	3.11E+01	2.38E+02	1.21E+00	1.25E+00	2.78E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.65E+01	2.66E+01	1.14E+02	3.87E-01	3.73E-01	2.75E+01
CHILD	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
CHILD	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
CHILD	VEG. ING	1.21E-01	1.58E+00	9.87E-02	9.87E-02	3.81E-01	0.00E+00
CHILD	MEAT ING	1.20E-02	1.64E-01	1.65E-02	1.65E-02	3.54E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.69E+01	2.87E+01	1.15E+02	7.90E-01	1.08E+00	2.78E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.91E+00	2.83E+01	5.95E+01	1.81E-01	2.04E-01	2.75E+01
TEENAGE	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
TEENAGE	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
TEENAGE	VEG. ING	2.00E-01	2.61E+00	1.63E-01	1.63E-01	6.31E-01	0.00E+00
TEENAGE	MEAT ING	1.94E-02	2.66E-01	2.67E-02	2.67E-02	5.74E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.04E+01	3.15E+01	6.00E+01	6.59E-01	1.18E+00	2.78E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.68E+00	2.74E+01	4.95E+01	1.52E-01	1.62E-01	2.75E+01
ADULT	GROUND	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01	2.12E-01
ADULT	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
ADULT	VEG. ING	2.76E-01	3.60E+00	2.25E-01	2.25E-01	8.71E-01	0.00E+00
ADULT	MEAT ING	3.39E-02	4.66E-01	4.67E-02	4.67E-02	1.00E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.28E+00	3.18E+01	5.01E+01	7.12E-01	1.42E+00	2.78E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 34 NAME=Spencer Ranch X= -2.0KM, Y= 1.2KM, Z= 0.0M, DIST= 2.3KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.43E+01	3.49E+01	2.69E+02	9.62E-01	1.06E+00	0.00E+00
INFANT	GROUND	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02
INFANT	CLOUD	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.43E+01	3.49E+01	2.69E+02	9.84E-01	1.08E+00	2.18E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.67E+01	3.02E+01	1.29E+02	4.03E-01	4.08E-01	0.00E+00
CHILD	GROUND	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02
CHILD	CLOUD	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07
CHILD	VEG. ING	1.36E-01	1.77E+00	1.08E-01	1.08E-01	4.28E-01	0.00E+00
CHILD	MEAT ING	1.34E-02	1.84E-01	1.81E-02	1.81E-02	3.95E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.69E+01	3.21E+01	1.29E+02	5.51E-01	8.97E-01	2.18E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.34E+00	3.20E+01	6.73E+01	1.90E-01	2.23E-01	0.00E+00
TEENAGE	GROUND	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02
TEENAGE	CLOUD	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07
TEENAGE	VEG. ING	2.24E-01	2.93E+00	1.79E-01	1.79E-01	7.08E-01	0.00E+00
TEENAGE	MEAT ING	2.17E-02	2.98E-01	2.94E-02	2.94E-02	6.42E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.61E+00	3.53E+01	6.75E+01	4.20E-01	1.02E+00	2.18E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.95E+00	3.11E+01	5.60E+01	1.60E-01	1.77E-01	0.00E+00
ADULT	GROUND	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02
ADULT	CLOUD	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07
ADULT	VEG. ING	3.10E-01	4.04E+00	2.47E-01	2.47E-01	9.78E-01	0.00E+00
ADULT	MEAT ING	3.79E-02	5.22E-01	5.13E-02	5.13E-02	1.12E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.32E+00	3.56E+01	5.63E+01	4.79E-01	1.29E+00	2.18E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 34 NAME=Spencer Ranch X= -2.0KM, Y= 1.2KM, Z= 0.0M, DIST= 2.3KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.62E+01	3.49E+01	2.69E+02	1.03E+00	1.09E+00	3.17E+01
INFANT	GROUND	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
INFANT	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.66E+01	3.53E+01	2.69E+02	1.42E+00	1.48E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.86E+01	3.02E+01	1.29E+02	4.35E-01	4.21E-01	3.17E+01
CHILD	GROUND	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
CHILD	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
CHILD	VEG. ING	1.37E-01	1.78E+00	1.12E-01	1.12E-01	4.31E-01	0.00E+00
CHILD	MEAT ING	1.35E-02	1.86E-01	1.86E-02	1.86E-02	4.00E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.92E+01	3.25E+01	1.30E+02	9.52E-01	1.28E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.12E+01	3.21E+01	6.73E+01	2.04E-01	2.30E-01	3.17E+01
TEENAGE	GROUND	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
TEENAGE	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
TEENAGE	VEG. ING	2.26E-01	2.95E+00	1.84E-01	1.84E-01	7.13E-01	0.00E+00
TEENAGE	MEAT ING	2.19E-02	3.01E-01	3.02E-02	3.02E-02	6.49E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.19E+01	3.57E+01	6.79E+01	8.05E-01	1.39E+00	3.20E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.85E+00	3.11E+01	5.60E+01	1.71E-01	1.83E-01	3.17E+01
ADULT	GROUND	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
ADULT	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
ADULT	VEG. ING	3.12E-01	4.07E+00	2.54E-01	2.54E-01	9.84E-01	0.00E+00
ADULT	MEAT ING	3.83E-02	5.27E-01	5.28E-02	5.28E-02	1.13E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.06E+01	3.61E+01	5.67E+01	8.65E-01	1.67E+00	3.20E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 35 NAME=BC Ranch X= -6.6KM, Y= 3.8KM, Z= 0.0M, DIST= 7.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.37E+01	2.42E+01	1.86E+02	6.66E-01	7.36E-01	0.00E+00
INFANT	GROUND	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02
INFANT	CLOUD	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.38E+01	2.42E+01	1.86E+02	6.82E-01	7.51E-01	1.51E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.16E+01	2.09E+01	8.93E+01	2.79E-01	2.82E-01	0.00E+00
CHILD	GROUND	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02
CHILD	CLOUD	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07
CHILD	VEG. ING	9.39E-02	1.23E+00	7.50E-02	7.50E-02	2.96E-01	0.00E+00
CHILD	MEAT ING	9.25E-03	1.27E-01	1.25E-02	1.25E-02	2.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.17E+01	2.23E+01	8.94E+01	3.82E-01	6.21E-01	1.51E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.46E+00	2.22E+01	4.65E+01	1.32E-01	1.55E-01	0.00E+00
TEENAGE	GROUND	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02
TEENAGE	CLOUD	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07
TEENAGE	VEG. ING	1.55E-01	2.03E+00	1.24E-01	1.24E-01	4.90E-01	0.00E+00
TEENAGE	MEAT ING	1.50E-02	2.07E-01	2.03E-02	2.03E-02	4.44E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.65E+00	2.44E+01	4.67E+01	2.91E-01	7.04E-01	1.51E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.50E+00	2.15E+01	3.87E+01	1.11E-01	1.23E-01	0.00E+00
ADULT	GROUND	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02	1.51E-02
ADULT	CLOUD	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07	4.72E-07
ADULT	VEG. ING	2.14E-01	2.80E+00	1.71E-01	1.71E-01	6.77E-01	0.00E+00
ADULT	MEAT ING	2.62E-02	3.61E-01	3.56E-02	3.56E-02	7.76E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.75E+00	2.47E+01	3.89E+01	3.32E-01	8.92E-01	1.51E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 35 NAME=BC Ranch X= -6.6KM, Y= 3.8KM, Z= 0.0M, DIST= 7.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.45E+01	2.42E+01	1.86E+02	7.04E-01	7.51E-01	1.28E+01
INFANT	GROUND	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01
INFANT	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.47E+01	2.44E+01	1.86E+02	9.17E-01	9.64E-01	1.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.23E+01	2.09E+01	8.93E+01	2.96E-01	2.89E-01	1.28E+01
CHILD	GROUND	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01
CHILD	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
CHILD	VEG. ING	9.44E-02	1.23E+00	7.67E-02	7.67E-02	2.98E-01	0.00E+00
CHILD	MEAT ING	9.33E-03	1.28E-01	1.28E-02	1.28E-02	2.76E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.27E+01	2.25E+01	8.96E+01	5.99E-01	8.28E-01	1.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.23E+00	2.22E+01	4.65E+01	1.39E-01	1.58E-01	1.28E+01
TEENAGE	GROUND	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01
TEENAGE	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
TEENAGE	VEG. ING	1.56E-01	2.04E+00	1.26E-01	1.26E-01	4.92E-01	0.00E+00
TEENAGE	MEAT ING	1.51E-02	2.08E-01	2.08E-02	2.08E-02	4.48E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.62E+00	2.47E+01	4.69E+01	5.00E-01	9.08E-01	1.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.27E+00	2.15E+01	3.87E+01	1.17E-01	1.25E-01	1.28E+01
ADULT	GROUND	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01
ADULT	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
ADULT	VEG. ING	2.16E-01	2.81E+00	1.75E-01	1.75E-01	6.80E-01	0.00E+00
ADULT	MEAT ING	2.65E-02	3.64E-01	3.63E-02	3.63E-02	7.83E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.72E+00	2.49E+01	3.91E+01	5.41E-01	1.10E+00	1.30E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 36 NAME=Puttman Ranch X= -5.2KM, Y= 7.2KM, Z= 0.0M, DIST= 8.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.39E+00	9.56E+00	7.35E+01	2.63E-01	2.91E-01	0.00E+00
INFANT	GROUND	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
INFANT	CLOUD	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	9.39E+00	9.57E+00	7.35E+01	2.69E-01	2.97E-01	5.95E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.58E+00	8.26E+00	3.53E+01	1.10E-01	1.12E-01	0.00E+00
CHILD	GROUND	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
CHILD	CLOUD	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07
CHILD	VEG. ING	3.71E-02	4.84E-01	2.96E-02	2.96E-02	1.17E-01	0.00E+00
CHILD	MEAT ING	3.66E-03	5.03E-02	4.95E-03	4.95E-03	1.08E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.63E+00	8.80E+00	3.54E+01	1.51E-01	2.45E-01	5.95E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.56E+00	8.77E+00	1.84E+01	5.21E-02	6.11E-02	0.00E+00
TEENAGE	GROUND	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
TEENAGE	CLOUD	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07
TEENAGE	VEG. ING	6.14E-02	8.01E-01	4.89E-02	4.89E-02	1.94E-01	0.00E+00
TEENAGE	MEAT ING	5.94E-03	8.17E-02	8.04E-03	8.04E-03	1.76E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.63E+00	9.66E+00	1.85E+01	1.15E-01	2.78E-01	5.95E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.17E+00	8.51E+00	1.53E+01	4.37E-02	4.85E-02	0.00E+00
ADULT	GROUND	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
ADULT	CLOUD	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07	1.87E-07
ADULT	VEG. ING	8.48E-02	1.11E+00	6.75E-02	6.75E-02	2.68E-01	0.00E+00
ADULT	MEAT ING	1.04E-02	1.43E-01	1.41E-02	1.41E-02	3.07E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.28E+00	9.76E+00	1.54E+01	1.31E-01	3.53E-01	5.95E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 36 NAME=Puttman Ranch X= -5.2KM, Y= 7.2KM, Z= 0.0M, DIST= 8.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.96E+00	9.58E+00	7.35E+01	3.28E-01	3.16E-01	9.47E+00
INFANT	GROUND	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
INFANT	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.01E+01	9.70E+00	7.36E+01	4.56E-01	4.44E-01	9.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	5.15E+00	8.27E+00	3.53E+01	1.39E-01	1.23E-01	9.47E+00
CHILD	GROUND	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
CHILD	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
CHILD	VEG. ING	3.80E-02	4.94E-01	3.26E-02	3.26E-02	1.20E-01	0.00E+00
CHILD	MEAT ING	3.79E-03	5.19E-02	5.42E-03	5.42E-03	1.12E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	5.32E+00	8.94E+00	3.55E+01	3.05E-01	3.82E-01	9.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.13E+00	8.79E+00	1.84E+01	6.45E-02	6.71E-02	9.47E+00
TEENAGE	GROUND	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
TEENAGE	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
TEENAGE	VEG. ING	6.28E-02	8.18E-01	5.37E-02	5.37E-02	1.98E-01	0.00E+00
TEENAGE	MEAT ING	6.16E-03	8.42E-02	8.80E-03	8.80E-03	1.82E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.32E+00	9.82E+00	1.86E+01	2.55E-01	4.11E-01	9.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.74E+00	8.52E+00	1.53E+01	5.41E-02	5.34E-02	9.47E+00
ADULT	GROUND	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
ADULT	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
ADULT	VEG. ING	8.67E-02	1.13E+00	7.42E-02	7.42E-02	2.73E-01	0.00E+00
ADULT	MEAT ING	1.08E-02	1.47E-01	1.54E-02	1.54E-02	3.18E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.97E+00	9.92E+00	1.55E+01	2.71E-01	4.86E-01	9.59E+00

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 37 NAME=Englebert Ranch X= 0.3KM, Y= -4.8KM, Z= 0.0M, DIST= 4.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.06E+01	2.09E+01	1.61E+02	5.76E-01	6.37E-01	0.00E+00
INFANT	GROUND	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
INFANT	CLOUD	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.06E+01	2.09E+01	1.61E+02	5.89E-01	6.50E-01	1.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.00E+01	1.81E+01	7.74E+01	2.41E-01	2.44E-01	0.00E+00
CHILD	GROUND	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
CHILD	CLOUD	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07
CHILD	VEG. ING	8.13E-02	1.06E+00	6.48E-02	6.48E-02	2.57E-01	0.00E+00
CHILD	MEAT ING	8.01E-03	1.10E-01	1.08E-02	1.08E-02	2.37E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.01E+01	1.92E+01	7.75E+01	3.30E-01	5.38E-01	1.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.60E+00	1.92E+01	4.03E+01	1.14E-01	1.34E-01	0.00E+00
TEENAGE	GROUND	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
TEENAGE	CLOUD	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07
TEENAGE	VEG. ING	1.34E-01	1.75E+00	1.07E-01	1.07E-01	4.25E-01	0.00E+00
TEENAGE	MEAT ING	1.30E-02	1.79E-01	1.76E-02	1.76E-02	3.85E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.76E+00	2.11E+01	4.05E+01	2.51E-01	6.10E-01	1.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.76E+00	1.86E+01	3.36E+01	9.56E-02	1.06E-01	0.00E+00
ADULT	GROUND	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02	1.30E-02
ADULT	CLOUD	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07	4.09E-07
ADULT	VEG. ING	1.86E-01	2.42E+00	1.48E-01	1.48E-01	5.86E-01	0.00E+00
ADULT	MEAT ING	2.27E-02	3.13E-01	3.07E-02	3.07E-02	6.72E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.98E+00	2.13E+01	3.37E+01	2.87E-01	7.73E-01	1.30E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 37 NAME=Englebert Ranch X= 0.3KM, Y= -4.8KM, Z= 0.0M, DIST= 4.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.21E+01	2.10E+01	1.61E+02	8.25E-01	7.33E-01	2.53E+01
INFANT	GROUND	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
INFANT	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.24E+01	2.13E+01	1.61E+02	1.15E+00	1.06E+00	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.16E+01	1.81E+01	7.74E+01	3.52E-01	2.90E-01	2.53E+01
CHILD	GROUND	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
CHILD	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
CHILD	VEG. ING	8.46E-02	1.10E+00	7.60E-02	7.60E-02	2.66E-01	0.00E+00
CHILD	MEAT ING	8.52E-03	1.16E-01	1.26E-02	1.26E-02	2.51E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.20E+01	1.96E+01	7.78E+01	7.70E-01	9.10E-01	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.12E+00	1.93E+01	4.03E+01	1.61E-01	1.57E-01	2.53E+01
TEENAGE	GROUND	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
TEENAGE	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
TEENAGE	VEG. ING	1.40E-01	1.82E+00	1.25E-01	1.25E-01	4.40E-01	0.00E+00
TEENAGE	MEAT ING	1.38E-02	1.89E-01	2.05E-02	2.05E-02	4.08E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.61E+00	2.16E+01	4.08E+01	6.37E-01	9.67E-01	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.29E+00	1.87E+01	3.36E+01	1.35E-01	1.25E-01	2.53E+01
ADULT	GROUND	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
ADULT	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
ADULT	VEG. ING	1.93E-01	2.51E+00	1.73E-01	1.73E-01	6.07E-01	0.00E+00
ADULT	MEAT ING	2.42E-02	3.30E-01	3.58E-02	3.58E-02	7.13E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.83E+00	2.18E+01	3.41E+01	6.74E-01	1.13E+00	2.56E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 38 NAME=Burdock School X= -2.3KM, Y= -2.0KM, Z= 0.0M, DIST= 3.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.88E+01	1.92E+01	1.47E+02	5.28E-01	5.83E-01	0.00E+00
INFANT	GROUND	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
INFANT	CLOUD	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.88E+01	1.92E+01	1.47E+02	5.40E-01	5.95E-01	1.19E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.18E+00	1.65E+01	7.08E+01	2.21E-01	2.24E-01	0.00E+00
CHILD	GROUND	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
CHILD	CLOUD	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07
CHILD	VEG. ING	7.44E-02	9.71E-01	5.94E-02	5.94E-02	2.35E-01	0.00E+00
CHILD	MEAT ING	7.33E-03	1.01E-01	9.92E-03	9.92E-03	2.17E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.27E+00	1.76E+01	7.09E+01	3.02E-01	4.92E-01	1.19E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.12E+00	1.76E+01	3.69E+01	1.04E-01	1.22E-01	0.00E+00
TEENAGE	GROUND	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
TEENAGE	CLOUD	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07
TEENAGE	VEG. ING	1.23E-01	1.61E+00	9.79E-02	9.79E-02	3.88E-01	0.00E+00
TEENAGE	MEAT ING	1.19E-02	1.64E-01	1.61E-02	1.61E-02	3.52E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.27E+00	1.93E+01	3.70E+01	2.30E-01	5.58E-01	1.19E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.36E+00	1.70E+01	3.07E+01	8.76E-02	9.72E-02	0.00E+00
ADULT	GROUND	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
ADULT	CLOUD	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07	3.74E-07
ADULT	VEG. ING	1.70E-01	2.22E+00	1.35E-01	1.35E-01	5.36E-01	0.00E+00
ADULT	MEAT ING	2.08E-02	2.86E-01	2.81E-02	2.81E-02	6.15E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.56E+00	1.96E+01	3.09E+01	2.63E-01	7.07E-01	1.19E-02

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 38 NAME=Burdock School X= -2.3KM, Y= -2.0KM, Z= 0.0M, DIST= 3.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.02E+01	1.92E+01	1.47E+02	6.92E-01	6.47E-01	2.36E+01
INFANT	GROUND	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01
INFANT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.05E+01	1.95E+01	1.48E+02	9.87E-01	9.41E-01	2.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.06E+01	1.66E+01	7.08E+01	2.94E-01	2.54E-01	2.36E+01
CHILD	GROUND	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01
CHILD	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
CHILD	VEG. ING	7.66E-02	9.96E-01	6.68E-02	6.68E-02	2.41E-01	0.00E+00
CHILD	MEAT ING	7.67E-03	1.05E-01	1.11E-02	1.11E-02	2.26E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.10E+01	1.80E+01	7.12E+01	6.66E-01	8.12E-01	2.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.55E+00	1.76E+01	3.69E+01	1.36E-01	1.38E-01	2.36E+01
TEENAGE	GROUND	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01
TEENAGE	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
TEENAGE	VEG. ING	1.27E-01	1.65E+00	1.10E-01	1.10E-01	3.98E-01	0.00E+00
TEENAGE	MEAT ING	1.25E-02	1.70E-01	1.80E-02	1.80E-02	3.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.98E+00	1.97E+01	3.73E+01	5.58E-01	8.67E-01	2.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.78E+00	1.71E+01	3.07E+01	1.14E-01	1.10E-01	2.36E+01
ADULT	GROUND	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01	1.33E-01
ADULT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
ADULT	VEG. ING	1.75E-01	2.27E+00	1.52E-01	1.52E-01	5.50E-01	0.00E+00
ADULT	MEAT ING	2.18E-02	2.97E-01	3.15E-02	3.15E-02	6.43E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.27E+00	1.99E+01	3.12E+01	5.92E-01	1.02E+00	2.39E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 39 NAME=Heck Ranch X= 1.7KM, Y= -6.4KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.28E+01	1.31E+01	1.01E+02	3.60E-01	3.97E-01	0.00E+00
INFANT	GROUND	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
INFANT	CLOUD	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.28E+01	1.31E+01	1.01E+02	3.68E-01	4.06E-01	8.14E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.26E+00	1.13E+01	4.83E+01	1.51E-01	1.52E-01	0.00E+00
CHILD	GROUND	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
CHILD	CLOUD	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07
CHILD	VEG. ING	5.07E-02	6.62E-01	4.05E-02	4.05E-02	1.60E-01	0.00E+00
CHILD	MEAT ING	5.00E-03	6.88E-02	6.76E-03	6.76E-03	1.48E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	6.32E+00	1.20E+01	4.83E+01	2.06E-01	3.36E-01	8.14E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.49E+00	1.20E+01	2.52E+01	7.11E-02	8.35E-02	0.00E+00
TEENAGE	GROUND	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
TEENAGE	CLOUD	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07
TEENAGE	VEG. ING	8.39E-02	1.10E+00	6.67E-02	6.67E-02	2.65E-01	0.00E+00
TEENAGE	MEAT ING	8.11E-03	1.12E-01	1.10E-02	1.10E-02	2.40E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.59E+00	1.32E+01	2.52E+01	1.57E-01	3.81E-01	8.14E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.97E+00	1.16E+01	2.09E+01	5.97E-02	6.62E-02	0.00E+00
ADULT	GROUND	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
ADULT	CLOUD	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07	2.55E-07
ADULT	VEG. ING	1.16E-01	1.51E+00	9.22E-02	9.22E-02	3.66E-01	0.00E+00
ADULT	MEAT ING	1.42E-02	1.95E-01	1.92E-02	1.92E-02	4.20E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.11E+00	1.33E+01	2.11E+01	1.79E-01	4.82E-01	8.14E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 39 NAME=Heck Ranch X= 1.7KM, Y= -6.4KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.41E+01	1.31E+01	1.01E+02	6.50E-01	5.10E-01	2.13E+01
INFANT	GROUND	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02
INFANT	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.44E+01	1.34E+01	1.01E+02	9.06E-01	7.67E-01	2.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	7.55E+00	1.13E+01	4.83E+01	2.80E-01	2.06E-01	2.13E+01
CHILD	GROUND	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02
CHILD	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
CHILD	VEG. ING	5.45E-02	7.06E-01	5.35E-02	5.35E-02	1.71E-01	0.00E+00
CHILD	MEAT ING	5.60E-03	7.57E-02	8.84E-03	8.84E-03	1.65E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	7.87E+00	1.24E+01	4.86E+01	5.99E-01	6.50E-01	2.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.78E+00	1.21E+01	2.52E+01	1.26E-01	1.10E-01	2.13E+01
TEENAGE	GROUND	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02
TEENAGE	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
TEENAGE	VEG. ING	9.02E-02	1.17E+00	8.83E-02	8.83E-02	2.83E-01	0.00E+00
TEENAGE	MEAT ING	9.09E-03	1.23E-01	1.43E-02	1.43E-02	2.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.14E+00	1.36E+01	2.55E+01	4.86E-01	6.76E-01	2.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.26E+00	1.17E+01	2.09E+01	1.06E-01	8.84E-02	2.13E+01
ADULT	GROUND	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02	9.10E-02
ADULT	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
ADULT	VEG. ING	1.25E-01	1.61E+00	1.22E-01	1.22E-01	3.90E-01	0.00E+00
ADULT	MEAT ING	1.59E-02	2.15E-01	2.51E-02	2.51E-02	4.68E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.66E+00	1.38E+01	2.13E+01	5.09E-01	7.82E-01	2.16E+01

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 40 NAME=Edgemont X= 11.0KM, Y= -18.6KM, Z= 0.0M, DIST= 21.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.19E+00	3.24E+00	2.50E+01	8.93E-02	9.87E-02	0.00E+00
INFANT	GROUND	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03
INFANT	CLOUD	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.19E+00	3.24E+00	2.50E+01	9.13E-02	1.01E-01	2.02E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.55E+00	2.80E+00	1.20E+01	3.74E-02	3.79E-02	0.00E+00
CHILD	GROUND	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03
CHILD	CLOUD	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08
CHILD	VEG. ING	1.26E-02	1.64E-01	1.00E-02	1.00E-02	3.98E-02	0.00E+00
CHILD	MEAT ING	1.24E-03	1.71E-02	1.68E-03	1.68E-03	3.67E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.57E+00	2.98E+00	1.20E+01	5.11E-02	8.33E-02	2.02E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.68E-01	2.97E+00	6.25E+00	1.77E-02	2.07E-02	0.00E+00
TEENAGE	GROUND	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03
TEENAGE	CLOUD	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08
TEENAGE	VEG. ING	2.08E-02	2.72E-01	1.66E-02	1.66E-02	6.58E-02	0.00E+00
TEENAGE	MEAT ING	2.01E-03	2.77E-02	2.73E-03	2.73E-03	5.96E-03	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.92E-01	3.27E+00	6.27E+00	3.90E-02	9.45E-02	2.02E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.38E-01	2.88E+00	5.20E+00	1.48E-02	1.64E-02	0.00E+00
ADULT	GROUND	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03
ADULT	CLOUD	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08	6.33E-08
ADULT	VEG. ING	2.88E-02	3.75E-01	2.29E-02	2.29E-02	9.08E-02	0.00E+00
ADULT	MEAT ING	3.52E-03	4.84E-02	4.76E-03	4.76E-03	1.04E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.72E-01	3.31E+00	5.23E+00	4.45E-02	1.20E-01	2.02E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 40 NAME=Edgemont X= 11.0KM, Y= -18.6KM, Z= 0.0M, DIST= 21.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.51E+00	3.29E+00	2.50E+01	3.67E-01	2.07E-01	5.04E+00
INFANT	GROUND	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
INFANT	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.57E+00	3.36E+00	2.50E+01	4.32E-01	2.72E-01	5.11E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.87E+00	2.84E+00	1.20E+01	1.61E-01	8.87E-02	5.04E+00
CHILD	GROUND	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
CHILD	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
CHILD	VEG. ING	1.62E-02	2.06E-01	2.25E-02	2.25E-02	4.99E-02	0.00E+00
CHILD	MEAT ING	1.82E-03	2.38E-02	3.67E-03	3.67E-03	5.29E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.95E+00	3.13E+00	1.21E+01	2.52E-01	2.09E-01	5.11E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.18E+00	3.07E+00	6.25E+00	7.06E-02	4.61E-02	5.04E+00
TEENAGE	GROUND	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
TEENAGE	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
TEENAGE	VEG. ING	2.68E-02	3.41E-01	3.72E-02	3.72E-02	8.26E-02	0.00E+00
TEENAGE	MEAT ING	2.95E-03	3.86E-02	5.95E-03	5.95E-03	8.59E-03	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.27E+00	3.52E+00	6.36E+00	1.79E-01	2.02E-01	5.11E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.05E+00	2.94E+00	5.20E+00	5.89E-02	3.76E-02	5.04E+00
ADULT	GROUND	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
ADULT	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
ADULT	VEG. ING	3.71E-02	4.71E-01	5.14E-02	5.14E-02	1.14E-01	0.00E+00
ADULT	MEAT ING	5.16E-03	6.74E-02	1.04E-02	1.04E-02	1.50E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.16E+00	3.55E+00	5.33E+00	1.86E-01	2.32E-01	5.11E+00

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 41 NAME=Background X= -5.3KM, Y= -3.0KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	6.81E+00	6.93E+00	5.33E+01	1.91E-01	2.11E-01	0.00E+00
INFANT	GROUND	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03
INFANT	CLOUD	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	6.81E+00	6.94E+00	5.33E+01	1.95E-01	2.15E-01	4.32E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	3.32E+00	5.99E+00	2.56E+01	8.00E-02	8.09E-02	0.00E+00
CHILD	GROUND	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03
CHILD	CLOUD	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07
CHILD	VEG. ING	2.69E-02	3.51E-01	2.15E-02	2.15E-02	8.49E-02	0.00E+00
CHILD	MEAT ING	2.65E-03	3.65E-02	3.59E-03	3.59E-03	7.85E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.35E+00	6.38E+00	2.56E+01	1.09E-01	1.78E-01	4.32E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.85E+00	6.36E+00	1.33E+01	3.78E-02	4.43E-02	0.00E+00
TEENAGE	GROUND	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03
TEENAGE	CLOUD	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07
TEENAGE	VEG. ING	4.45E-02	5.81E-01	3.54E-02	3.54E-02	1.41E-01	0.00E+00
TEENAGE	MEAT ING	4.30E-03	5.92E-02	5.83E-03	5.83E-03	1.27E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.91E+00	7.00E+00	1.34E+01	8.34E-02	2.02E-01	4.32E-03

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.58E+00	6.17E+00	1.11E+01	3.17E-02	3.52E-02	0.00E+00
ADULT	GROUND	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03	4.32E-03
ADULT	CLOUD	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07
ADULT	VEG. ING	6.15E-02	8.02E-01	4.90E-02	4.90E-02	1.94E-01	0.00E+00
ADULT	MEAT ING	7.52E-03	1.04E-01	1.02E-02	1.02E-02	2.23E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.65E+00	7.08E+00	1.12E+01	9.52E-02	2.56E-01	4.32E-03

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 41 NAME=Background X= -5.3KM, Y= -3.0KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	7.68E+00	6.97E+00	5.33E+01	3.57E-01	2.75E-01	1.44E+01
INFANT	GROUND	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02
INFANT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	7.85E+00	7.13E+00	5.35E+01	5.21E-01	4.39E-01	1.46E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.19E+00	6.01E+00	2.56E+01	1.54E-01	1.11E-01	1.44E+01
CHILD	GROUND	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02
CHILD	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
CHILD	VEG. ING	2.91E-02	3.76E-01	2.90E-02	2.90E-02	9.10E-02	0.00E+00
CHILD	MEAT ING	3.00E-03	4.05E-02	4.78E-03	4.78E-03	8.81E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.39E+00	6.59E+00	2.58E+01	3.51E-01	3.75E-01	1.46E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.72E+00	6.42E+00	1.33E+01	6.94E-02	5.95E-02	1.44E+01
TEENAGE	GROUND	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02
TEENAGE	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
TEENAGE	VEG. ING	4.81E-02	6.23E-01	4.78E-02	4.78E-02	1.51E-01	0.00E+00
TEENAGE	MEAT ING	4.87E-03	6.57E-02	7.76E-03	7.76E-03	1.43E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.94E+00	7.27E+00	1.36E+01	2.89E-01	3.88E-01	1.46E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.45E+00	6.20E+00	1.11E+01	5.80E-02	4.78E-02	1.44E+01
ADULT	GROUND	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02	4.86E-02
ADULT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
ADULT	VEG. ING	6.64E-02	8.60E-01	6.60E-02	6.60E-02	2.08E-01	0.00E+00
ADULT	MEAT ING	8.50E-03	1.15E-01	1.36E-02	1.36E-02	2.50E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.69E+00	7.34E+00	1.13E+01	3.01E-01	4.44E-01	1.46E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE N DIRECTION, THETA EQUALS 0.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	3.953E-02	1.372E-02	8.231E-03	8.231E-03	2.090E+01	2.052E+01	1.375E+01	9.127E+00	2.226E-05	1.249E-04
2.5	4.633E-03	1.611E-03	9.667E-04	9.667E-04	1.449E+01	1.445E+01	1.133E+01	8.489E+00	2.125E-05	1.040E-04
3.5	3.025E-03	1.052E-03	6.315E-04	6.315E-04	1.158E+01	1.156E+01	9.789E+00	7.946E+00	2.301E-05	9.117E-05
4.5	1.996E-03	6.945E-04	4.168E-04	4.168E-04	8.481E+00	8.478E+00	7.560E+00	6.493E+00	2.276E-05	7.128E-05
7.5	7.947E-04	2.766E-04	1.660E-04	1.660E-04	4.908E+00	4.910E+00	4.713E+00	4.446E+00	2.706E-05	4.553E-05
15.0	2.157E-04	7.509E-05	4.507E-05	4.507E-05	2.240E+00	2.241E+00	2.236E+00	2.218E+00	3.430E-05	2.192E-05
25.0	6.321E-05	2.201E-05	1.321E-05	1.321E-05	1.273E+00	1.274E+00	1.278E+00	1.278E+00	3.725E-05	1.256E-05
35.0	2.610E-05	9.085E-06	5.453E-06	5.453E-06	8.510E-01	8.515E-01	8.553E-01	8.577E-01	3.745E-05	8.413E-06
45.0	1.314E-05	4.574E-06	2.745E-06	2.745E-06	6.233E-01	6.236E-01	6.266E-01	6.288E-01	3.695E-05	6.165E-06
55.0	7.434E-06	2.588E-06	1.553E-06	1.553E-06	4.832E-01	4.835E-01	4.859E-01	4.876E-01	3.627E-05	4.780E-06
65.0	4.493E-06	1.564E-06	9.388E-07	9.388E-07	3.893E-01	3.895E-01	3.914E-01	3.928E-01	3.553E-05	3.851E-06
75.0	2.827E-06	9.842E-07	5.907E-07	5.907E-07	3.223E-01	3.225E-01	3.241E-01	3.252E-01	3.480E-05	3.188E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	4.120E+05	1.429E+05	8.439E+04	8.439E+04	0.000E+00	8.440E+04	8.440E+04	8.440E+04	4.636E+01
2.5	4.830E+04	1.679E+04	9.912E+03	9.912E+03	0.000E+00	9.923E+03	9.923E+03	9.923E+03	4.426E+01
3.5	3.153E+04	1.097E+04	6.475E+03	6.475E+03	0.000E+00	6.484E+03	6.484E+03	6.484E+03	4.793E+01
4.5	2.080E+04	7.237E+03	4.273E+03	4.273E+03	0.000E+00	4.280E+03	4.280E+03	4.280E+03	4.741E+01
7.5	8.284E+03	2.882E+03	1.702E+03	1.702E+03	0.000E+00	1.706E+03	1.706E+03	1.706E+03	5.636E+01
15.0	2.249E+03	7.825E+02	4.621E+02	4.621E+02	0.000E+00	4.638E+02	4.638E+02	4.638E+02	7.145E+01
25.0	6.589E+02	2.293E+02	1.354E+02	1.354E+02	0.000E+00	1.364E+02	1.364E+02	1.364E+02	7.760E+01
35.0	2.720E+02	9.467E+01	5.590E+01	5.590E+01	0.000E+00	5.658E+01	5.658E+01	5.658E+01	7.801E+01
45.0	1.370E+02	4.766E+01	2.815E+01	2.815E+01	0.000E+00	2.864E+01	2.864E+01	2.864E+01	7.698E+01
55.0	7.749E+01	2.696E+01	1.592E+01	1.592E+01	0.000E+00	1.631E+01	1.631E+01	1.631E+01	7.554E+01
65.0	4.684E+01	1.630E+01	9.625E+00	9.625E+00	0.000E+00	9.934E+00	9.934E+00	9.934E+00	7.401E+01
75.0	2.947E+01	1.026E+01	6.056E+00	6.056E+00	0.000E+00	6.312E+00	6.312E+00	6.312E+00	7.248E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	3.953E-04	1.372E-04	8.231E-05	8.237E-05
2.5	4.633E-05	1.611E-05	9.667E-06	9.731E-06
3.5	3.025E-05	1.052E-05	6.315E-06	6.384E-06
4.5	1.996E-05	6.945E-06	4.168E-06	4.236E-06
7.5	7.947E-06	2.766E-06	1.660E-06	1.741E-06
15.0	2.157E-06	7.509E-07	4.507E-07	5.536E-07
25.0	6.321E-07	2.201E-07	1.321E-07	2.438E-07
35.0	2.610E-07	9.085E-08	5.453E-08	1.669E-07
45.0	1.314E-07	4.574E-08	2.745E-08	1.383E-07
55.0	7.434E-08	2.588E-08	1.553E-08	1.243E-07
65.0	4.493E-08	1.564E-08	9.388E-09	1.160E-07
75.0	2.827E-08	9.842E-09	5.907E-09	1.103E-07

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE E DIRECTION, THETA EQUALS 90.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.481E-03	2.599E-03	1.560E-03	1.560E-03	2.830E+01	2.724E+01	1.267E+01	6.790E+00	2.446E-05	1.176E-04
2.5	4.745E-03	1.649E-03	9.897E-04	9.897E-04	2.122E+01	2.080E+01	1.106E+01	6.519E+00	2.552E-05	1.018E-04
3.5	3.134E-03	1.089E-03	6.538E-04	6.538E-04	1.381E+01	1.365E+01	9.630E+00	6.729E+00	2.855E-05	8.799E-05
4.5	2.159E-03	7.508E-04	4.506E-04	4.506E-04	1.010E+01	1.006E+01	8.132E+00	6.430E+00	3.137E-05	7.557E-05
7.5	1.128E-03	3.923E-04	2.354E-04	2.354E-04	5.018E+00	5.017E+00	4.634E+00	4.260E+00	3.430E-05	4.455E-05
15.0	4.277E-04	1.488E-04	8.933E-05	8.933E-05	2.292E+00	2.294E+00	2.237E+00	2.163E+00	3.760E-05	2.177E-05
25.0	1.753E-04	6.103E-05	3.663E-05	3.663E-05	1.270E+00	1.271E+00	1.262E+00	1.246E+00	3.722E-05	1.236E-05
35.0	8.995E-05	3.131E-05	1.879E-05	1.879E-05	8.527E-01	8.531E-01	8.530E-01	8.490E-01	3.629E-05	8.370E-06
45.0	5.216E-05	1.816E-05	1.090E-05	1.090E-05	6.287E-01	6.290E-01	6.305E-01	6.299E-01	3.530E-05	6.194E-06
55.0	3.260E-05	1.135E-05	6.810E-06	6.810E-06	4.904E-01	4.907E-01	4.924E-01	4.929E-01	3.437E-05	4.841E-06
65.0	2.142E-05	7.457E-06	4.476E-06	4.476E-06	3.973E-01	3.976E-01	3.992E-01	4.000E-01	3.351E-05	3.925E-06
75.0	1.461E-05	5.087E-06	3.053E-06	3.053E-06	3.307E-01	3.309E-01	3.324E-01	3.333E-01	3.271E-05	3.269E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.798E+04	2.708E+04	1.599E+04	1.599E+04	0.000E+00	1.601E+04	1.601E+04	1.601E+04	5.096E+01
2.5	4.946E+04	1.718E+04	1.015E+04	1.015E+04	0.000E+00	1.016E+04	1.016E+04	1.016E+04	5.316E+01
3.5	3.266E+04	1.135E+04	6.704E+03	6.704E+03	0.000E+00	6.714E+03	6.714E+03	6.714E+03	5.948E+01
4.5	2.250E+04	7.823E+03	4.620E+03	4.620E+03	0.000E+00	4.628E+03	4.628E+03	4.628E+03	6.534E+01
7.5	1.176E+04	4.088E+03	2.414E+03	2.414E+03	0.000E+00	2.418E+03	2.418E+03	2.418E+03	7.144E+01
15.0	4.458E+03	1.551E+03	9.159E+02	9.159E+02	0.000E+00	9.177E+02	9.177E+02	9.177E+02	7.832E+01
25.0	1.828E+03	6.359E+02	3.755E+02	3.755E+02	0.000E+00	3.765E+02	3.765E+02	3.765E+02	7.753E+01
35.0	9.377E+02	3.263E+02	1.927E+02	1.927E+02	0.000E+00	1.934E+02	1.934E+02	1.934E+02	7.558E+01
45.0	5.437E+02	1.892E+02	1.117E+02	1.117E+02	0.000E+00	1.122E+02	1.122E+02	1.122E+02	7.353E+01
55.0	3.398E+02	1.182E+02	6.982E+01	6.982E+01	0.000E+00	7.021E+01	7.021E+01	7.021E+01	7.159E+01
65.0	2.233E+02	7.770E+01	4.589E+01	4.589E+01	0.000E+00	4.620E+01	4.620E+01	4.620E+01	6.979E+01
75.0	1.523E+02	5.301E+01	3.130E+01	3.130E+01	0.000E+00	3.157E+01	3.157E+01	3.157E+01	6.813E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.481E-05	2.599E-05	1.560E-05	1.567E-05
2.5	4.745E-05	1.649E-05	9.897E-06	9.973E-06
3.5	3.134E-05	1.089E-05	6.538E-06	6.624E-06
4.5	2.159E-05	7.508E-06	4.506E-06	4.600E-06
7.5	1.128E-05	3.923E-06	2.354E-06	2.457E-06
15.0	4.277E-06	1.488E-06	8.933E-07	1.006E-06
25.0	1.753E-06	6.103E-07	3.663E-07	4.779E-07
35.0	8.995E-07	3.131E-07	1.879E-07	2.968E-07
45.0	5.216E-07	1.816E-07	1.090E-07	2.149E-07
55.0	3.260E-07	1.135E-07	6.810E-08	1.712E-07
65.0	2.142E-07	7.457E-08	4.476E-08	1.453E-07
75.0	1.461E-07	5.087E-08	3.053E-08	1.287E-07

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE S DIRECTION, THETA EQUALS 180.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	1.210E-02	4.205E-03	2.526E-03	2.526E-03	4.362E+01	4.322E+01	2.664E+01	1.562E+01	4.300E-05	2.379E-04
2.5	1.407E-02	4.890E-03	2.939E-03	2.939E-03	3.222E+01	3.215E+01	2.503E+01	1.819E+01	5.851E-05	2.278E-04
3.5	8.991E-03	3.125E-03	1.878E-03	1.878E-03	2.512E+01	2.512E+01	2.170E+01	1.783E+01	7.268E-05	2.024E-04
4.5	4.164E-03	1.448E-03	8.697E-04	8.697E-04	2.131E+01	2.131E+01	1.951E+01	1.725E+01	8.752E-05	1.852E-04
7.5	1.536E-03	5.345E-04	3.209E-04	3.209E-04	1.313E+01	1.313E+01	1.279E+01	1.232E+01	1.092E-04	1.243E-04
15.0	4.213E-04	1.466E-04	8.802E-05	8.802E-05	6.424E+00	6.428E+00	6.405E+00	6.346E+00	1.206E-04	6.276E-05
25.0	1.520E-04	5.293E-05	3.177E-05	3.177E-05	3.569E+00	3.571E+00	3.581E+00	3.579E+00	1.183E-04	3.518E-05
35.0	7.138E-05	2.485E-05	1.492E-05	1.492E-05	2.365E+00	2.366E+00	2.376E+00	2.381E+00	1.136E-04	2.337E-05
45.0	3.851E-05	1.341E-05	8.049E-06	8.049E-06	1.719E+00	1.720E+00	1.728E+00	1.733E+00	1.090E-04	1.700E-05
55.0	2.259E-05	7.868E-06	4.722E-06	4.722E-06	1.323E+00	1.323E+00	1.330E+00	1.334E+00	1.047E-04	1.308E-05
65.0	1.405E-05	4.893E-06	2.936E-06	2.936E-06	1.058E+00	1.058E+00	1.064E+00	1.067E+00	1.010E-04	1.046E-05
75.0	9.172E-06	3.194E-06	1.917E-06	1.917E-06	8.698E-01	8.703E-01	8.745E-01	8.776E-01	9.758E-05	8.604E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	1.261E+05	4.381E+04	2.590E+04	2.590E+04	0.000E+00	2.593E+04	2.593E+04	2.593E+04	8.956E+01
2.5	1.467E+05	5.095E+04	3.013E+04	3.013E+04	0.000E+00	3.015E+04	3.015E+04	3.015E+04	1.219E+02
3.5	9.372E+04	3.256E+04	1.925E+04	1.925E+04	0.000E+00	1.927E+04	1.927E+04	1.927E+04	1.514E+02
4.5	4.340E+04	1.509E+04	8.917E+03	8.917E+03	0.000E+00	8.934E+03	8.934E+03	8.934E+03	1.823E+02
7.5	1.601E+04	5.569E+03	3.290E+03	3.290E+03	0.000E+00	3.301E+03	3.301E+03	3.301E+03	2.274E+02
15.0	4.391E+03	1.528E+03	9.025E+02	9.025E+02	0.000E+00	9.076E+02	9.076E+02	9.076E+02	2.512E+02
25.0	1.585E+03	5.515E+02	3.257E+02	3.257E+02	0.000E+00	3.285E+02	3.285E+02	3.285E+02	2.465E+02
35.0	7.440E+02	2.590E+02	1.529E+02	1.529E+02	0.000E+00	1.548E+02	1.548E+02	1.548E+02	2.366E+02
45.0	4.014E+02	1.397E+02	8.253E+01	8.253E+01	0.000E+00	8.389E+01	8.389E+01	8.389E+01	2.270E+02
55.0	2.355E+02	8.199E+01	4.842E+01	4.842E+01	0.000E+00	4.946E+01	4.946E+01	4.946E+01	2.182E+02
65.0	1.464E+02	5.098E+01	3.011E+01	3.011E+01	0.000E+00	3.095E+01	3.095E+01	3.095E+01	2.103E+02
75.0	9.561E+01	3.328E+01	1.966E+01	1.966E+01	0.000E+00	2.034E+01	2.034E+01	2.034E+01	2.033E+02

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	1.210E-04	4.205E-05	2.526E-05	2.539E-05
2.5	1.407E-04	4.890E-05	2.939E-05	2.956E-05
3.5	8.991E-05	3.125E-05	1.878E-05	1.900E-05
4.5	4.164E-05	1.448E-05	8.697E-06	8.960E-06
7.5	1.536E-05	5.345E-06	3.209E-06	3.537E-06
15.0	4.213E-06	1.466E-06	8.802E-07	1.242E-06
25.0	1.520E-06	5.293E-07	3.177E-07	6.727E-07
35.0	7.138E-07	2.485E-07	1.492E-07	4.900E-07
45.0	3.851E-07	1.341E-07	8.049E-08	4.074E-07
55.0	2.259E-07	7.868E-08	4.722E-08	3.615E-07
65.0	1.405E-07	4.893E-08	2.936E-08	3.323E-07
75.0	9.172E-08	3.194E-08	1.917E-08	3.119E-07

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE W DIRECTION, THETA EQUALS 270.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.166E-03	2.493E-03	1.497E-03	1.497E-03	2.169E+01	2.126E+01	1.527E+01	1.141E+01	3.253E-05	1.419E-04
2.5	4.706E-03	1.639E-03	9.839E-04	9.839E-04	2.583E+01	2.568E+01	2.061E+01	1.608E+01	4.191E-05	1.909E-04
3.5	4.211E-03	1.468E-03	8.808E-04	8.808E-04	2.714E+01	2.710E+01	2.248E+01	1.763E+01	4.461E-05	2.077E-04
4.5	3.330E-03	1.161E-03	6.966E-04	6.966E-04	2.397E+01	2.395E+01	2.016E+01	1.586E+01	4.069E-05	1.860E-04
7.5	9.519E-04	3.316E-04	1.990E-04	1.990E-04	8.250E+00	8.252E+00	7.601E+00	6.713E+00	2.843E-05	7.208E-05
15.0	3.075E-04	1.071E-04	6.425E-05	6.425E-05	1.829E+00	1.830E+00	1.756E+00	1.678E+00	2.200E-05	1.705E-05
25.0	1.395E-04	4.857E-05	2.915E-05	2.915E-05	8.966E-01	8.971E-01	8.823E-01	8.591E-01	2.097E-05	8.602E-06
35.0	7.893E-05	2.748E-05	1.649E-05	1.649E-05	5.670E-01	5.673E-01	5.644E-01	5.571E-01	1.978E-05	5.524E-06
45.0	4.941E-05	1.720E-05	1.032E-05	1.032E-05	4.045E-01	4.047E-01	4.048E-01	4.026E-01	1.880E-05	3.971E-06
55.0	3.289E-05	1.145E-05	6.872E-06	6.872E-06	3.093E-01	3.095E-01	3.102E-01	3.098E-01	1.799E-05	3.047E-06
65.0	2.282E-05	7.943E-06	4.768E-06	4.768E-06	2.473E-01	2.475E-01	2.484E-01	2.486E-01	1.729E-05	2.441E-06
75.0	1.632E-05	5.682E-06	3.411E-06	3.411E-06	2.041E-01	2.042E-01	2.050E-01	2.055E-01	1.669E-05	2.016E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.470E+04	2.598E+04	1.535E+04	1.535E+04	0.000E+00	1.537E+04	1.537E+04	1.537E+04	6.776E+01
2.5	4.906E+04	1.708E+04	1.009E+04	1.009E+04	0.000E+00	1.011E+04	1.011E+04	1.011E+04	8.730E+01
3.5	4.390E+04	1.530E+04	9.031E+03	9.031E+03	0.000E+00	9.052E+03	9.052E+03	9.052E+03	9.292E+01
4.5	3.471E+04	1.210E+04	7.142E+03	7.142E+03	0.000E+00	7.161E+03	7.161E+03	7.161E+03	8.476E+01
7.5	9.922E+03	3.455E+03	2.040E+03	2.040E+03	0.000E+00	2.047E+03	2.047E+03	2.047E+03	5.923E+01
15.0	3.205E+03	1.115E+03	6.587E+02	6.587E+02	0.000E+00	6.602E+02	6.602E+02	6.602E+02	4.583E+01
25.0	1.454E+03	5.062E+02	2.989E+02	2.989E+02	0.000E+00	2.996E+02	2.996E+02	2.996E+02	4.368E+01
35.0	8.228E+02	2.863E+02	1.691E+02	1.691E+02	0.000E+00	1.696E+02	1.696E+02	1.696E+02	4.121E+01
45.0	5.150E+02	1.792E+02	1.059E+02	1.059E+02	0.000E+00	1.062E+02	1.062E+02	1.062E+02	3.916E+01
55.0	3.428E+02	1.193E+02	7.046E+01	7.046E+01	0.000E+00	7.070E+01	7.070E+01	7.070E+01	3.746E+01
65.0	2.378E+02	8.277E+01	4.888E+01	4.888E+01	0.000E+00	4.908E+01	4.908E+01	4.908E+01	3.602E+01
75.0	1.701E+02	5.921E+01	3.497E+01	3.497E+01	0.000E+00	3.513E+01	3.513E+01	3.513E+01	3.476E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.166E-05	2.493E-05	1.497E-05	1.507E-05
2.5	4.706E-05	1.639E-05	9.839E-06	9.964E-06
3.5	4.211E-05	1.468E-05	8.808E-06	8.942E-06
4.5	3.330E-05	1.161E-05	6.966E-06	7.088E-06
7.5	9.519E-06	3.316E-06	1.990E-06	2.075E-06
15.0	3.075E-06	1.071E-06	6.425E-07	7.085E-07
25.0	1.395E-06	4.857E-07	2.915E-07	3.545E-07
35.0	7.893E-07	2.748E-07	1.649E-07	2.243E-07
45.0	4.941E-07	1.720E-07	1.032E-07	1.596E-07
55.0	3.289E-07	1.145E-07	6.872E-08	1.227E-07
65.0	2.282E-07	7.943E-08	4.768E-08	9.955E-08
75.0	1.632E-07	5.682E-08	3.411E-08	8.417E-08

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE WNW DIRECTION, THETA EQUALS 292.5 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	7.576E-03	2.635E-03	1.582E-03	1.582E-03	2.260E+01	2.229E+01	1.594E+01	1.162E+01	2.945E-05	1.471E-04
2.5	6.107E-03	2.127E-03	1.277E-03	1.277E-03	2.739E+01	2.711E+01	2.000E+01	1.423E+01	2.940E-05	1.824E-04
3.5	6.589E-03	2.297E-03	1.378E-03	1.378E-03	3.990E+01	3.942E+01	2.705E+01	1.718E+01	2.839E-05	2.418E-04
4.5	7.683E-03	2.680E-03	1.608E-03	1.608E-03	4.933E+01	4.887E+01	3.041E+01	1.674E+01	2.361E-05	2.670E-04
7.5	2.281E-03	7.955E-04	4.773E-04	4.773E-04	9.239E+00	9.140E+00	6.617E+00	4.617E+00	1.525E-05	6.019E-05
15.0	3.802E-04	1.325E-04	7.950E-05	7.950E-05	1.907E+00	1.908E+00	1.813E+00	1.714E+00	2.026E-05	1.755E-05
25.0	1.243E-04	4.330E-05	2.598E-05	2.598E-05	8.602E-01	8.606E-01	8.515E-01	8.348E-01	2.012E-05	8.318E-06
35.0	5.860E-05	2.041E-05	1.225E-05	1.225E-05	5.303E-01	5.306E-01	5.303E-01	5.272E-01	1.923E-05	5.202E-06
45.0	3.255E-05	1.134E-05	6.803E-06	6.803E-06	3.740E-01	3.742E-01	3.753E-01	3.751E-01	1.845E-05	3.687E-06
55.0	1.980E-05	6.895E-06	4.138E-06	4.138E-06	2.837E-01	2.839E-01	2.850E-01	2.855E-01	1.775E-05	2.802E-06
65.0	1.275E-05	4.441E-06	2.666E-06	2.666E-06	2.259E-01	2.260E-01	2.270E-01	2.276E-01	1.716E-05	2.233E-06
75.0	8.550E-06	2.977E-06	1.787E-06	1.787E-06	1.856E-01	1.857E-01	1.866E-01	1.872E-01	1.664E-05	1.836E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	7.896E+04	2.746E+04	1.622E+04	1.622E+04	0.000E+00	1.623E+04	1.623E+04	1.623E+04	6.134E+01
2.5	6.366E+04	2.217E+04	1.309E+04	1.309E+04	0.000E+00	1.311E+04	1.311E+04	1.311E+04	6.124E+01
3.5	6.868E+04	2.394E+04	1.413E+04	1.413E+04	0.000E+00	1.416E+04	1.416E+04	1.416E+04	5.913E+01
4.5	8.009E+04	2.793E+04	1.649E+04	1.649E+04	0.000E+00	1.652E+04	1.652E+04	1.652E+04	4.918E+01
7.5	2.378E+04	8.290E+03	4.894E+03	4.894E+03	0.000E+00	4.901E+03	4.901E+03	4.901E+03	3.176E+01
15.0	3.963E+03	1.381E+03	8.151E+02	8.151E+02	0.000E+00	8.166E+02	8.166E+02	8.166E+02	4.219E+01
25.0	1.296E+03	4.512E+02	2.664E+02	2.664E+02	0.000E+00	2.671E+02	2.671E+02	2.671E+02	4.191E+01
35.0	6.108E+02	2.127E+02	1.256E+02	1.256E+02	0.000E+00	1.260E+02	1.260E+02	1.260E+02	4.006E+01
45.0	3.393E+02	1.181E+02	6.975E+01	6.975E+01	0.000E+00	7.005E+01	7.005E+01	7.005E+01	3.842E+01
55.0	2.064E+02	7.185E+01	4.243E+01	4.243E+01	0.000E+00	4.265E+01	4.265E+01	4.265E+01	3.697E+01
65.0	1.330E+02	4.628E+01	2.733E+01	2.733E+01	0.000E+00	2.751E+01	2.751E+01	2.751E+01	3.575E+01
75.0	8.912E+01	3.102E+01	1.832E+01	1.832E+01	0.000E+00	1.847E+01	1.847E+01	1.847E+01	3.466E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	7.576E-05	2.635E-05	1.582E-05	1.590E-05
2.5	6.107E-05	2.127E-05	1.277E-05	1.285E-05
3.5	6.589E-05	2.297E-05	1.378E-05	1.387E-05
4.5	7.683E-05	2.680E-05	1.608E-05	1.615E-05
7.5	2.281E-05	7.955E-06	4.773E-06	4.819E-06
15.0	3.802E-06	1.325E-06	7.950E-07	8.558E-07
25.0	1.243E-06	4.330E-07	2.598E-07	3.202E-07
35.0	5.860E-07	2.041E-07	1.225E-07	1.802E-07
45.0	3.255E-07	1.134E-07	6.803E-08	1.234E-07
55.0	1.980E-07	6.895E-08	4.138E-08	9.463E-08
65.0	1.275E-07	4.441E-08	2.666E-08	7.815E-08
75.0	8.550E-08	2.977E-08	1.787E-08	6.778E-08

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.465E-03	1.421E-02	2.007E-03	5.010E-04	3.115E-04	3.326E-04	3.641E-04
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.459E-03	4.572E-04	1.370E-03	7.768E-04	1.727E-03	4.097E-03	1.531E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.141E-03	9.846E-04	1.509E-02	6.777E-02	4.528E-03	1.514E-02	2.161E-02
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.601E-02	1.438E-02	6.176E-04	1.370E-03	3.443E-03	5.003E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.361E-02	1.100E-02	6.079E-02	3.321E-01	1.265E-02	2.150E-03	2.059E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.209E-02	1.305E-02	2.197E-02	6.049E-02	2.276E-02	1.255E-02	8.709E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.783E-02	2.644E-01	8.568E-03	1.024E-02	2.724E-03	2.176E-03	4.316E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.844E-03	1.927E-02	2.973E-01	1.281E-02	1.053E-03	2.968E-03	1.372E-03	1.487E-03
S	0.000E+00	1.856E-02	0.000E+00	0.000E+00	2.238E-02	0.000E+00	1.465E-03	6.149E-04	1.058E-03	7.495E-05	4.408E-04	8.470E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.213E-03	1.791E-03	0.000E+00	6.529E-05	3.650E-05	2.973E-04	1.814E-04	3.251E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.460E-04	2.077E-04	1.670E-04	1.362E-04	2.846E-04
WSW	0.000E+00	0.000E+00	2.493E-02	0.000E+00	0.000E+00	3.487E-03	1.216E-03	7.678E-04	1.336E-04	6.508E-04	1.351E-04	1.141E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.112E-04	6.657E-04	0.000E+00	6.901E-04	4.096E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.410E-02	3.020E-03	3.310E-04	1.575E-04	7.974E-04	1.563E-03	1.049E-03	4.125E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.210E-02	1.112E-03	0.000E+00	9.263E-04	1.187E-03	1.029E-03	1.153E-03	1.164E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.585E-03	0.000E+00	5.365E-03	1.687E-02	1.694E-01	3.136E-03	5.546E-03	9.606E-04

TOTAL DOSE COMMITMENT IS 1.815E+00 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.957E-02	5.765E-02	8.495E-03	2.248E-03	1.499E-03	1.728E-03	2.045E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.757E-03	1.867E-03	5.899E-03	3.602E-03	8.707E-03	2.248E-02	9.097E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.478E-03	3.985E-03	6.317E-02	2.961E-01	2.076E-02	7.310E-02	1.099E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.417E-02	5.878E-02	2.591E-03	5.941E-03	1.552E-02	2.356E-02
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.367E-02	4.370E-02	2.441E-01	1.354E+00	5.258E-02	9.154E-03	9.030E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.696E-02	5.157E-02	8.724E-02	2.417E-01	9.164E-02	5.104E-02	3.583E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.020E-02	1.045E+00	3.399E-02	4.082E-02	1.093E-02	8.787E-03	1.757E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.298E-02	7.623E-02	1.189E+00	5.198E-02	4.353E-03	1.256E-02	5.974E-03	6.691E-03
S	0.000E+00	7.277E-02	0.000E+00	0.000E+00	8.816E-02	0.000E+00	6.002E-03	2.622E-03	4.753E-03	3.582E-04	2.254E-03	4.634E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.270E-02	7.224E-03	0.000E+00	2.997E-04	1.831E-04	1.631E-03	1.079E-03	2.071E-03
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.508E-03	1.024E-03	8.819E-04	7.680E-04	1.704E-03
WSW	0.000E+00	0.000E+00	9.799E-02	0.000E+00	0.000E+00	1.386E-02	4.890E-03	3.129E-03	5.531E-04	2.742E-03	5.810E-04	5.021E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.409E-04	2.670E-03	0.000E+00	2.825E-03	1.699E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.473E-02	1.190E-02	1.312E-03	6.299E-04	3.232E-03	6.445E-03	4.421E-03	1.787E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.262E-01	4.381E-03	0.000E+00	3.701E-03	4.795E-03	4.215E-03	4.810E-03	4.967E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.409E-02	0.000E+00	2.143E-02	6.862E-02	7.055E-01	1.346E-02	2.467E-02	4.456E-03

TOTAL DOSE COMMITMENT IS 7.395E+00 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS AVG.LUNG

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.145E-02	9.572E-02	1.294E-02	3.022E-03	1.713E-03	1.621E-03	1.524E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.693E-02	3.061E-03	8.669E-03	4.497E-03	8.855E-03	1.802E-02	5.587E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.475E-02	6.648E-03	9.848E-02	4.220E-01	2.659E-02	8.293E-02	1.091E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.092E-01	9.618E-02	4.020E-03	8.604E-03	2.065E-02	2.836E-02
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.415E-02	7.559E-02	4.135E-01	2.227E+00	8.320E-02	1.378E-02	1.276E-02
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.531E-01	9.010E-02	1.510E-01	4.134E-01	1.544E-01	8.437E-02	5.784E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.235E-01	1.826E+00	5.894E-02	7.011E-02	1.855E-02	1.472E-02	2.896E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.053E-02	1.329E-01	2.030E+00	8.624E-02	6.954E-03	1.913E-02	8.573E-03	8.939E-03
S	0.000E+00	1.290E-01	0.000E+00	0.000E+00	1.550E-01	0.000E+00	9.768E-03	3.934E-03	6.377E-03	4.165E-04	2.208E-03	3.745E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.220E-02	1.214E-02	0.000E+00	3.831E-04	1.886E-04	1.308E-03	6.607E-04	9.594E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.199E-03	1.103E-03	7.902E-04	5.647E-04	1.018E-03
WSW	0.000E+00	0.000E+00	1.731E-01	0.000E+00	0.000E+00	2.394E-02	8.255E-03	5.147E-03	8.820E-04	4.217E-03	8.561E-04	7.040E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.448E-03	4.534E-03	0.000E+00	4.608E-03	2.698E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.674E-01	2.093E-02	2.281E-03	1.075E-03	5.377E-03	1.036E-02	6.795E-03	2.593E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.230E-01	7.706E-03	0.000E+00	6.334E-03	8.031E-03	6.863E-03	7.551E-03	7.442E-03
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.490E-02	0.000E+00	3.669E-02	1.134E-01	1.111E+00	1.992E-02	3.381E-02	5.556E-03

TOTAL DOSE COMMITMENT IS 1.217E+01 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BRONCHI

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.281E-02	2.626E-01	5.744E-02	1.948E-02	1.510E-02	1.898E-02	2.337E-02
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.527E-02	9.404E-03	4.607E-02	3.644E-02	1.007E-01	2.755E-01	1.126E-01
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.821E-02	1.550E-02	3.436E-01	1.974E+00	1.561E-01	5.893E-01	9.189E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.718E-01	2.083E-01	1.132E-02	3.043E-02	8.990E-02	1.496E-01
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.877E-02	7.460E-02	5.340E-01	3.655E+00	1.704E-01	3.477E-02	3.927E-02
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.029E-02	6.049E-02	1.179E-01	3.764E-01	1.639E-01	1.045E-01	8.354E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.672E-02	1.205E+00	4.296E-02	5.692E-02	1.684E-02	1.495E-02	3.291E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.612E-02	1.486E-01	2.947E+00	1.571E-01	1.547E-02	5.134E-02	2.754E-02	3.416E-02
S	0.000E+00	4.027E-02	0.000E+00	0.000E+00	1.805E-01	0.000E+00	3.123E-02	1.774E-02	3.868E-02	3.307E-03	2.248E-02	4.784E-02
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.805E-02	4.011E-02	0.000E+00	3.603E-03	2.505E-03	2.330E-02	1.525E-02	2.804E-02
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.141E-02	1.348E-02	1.168E-02	9.948E-03	2.122E-02
WSW	0.000E+00	0.000E+00	1.439E-01	0.000E+00	0.000E+00	4.933E-02	1.733E-02	1.139E-02	2.111E-03	1.105E-02	2.477E-03	2.261E-03
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.417E-03	5.057E-03	0.000E+00	6.802E-03	4.591E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.239E-02	1.430E-02	2.150E-03	1.326E-03	8.415E-03	2.022E-02	1.638E-02	7.657E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.047E-01	5.588E-03	0.000E+00	7.317E-03	1.133E-02	1.172E-02	1.555E-02	1.849E-02
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.729E-02	0.000E+00	5.843E-02	2.455E-01	3.075E+00	6.859E-02	1.425E-01	2.851E-02

TOTAL DOSE COMMITMENT IS 2.104E+01 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS GROUND EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.379E-03	4.457E-03	6.093E-04	1.445E-04	8.370E-05	8.153E-05	7.974E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.831E-04	1.428E-04	4.102E-04	2.174E-04	4.409E-04	9.329E-04	3.048E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.819E-04	3.091E-04	4.616E-03	1.999E-02	1.275E-03	4.038E-03	5.410E-03
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.059E-03	4.477E-03	1.882E-04	4.058E-04	9.834E-04	1.366E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.343E-03	3.493E-03	1.916E-02	1.035E-01	3.882E-03	6.461E-04	6.026E-04
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.055E-03	4.157E-03	6.974E-03	1.912E-02	7.149E-03	3.914E-03	2.690E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.694E-03	8.424E-02	2.722E-03	3.240E-03	8.583E-04	6.817E-04	1.344E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.870E-03	6.143E-03	9.404E-02	4.007E-03	3.244E-04	8.968E-04	4.044E-04	4.249E-04
S	0.000E+00	5.942E-03	0.000E+00	0.000E+00	7.157E-03	0.000E+00	4.561E-04	1.855E-04	3.048E-04	2.027E-05	1.101E-04	1.926E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.027E-03	5.657E-04	0.000E+00	1.854E-05	9.423E-06	6.812E-05	3.630E-05	5.631E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.549E-04	5.467E-05	4.026E-05	2.976E-05	5.588E-05
WSW	0.000E+00	0.000E+00	7.990E-03	0.000E+00	0.000E+00	1.109E-03	3.832E-04	2.395E-04	4.116E-05	1.975E-04	4.025E-05	3.327E-05
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.696E-05	2.099E-04	0.000E+00	2.142E-04	1.257E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.725E-03	9.659E-04	1.054E-04	4.979E-05	2.497E-04	4.828E-04	3.181E-04	1.221E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.029E-02	3.557E-04	0.000E+00	2.931E-04	3.725E-04	3.193E-04	3.526E-04	3.491E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.148E-03	0.000E+00	1.700E-03	5.274E-03	5.196E-02	9.378E-04	1.605E-03	2.667E-04

TOTAL DOSE COMMITMENT IS 5.658E-01 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS CLOUD EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.321E-04	2.310E-03	5.070E-04	1.721E-04	1.334E-04	1.677E-04	2.065E-04
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.200E-04	8.274E-05	4.065E-04	3.218E-04	8.898E-04	2.434E-03	9.949E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.575E-04	1.357E-04	3.021E-03	1.740E-02	1.378E-03	5.203E-03	8.116E-03
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.497E-03	1.828E-03	9.959E-05	2.683E-04	7.932E-04	1.321E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.709E-04	6.424E-04	4.661E-03	3.209E-02	1.500E-03	3.065E-04	3.466E-04
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.056E-04	5.037E-04	1.010E-03	3.271E-03	1.435E-03	9.181E-04	7.358E-04
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.964E-04	9.882E-03	3.628E-04	4.890E-04	1.461E-04	1.306E-04	2.886E-04
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.835E-04	1.254E-03	2.554E-02	1.375E-03	1.360E-04	4.524E-04	2.430E-04	3.016E-04
S	0.000E+00	2.086E-04	0.000E+00	0.000E+00	1.491E-03	0.000E+00	2.743E-04	1.564E-04	3.415E-04	2.921E-05	1.986E-04	4.227E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.205E-04	3.509E-04	0.000E+00	3.181E-05	2.213E-05	2.059E-04	1.347E-04	2.478E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.771E-04	1.191E-04	1.031E-04	8.789E-05	1.875E-04
WSW	0.000E+00	0.000E+00	9.926E-04	0.000E+00	0.000E+00	4.227E-04	1.502E-04	9.954E-05	1.853E-05	9.729E-05	2.184E-05	1.995E-05
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.222E-05	4.411E-05	0.000E+00	5.988E-05	4.049E-05
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.267E-04	1.135E-04	1.833E-05	1.155E-05	7.393E-05	1.782E-04	1.445E-04	6.762E-05
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.952E-04	4.488E-05	0.000E+00	6.376E-05	9.951E-05	1.033E-04	1.372E-04	1.633E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.176E-04	0.000E+00	5.087E-04	2.157E-03	2.711E-02	6.054E-04	1.259E-03	2.519E-04

TOTAL DOSE COMMITMENT IS 1.821E-01 PERSON-REM/YR

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS VEG. ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS VEG. ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN
ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
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TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

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DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

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DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

SUMMARY PRINT OF POPULATION DOSES COMPUTED FOR TSTEP 2--DOSES SHOWN ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DOSES RECEIVED BY PEOPLE WITHIN 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	1.815E+00	7.395E+00	1.217E+01	5.410E-01	3.086E-01	2.104E+01
GROUND	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01
CLOUD	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTALS	2.563E+00	8.143E+00	1.292E+01	1.289E+00	1.057E+00	2.179E+01

DOSES RECEIVED BY PEOPLE BEYOND 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
GROUND	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CLOUD	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01
TOTALS	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01

TOTAL DOSES COMPUTED OVER ALL POPULATIONS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	1.815E+00	7.395E+00	1.217E+01	5.410E-01	3.086E-01	2.104E+01
GROUND	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01	5.658E-01
CLOUD	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01	1.821E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	8.039E+00	1.096E+02	1.827E+00	8.039E+00	8.039E+00	5.116E+01
TOTALS	1.060E+01	1.178E+02	1.475E+01	9.328E+00	9.095E+00	7.295E+01

COMPLETE SUMMARY OF COMPUTED ENVIRONMENTAL DOSE COMMITMENTS, INTEGRATED OVER ALL TIME STEPS

100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED BY PEOPLE WITHIN 80 KILOMETERS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	1.281E+01	4.071E+01	6.461E+01	6.445E+00	5.283E+00	1.090E+02
2	2013.00	2113.00	100.00	TOTALS	2.563E+02	8.143E+02	1.292E+03	1.289E+02	1.057E+02	2.179E+03
TOTALS OVER ALL 2 TIME STEPS					2.691E+02	8.550E+02	1.357E+03	1.353E+02	1.109E+02	2.288E+03

100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED BY PEOPLE BEYOND 80 KILOMETERS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	4.019E+01	5.481E+02	9.135E+00	4.019E+01	4.019E+01	2.558E+02
2	2013.00	2113.00	100.00	TOTALS	8.039E+02	1.096E+04	1.827E+02	8.039E+02	8.039E+02	5.116E+03
TOTALS OVER ALL 2 TIME STEPS					8.441E+02	1.151E+04	1.918E+02	8.441E+02	8.441E+02	5.371E+03

GRAND TOTAL 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED OVER ALL POPULATIONS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	5.301E+01	5.888E+02	7.374E+01	4.664E+01	4.548E+01	3.647E+02
2	2013.00	2113.00	100.00	TOTALS	1.060E+03	1.178E+04	1.475E+03	9.328E+02	9.095E+02	7.295E+03
TOTALS OVER ALL 2 TIME STEPS					1.113E+03	1.236E+04	1.549E+03	9.794E+02	9.550E+02	7.659E+03

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

			AIRBORNE CONCENTRATIONS, PCI/M3				GROUND CONCENTRATIONS, PCI/M2			
NO.	NAME	PTSZ	U-238	Th-230	Ra-226	Pb-210	U-238	Th-230	Ra-226	Pb-210
1	CPP N	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1	CPP N	2	3.633E-03	1.263E-03	7.582E-04	1.254E-04	3.871E+04	1.346E+04	7.941E+03	7.941E+03
1	CPP N	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1	CPP N	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.633E-03	1.263E-03	7.582E-04	1.254E-04	3.871E+04	1.346E+04	7.941E+03	7.941E+03
2	CPP NNE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2	CPP NNE	2	2.509E-03	8.728E-04	5.238E-04	8.664E-05	2.673E+04	9.296E+03	5.486E+03	5.486E+03
2	CPP NNE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2	CPP NNE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.509E-03	8.728E-04	5.238E-04	8.664E-05	2.673E+04	9.296E+03	5.486E+03	5.486E+03
3	CPP NE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3	CPP NE	2	6.552E-03	2.276E-03	1.366E-03	2.260E-04	6.980E+04	2.424E+04	1.431E+04	1.431E+04
3	CPP NE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3	CPP NE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.552E-03	2.276E-03	1.366E-03	2.260E-04	6.980E+04	2.424E+04	1.431E+04	1.431E+04
4	CPP ENE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
4	CPP ENE	2	2.963E-03	1.030E-03	6.182E-04	1.023E-04	3.157E+04	1.097E+04	6.475E+03	6.475E+03
4	CPP ENE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
4	CPP ENE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.963E-03	1.030E-03	6.182E-04	1.023E-04	3.157E+04	1.097E+04	6.475E+03	6.475E+03
5	CPP E	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	CPP E	2	4.216E-03	1.465E-03	8.793E-04	1.454E-04	4.491E+04	1.560E+04	9.208E+03	9.208E+03
5	CPP E	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5	CPP E	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.216E-03	1.465E-03	8.793E-04	1.454E-04	4.491E+04	1.560E+04	9.208E+03	9.208E+03
6	CPP ESE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
6	CPP ESE	2	4.218E-03	1.466E-03	8.800E-04	1.455E-04	4.494E+04	1.561E+04	9.217E+03	9.217E+03
6	CPP ESE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
6	CPP ESE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.218E-03	1.466E-03	8.800E-04	1.455E-04	4.494E+04	1.561E+04	9.217E+03	9.217E+03
7	CPP SSE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	CPP SSE	2	7.448E-03	2.589E-03	1.555E-03	2.570E-04	7.935E+04	2.757E+04	1.629E+04	1.629E+04
7	CPP SSE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
7	CPP SSE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		7.448E-03	2.589E-03	1.555E-03	2.570E-04	7.935E+04	2.757E+04	1.629E+04	1.629E+04
8	CPP SE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	CPP SE	2	4.963E-03	1.725E-03	1.036E-03	1.713E-04	5.288E+04	1.837E+04	1.085E+04	1.085E+04
8	CPP SE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
8	CPP SE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.963E-03	1.725E-03	1.036E-03	1.713E-04	5.288E+04	1.837E+04	1.085E+04	1.085E+04

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

			AIRBORNE CONCENTRATIONS, PCI/M3				GROUND CONCENTRATIONS, PCI/M2			
NO.	NAME	PTSZ	U-238	Th-230	Ra-226	Pb-210	U-238	Th-230	Ra-226	Pb-210
9	CPP S	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9	CPP S	2	1.649E-02	5.732E-03	3.445E-03	5.690E-04	1.757E+05	6.105E+04	3.608E+04	3.608E+04
9	CPP S	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
9	CPP S	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.649E-02	5.732E-03	3.445E-03	5.690E-04	1.757E+05	6.105E+04	3.608E+04	3.608E+04
10	CPP SSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10	CPP SSW	2	5.040E-03	1.753E-03	1.053E-03	1.740E-04	5.369E+04	1.867E+04	1.103E+04	1.103E+04
10	CPP SSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10	CPP SSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.040E-03	1.753E-03	1.053E-03	1.740E-04	5.369E+04	1.867E+04	1.103E+04	1.103E+04
11	CPP SW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
11	CPP SW	2	3.581E-03	1.247E-03	7.485E-04	1.237E-04	3.815E+04	1.328E+04	7.839E+03	7.839E+03
11	CPP SW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
11	CPP SW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.581E-03	1.247E-03	7.485E-04	1.237E-04	3.815E+04	1.328E+04	7.839E+03	7.839E+03
12	CPP WSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
12	CPP WSW	2	9.412E-03	3.273E-03	1.966E-03	3.249E-04	1.003E+05	3.486E+04	2.059E+04	2.059E+04
12	CPP WSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
12	CPP WSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		9.412E-03	3.273E-03	1.966E-03	3.249E-04	1.003E+05	3.486E+04	2.059E+04	2.059E+04
13	CPP W	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
13	CPP W	2	5.377E-03	1.872E-03	1.124E-03	1.859E-04	5.729E+04	1.994E+04	1.177E+04	1.177E+04
13	CPP W	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
13	CPP W	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.377E-03	1.872E-03	1.124E-03	1.859E-04	5.729E+04	1.994E+04	1.177E+04	1.177E+04
14	CPP WNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
14	CPP WNW	2	6.087E-03	2.120E-03	1.272E-03	2.104E-04	6.484E+04	2.257E+04	1.332E+04	1.332E+04
14	CPP WNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
14	CPP WNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.087E-03	2.120E-03	1.272E-03	2.104E-04	6.484E+04	2.257E+04	1.332E+04	1.332E+04
15	CPP NW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15	CPP NW	2	6.155E-03	2.145E-03	1.287E-03	2.129E-04	6.557E+04	2.284E+04	1.348E+04	1.348E+04
15	CPP NW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15	CPP NW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.155E-03	2.145E-03	1.287E-03	2.129E-04	6.557E+04	2.284E+04	1.348E+04	1.348E+04
16	CPP NNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
16	CPP NNW	2	4.624E-03	1.609E-03	9.656E-04	1.597E-04	4.927E+04	1.714E+04	1.011E+04	1.011E+04
16	CPP NNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
16	CPP NNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.624E-03	1.609E-03	9.656E-04	1.597E-04	4.927E+04	1.714E+04	1.011E+04	1.011E+04

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

			AIRBORNE CONCENTRATIONS, PCI/M3				GROUND CONCENTRATIONS, PCI/M2			
NO.	NAME	PTSZ	U-238	Th-230	Ra-226	Pb-210	U-238	Th-230	Ra-226	Pb-210
17	SF N	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
17	SF N	2	4.386E-03	1.530E-03	9.180E-04	1.519E-04	4.673E+04	1.630E+04	9.614E+03	9.614E+03
17	SF N	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
17	SF N	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.386E-03	1.530E-03	9.180E-04	1.519E-04	4.673E+04	1.630E+04	9.614E+03	9.614E+03
18	SF NNE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
18	SF NNE	2	4.918E-03	1.716E-03	1.029E-03	1.703E-04	5.240E+04	1.827E+04	1.078E+04	1.078E+04
18	SF NNE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
18	SF NNE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.918E-03	1.716E-03	1.029E-03	1.703E-04	5.240E+04	1.827E+04	1.078E+04	1.078E+04
19	SF NE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
19	SF NE	2	4.696E-03	1.638E-03	9.828E-04	1.626E-04	5.004E+04	1.745E+04	1.029E+04	1.029E+04
19	SF NE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
19	SF NE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.696E-03	1.638E-03	9.828E-04	1.626E-04	5.004E+04	1.745E+04	1.029E+04	1.029E+04
20	SF ENE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
20	SF ENE	2	4.000E-03	1.395E-03	8.368E-04	1.384E-04	4.262E+04	1.485E+04	8.763E+03	8.763E+03
20	SF ENE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
20	SF ENE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.000E-03	1.395E-03	8.368E-04	1.384E-04	4.262E+04	1.485E+04	8.763E+03	8.763E+03
21	SF E	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
21	SF E	2	5.361E-03	1.869E-03	1.122E-03	1.855E-04	5.712E+04	1.991E+04	1.175E+04	1.175E+04
21	SF E	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
21	SF E	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.361E-03	1.869E-03	1.122E-03	1.855E-04	5.712E+04	1.991E+04	1.175E+04	1.175E+04
22	SF SSE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
22	SF SSE	2	4.511E-03	1.573E-03	9.437E-04	1.561E-04	4.806E+04	1.675E+04	9.883E+03	9.883E+03
22	SF SSE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
22	SF SSE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.511E-03	1.573E-03	9.437E-04	1.561E-04	4.806E+04	1.675E+04	9.883E+03	9.883E+03
23	SF SE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
23	SF SE	2	6.574E-03	2.291E-03	1.375E-03	2.274E-04	7.004E+04	2.440E+04	1.440E+04	1.440E+04
23	SF SE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
23	SF SE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.574E-03	2.291E-03	1.375E-03	2.274E-04	7.004E+04	2.440E+04	1.440E+04	1.440E+04
24	SF S	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
24	SF S	2	2.527E-03	8.809E-04	5.286E-04	8.745E-05	2.692E+04	9.382E+03	5.536E+03	5.536E+03
24	SF S	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
24	SF S	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.527E-03	8.809E-04	5.286E-04	8.745E-05	2.692E+04	9.382E+03	5.536E+03	5.536E+03

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
25	SF SSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
25	SF SSW	2	3.290E-03	1.147E-03	6.883E-04	1.139E-04	3.505E+04	1.222E+04	7.208E+03	7.208E+03
25	SF SSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
25	SF SSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.290E-03	1.147E-03	6.883E-04	1.139E-04	3.505E+04	1.222E+04	7.208E+03	7.208E+03
26	SF SW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
26	SF SW	2	5.483E-03	1.913E-03	1.148E-03	1.899E-04	5.841E+04	2.037E+04	1.202E+04	1.202E+04
26	SF SW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
26	SF SW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.483E-03	1.913E-03	1.148E-03	1.899E-04	5.841E+04	2.037E+04	1.202E+04	1.202E+04
27	SF WSW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
27	SF WSW	2	6.515E-03	2.273E-03	1.364E-03	2.256E-04	6.941E+04	2.421E+04	1.428E+04	1.428E+04
27	SF WSW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
27	SF WSW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.515E-03	2.273E-03	1.364E-03	2.256E-04	6.941E+04	2.421E+04	1.428E+04	1.428E+04
28	SF W	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
28	SF W	2	1.076E-02	3.755E-03	2.253E-03	3.727E-04	1.146E+05	3.999E+04	2.359E+04	2.359E+04
28	SF W	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
28	SF W	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.076E-02	3.755E-03	2.253E-03	3.727E-04	1.146E+05	3.999E+04	2.359E+04	2.359E+04
29	SF WNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
29	SF WNW	2	3.941E-02	1.376E-02	8.252E-03	1.365E-03	4.199E+05	1.465E+05	8.642E+04	8.642E+04
29	SF WNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
29	SF WNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.941E-02	1.376E-02	8.252E-03	1.365E-03	4.199E+05	1.465E+05	8.642E+04	8.642E+04
30	SF NW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
30	SF NW	2	4.052E-02	1.414E-02	8.484E-03	1.404E-03	4.317E+05	1.506E+05	8.885E+04	8.885E+04
30	SF NW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
30	SF NW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.052E-02	1.414E-02	8.484E-03	1.404E-03	4.317E+05	1.506E+05	8.885E+04	8.885E+04
31	SF NNW	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
31	SF NNW	2	3.955E-02	1.380E-02	8.281E-03	1.370E-03	4.214E+05	1.470E+05	8.673E+04	8.673E+04
31	SF NNW	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
31	SF NNW	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.955E-02	1.380E-02	8.281E-03	1.370E-03	4.214E+05	1.470E+05	8.673E+04	8.673E+04
32	SF ESE	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
32	SF ESE	2	6.635E-03	2.314E-03	1.388E-03	2.297E-04	7.069E+04	2.464E+04	1.454E+04	1.454E+04
32	SF ESE	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
32	SF ESE	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.635E-03	2.314E-03	1.388E-03	2.297E-04	7.069E+04	2.464E+04	1.454E+04	1.454E+04

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

NO.	NAME	PTSZ	AIRBORNE CONCENTRATIONS, PCI/M3 U-238	Th-230	Ra-226	Pb-210	GROUND CONCENTRATIONS, PCI/M2 U-238	Th-230	Ra-226	Pb-210
33	Daniels Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
33	Daniels Ranch	2	5.474E-03	1.902E-03	1.141E-03	1.888E-04	5.832E+04	2.025E+04	1.195E+04	1.195E+04
33	Daniels Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
33	Daniels Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.474E-03	1.902E-03	1.141E-03	1.888E-04	5.832E+04	2.025E+04	1.195E+04	1.195E+04
34	Spencer Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
34	Spencer Ranch	2	6.186E-03	2.154E-03	1.292E-03	2.138E-04	6.591E+04	2.294E+04	1.354E+04	1.354E+04
34	Spencer Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
34	Spencer Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		6.186E-03	2.154E-03	1.292E-03	2.138E-04	6.591E+04	2.294E+04	1.354E+04	1.354E+04
35	BC Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
35	BC Ranch	2	4.277E-03	1.492E-03	8.952E-04	1.481E-04	4.557E+04	1.589E+04	9.375E+03	9.375E+03
35	BC Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
35	BC Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		4.277E-03	1.492E-03	8.952E-04	1.481E-04	4.557E+04	1.589E+04	9.375E+03	9.375E+03
36	Puttman Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
36	Puttman Ranch	2	1.691E-03	5.898E-04	3.538E-04	5.854E-05	1.802E+04	6.281E+03	3.706E+03	3.706E+03
36	Puttman Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
36	Puttman Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.691E-03	5.898E-04	3.538E-04	5.854E-05	1.802E+04	6.281E+03	3.706E+03	3.706E+03
37	Englebert Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
37	Englebert Ranch	2	3.708E-03	1.290E-03	7.745E-04	1.280E-04	3.951E+04	1.373E+04	8.112E+03	8.112E+03
37	Englebert Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
37	Englebert Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.708E-03	1.290E-03	7.745E-04	1.280E-04	3.951E+04	1.373E+04	8.112E+03	8.112E+03
38	Burdock School	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
38	Burdock School	2	3.392E-03	1.181E-03	7.091E-04	1.172E-04	3.614E+04	1.258E+04	7.426E+03	7.426E+03
38	Burdock School	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
38	Burdock School	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		3.392E-03	1.181E-03	7.091E-04	1.172E-04	3.614E+04	1.258E+04	7.426E+03	7.426E+03
39	Heck Ranch	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
39	Heck Ranch	2	2.314E-03	8.049E-04	4.834E-04	7.990E-05	2.465E+04	8.573E+03	5.062E+03	5.062E+03
39	Heck Ranch	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
39	Heck Ranch	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		2.314E-03	8.049E-04	4.834E-04	7.990E-05	2.465E+04	8.573E+03	5.062E+03	5.062E+03
40	Edgemont	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
40	Edgemont	2	5.744E-04	1.999E-04	1.200E-04	1.984E-05	6.120E+03	2.129E+03	1.257E+03	1.257E+03
40	Edgemont	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
40	Edgemont	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		5.744E-04	1.999E-04	1.200E-04	1.984E-05	6.120E+03	2.129E+03	1.257E+03	1.257E+03

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS

			AIRBORNE CONCENTRATIONS, PCI/M3				GROUND CONCENTRATIONS, PCI/M2			
NO.	NAME	PTSZ	U-238	Th-230	Ra-226	Pb-210	U-238	Th-230	Ra-226	Pb-210
41	Background	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
41	Background	2	1.227E-03	4.276E-04	2.566E-04	4.244E-05	1.307E+04	4.554E+03	2.687E+03	2.687E+03
41	Background	3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
41	Background	4	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
	CONCENTRATION TOTALS		1.227E-03	4.276E-04	2.566E-04	4.244E-05	1.307E+04	4.554E+03	2.687E+03	2.687E+03

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

INDIVIDUAL RECEPTOR RADON AND RADON DAUGHTER CONCENTRATIONS

	AIRBORNE CONCENTRATIONS, PCI/M3								GROUND CONCENTRATIONS, PCI/M2			
NO.	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	Bi-210	Po-210	WL	Po-218	Pb-214	Bi-214	Pb-210
1	1.279E+01	1.277E+01	1.037E+01	8.044E+00	2.128E-05	6.198E-08	5.088E-12	9.570E-05	1.011E+01	1.011E+01	1.011E+01	4.443E+01
2	1.050E+01	1.050E+01	8.838E+00	7.092E+00	2.235E-05	8.076E-08	8.457E-12	8.207E-05	8.313E+00	8.313E+00	8.313E+00	4.665E+01
3	1.774E+01	1.761E+01	1.199E+01	7.841E+00	2.317E-05	9.676E-08	1.183E-11	1.082E-04	1.395E+01	1.395E+01	1.395E+01	4.837E+01
4	1.171E+01	1.168E+01	8.757E+00	6.270E+00	2.417E-05	1.309E-07	2.061E-11	7.982E-05	9.249E+00	9.249E+00	9.249E+00	5.047E+01
5	1.985E+01	1.935E+01	1.089E+01	6.586E+00	2.617E-05	1.551E-07	2.627E-11	9.971E-05	1.532E+01	1.532E+01	1.532E+01	5.464E+01
6	4.158E+01	3.988E+01	1.970E+01	1.020E+01	3.339E-05	2.030E-07	3.667E-11	1.790E-04	3.159E+01	3.159E+01	3.159E+01	6.970E+01
7	3.771E+01	3.759E+01	2.757E+01	1.876E+01	5.589E-05	2.778E-07	4.444E-11	2.485E-04	2.977E+01	2.977E+01	2.977E+01	1.167E+02
8	4.922E+01	4.840E+01	2.912E+01	1.671E+01	4.677E-05	2.554E-07	4.434E-11	2.598E-04	3.833E+01	3.833E+01	3.833E+01	9.764E+01
9	2.796E+01	2.791E+01	2.282E+01	1.763E+01	6.335E-05	3.136E-07	4.731E-11	2.102E-04	2.211E+01	2.211E+01	2.211E+01	1.323E+02
10	2.010E+01	2.010E+01	1.782E+01	1.522E+01	6.789E-05	3.418E-07	4.817E-11	1.678E-04	1.592E+01	1.592E+01	1.592E+01	1.417E+02
11	1.911E+01	1.910E+01	1.692E+01	1.456E+01	5.958E-05	2.574E-07	3.032E-11	1.598E-04	1.512E+01	1.512E+01	1.512E+01	1.244E+02
12	2.142E+01	2.108E+01	1.519E+01	1.133E+01	3.562E-05	1.268E-07	1.251E-11	1.409E-04	1.670E+01	1.670E+01	1.670E+01	7.437E+01
13	2.352E+01	2.332E+01	1.816E+01	1.401E+01	3.733E-05	1.071E-07	8.437E-12	1.683E-04	1.847E+01	1.847E+01	1.847E+01	7.794E+01
14	2.475E+01	2.450E+01	1.815E+01	1.313E+01	2.860E-05	6.902E-08	4.668E-12	1.662E-04	1.940E+01	1.940E+01	1.940E+01	5.971E+01
15	2.841E+01	2.761E+01	1.656E+01	9.609E+00	1.570E-05	3.589E-08	2.695E-12	1.482E-04	2.187E+01	2.187E+01	2.187E+01	3.278E+01
16	1.584E+01	1.569E+01	1.174E+01	8.515E+00	1.899E-05	4.766E-08	3.404E-12	1.074E-04	1.242E+01	1.242E+01	1.242E+01	3.964E+01
17	2.109E+01	2.067E+01	1.003E+01	4.668E+00	1.171E-05	6.336E-08	1.046E-11	8.957E-05	1.637E+01	1.637E+01	1.637E+01	2.445E+01
18	2.017E+01	1.982E+01	9.654E+00	4.445E+00	1.134E-05	6.001E-08	9.505E-12	8.594E-05	1.570E+01	1.570E+01	1.570E+01	2.367E+01
19	2.118E+01	2.077E+01	1.010E+01	4.720E+00	1.179E-05	5.779E-08	8.489E-12	9.022E-05	1.645E+01	1.645E+01	1.645E+01	2.461E+01
20	1.810E+01	1.780E+01	9.266E+00	4.881E+00	1.271E-05	5.396E-08	6.846E-12	8.352E-05	1.410E+01	1.410E+01	1.410E+01	2.653E+01
21	2.620E+01	2.490E+01	1.223E+01	6.224E+00	1.259E-05	4.187E-08	4.399E-12	1.109E-04	1.972E+01	1.972E+01	1.972E+01	2.629E+01
22	2.937E+01	2.932E+01	2.388E+01	1.818E+01	4.228E-05	1.075E-07	7.768E-12	2.191E-04	2.322E+01	2.322E+01	2.322E+01	8.827E+01
23	3.458E+01	3.415E+01	2.403E+01	1.595E+01	2.844E-05	6.041E-08	3.896E-12	2.165E-04	2.705E+01	2.705E+01	2.705E+01	5.937E+01
24	1.982E+01	1.982E+01	1.738E+01	1.437E+01	4.313E-05	1.393E-07	1.289E-11	1.621E-04	1.570E+01	1.570E+01	1.570E+01	9.004E+01
25	1.716E+01	1.715E+01	1.358E+01	9.642E+00	2.239E-05	7.637E-08	9.284E-12	1.225E-04	1.358E+01	1.358E+01	1.358E+01	4.675E+01
26	1.626E+01	1.615E+01	1.035E+01	6.095E+00	1.482E-05	6.873E-08	1.066E-11	9.184E-05	1.279E+01	1.279E+01	1.279E+01	3.095E+01
27	1.464E+01	1.409E+01	7.815E+00	4.407E+00	1.260E-05	6.663E-08	1.099E-11	7.058E-05	1.116E+01	1.116E+01	1.116E+01	2.631E+01
28	1.466E+01	1.362E+01	6.918E+00	3.894E+00	1.203E-05	6.672E-08	1.132E-11	6.363E-05	1.079E+01	1.079E+01	1.079E+01	2.512E+01
29	1.965E+01	1.597E+01	6.255E+00	3.248E+00	1.069E-05	5.957E-08	9.638E-12	6.028E-05	1.265E+01	1.265E+01	1.265E+01	2.231E+01
30	2.435E+01	1.782E+01	6.274E+00	3.144E+00	1.044E-05	5.810E-08	9.283E-12	6.189E-05	1.411E+01	1.411E+01	1.411E+01	2.179E+01
31	2.470E+01	2.198E+01	7.945E+00	3.565E+00	1.080E-05	6.063E-08	9.897E-12	7.622E-05	1.741E+01	1.741E+01	1.741E+01	2.255E+01
32	4.020E+01	3.868E+01	1.976E+01	9.736E+00	1.421E-05	3.506E-08	3.038E-12	1.763E-04	3.064E+01	3.064E+01	3.064E+01	2.966E+01
33	2.198E+01	2.153E+01	1.093E+01	6.370E+00	2.489E-05	1.377E-07	2.131E-11	1.013E-04	1.705E+01	1.705E+01	1.705E+01	5.197E+01
34	2.533E+01	2.501E+01	1.806E+01	1.272E+01	2.604E-05	5.987E-08	3.899E-12	1.648E-04	1.981E+01	1.981E+01	1.981E+01	5.437E+01
35	1.024E+01	1.000E+01	6.369E+00	4.098E+00	1.347E-05	7.748E-08	1.406E-11	5.788E-05	7.924E+00	7.924E+00	7.924E+00	2.812E+01
36	7.573E+00	7.573E+00	6.621E+00	5.521E+00	2.323E-05	1.340E-07	2.492E-11	6.196E-05	5.998E+00	5.998E+00	5.998E+00	4.849E+01
37	2.022E+01	2.022E+01	1.863E+01	1.664E+01	8.878E-05	5.541E-07	1.021E-10	1.773E-04	1.602E+01	1.602E+01	1.602E+01	1.854E+02
38	1.892E+01	1.890E+01	1.678E+01	1.448E+01	5.890E-05	2.511E-07	2.911E-11	1.586E-04	1.497E+01	1.497E+01	1.497E+01	1.230E+02
39	1.707E+01	1.708E+01	1.611E+01	1.499E+01	1.036E-04	7.856E-07	1.732E-10	1.552E-04	1.353E+01	1.353E+01	1.353E+01	2.163E+02
40	4.033E+00	4.035E+00	3.967E+00	3.873E+00	9.921E-05	2.362E-06	1.446E-09	3.872E-05	3.196E+00	3.196E+00	3.196E+00	2.071E+02
41	1.155E+01	1.155E+01	1.106E+01	1.042E+01	5.927E-05	3.173E-07	4.421E-11	1.069E-04	9.150E+00	9.150E+00	9.150E+00	1.237E+02

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 1 NAME=CPP N X= 0.1KM, Y= 2.8KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.03E+01	2.07E+01	1.59E+02	5.68E-01	6.28E-01	0.00E+00
INFANT	GROUND	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
INFANT	CLOUD	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.05E+01	2.08E+01	1.60E+02	7.14E-01	7.74E-01	1.46E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.93E+00	1.79E+01	7.66E+01	2.38E-01	2.41E-01	0.00E+00
CHILD	GROUND	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
CHILD	CLOUD	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07
CHILD	VEG. ING	1.16E-01	1.50E+00	1.36E-01	1.36E-01	3.41E-01	0.00E+00
CHILD	MEAT ING	1.61E-02	2.14E-01	3.39E-02	3.39E-02	4.30E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.02E+01	1.97E+01	7.69E+01	5.53E-01	7.71E-01	1.46E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.54E+00	1.90E+01	3.99E+01	1.12E-01	1.32E-01	0.00E+00
TEENAGE	GROUND	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
TEENAGE	CLOUD	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07
TEENAGE	VEG. ING	1.89E-01	2.46E+00	2.20E-01	2.20E-01	5.59E-01	0.00E+00
TEENAGE	MEAT ING	2.61E-02	3.47E-01	5.50E-02	5.50E-02	6.97E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.90E+00	2.19E+01	4.03E+01	5.33E-01	9.07E-01	1.46E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.71E+00	1.84E+01	3.32E+01	9.43E-02	1.05E-01	0.00E+00
ADULT	GROUND	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
ADULT	CLOUD	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07
ADULT	VEG. ING	2.61E-01	3.39E+00	3.04E-01	3.04E-01	7.72E-01	0.00E+00
ADULT	MEAT ING	4.56E-02	6.07E-01	9.62E-02	9.62E-02	1.22E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.17E+00	2.25E+01	3.37E+01	6.40E-01	1.14E+00	1.46E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 1 NAME=CPP N X= 0.1KM, Y= 2.8KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.13E+01	2.07E+01	1.59E+02	6.27E-01	6.52E-01	1.60E+01
INFANT	GROUND	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
INFANT	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.30E+01	2.24E+01	1.61E+02	2.29E+00	2.31E+00	1.77E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.09E+01	1.79E+01	7.66E+01	2.64E-01	2.52E-01	1.60E+01
CHILD	GROUND	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
CHILD	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
CHILD	VEG. ING	1.17E-01	1.51E+00	1.39E-01	1.39E-01	3.44E-01	0.00E+00
CHILD	MEAT ING	1.62E-02	2.16E-01	3.44E-02	3.44E-02	4.34E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.27E+01	2.13E+01	7.84E+01	2.10E+00	2.30E+00	1.77E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.50E+00	1.90E+01	3.99E+01	1.24E-01	1.38E-01	1.60E+01
TEENAGE	GROUND	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
TEENAGE	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
TEENAGE	VEG. ING	1.91E-01	2.48E+00	2.25E-01	2.25E-01	5.63E-01	0.00E+00
TEENAGE	MEAT ING	2.64E-02	3.50E-01	5.59E-02	5.59E-02	7.04E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.38E+00	2.35E+01	4.18E+01	2.06E+00	2.43E+00	1.77E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.67E+00	1.84E+01	3.32E+01	1.04E-01	1.09E-01	1.60E+01
ADULT	GROUND	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
ADULT	CLOUD	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02	9.13E-02
ADULT	VEG. ING	2.63E-01	3.41E+00	3.11E-01	3.11E-01	7.78E-01	0.00E+00
ADULT	MEAT ING	4.61E-02	6.12E-01	9.77E-02	9.77E-02	1.23E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.64E+00	2.41E+01	3.53E+01	2.17E+00	2.67E+00	1.77E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 2 NAME=CPP NNE X= 1.3KM, Y= 2.8KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.41E+01	1.43E+01	1.10E+02	3.92E-01	4.34E-01	0.00E+00
INFANT	GROUND	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
INFANT	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.42E+01	1.44E+01	1.10E+02	4.93E-01	5.35E-01	1.01E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.86E+00	1.23E+01	5.29E+01	1.64E-01	1.67E-01	0.00E+00
CHILD	GROUND	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
CHILD	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
CHILD	VEG. ING	7.99E-02	1.04E+00	9.38E-02	9.38E-02	2.36E-01	0.00E+00
CHILD	MEAT ING	1.11E-02	1.48E-01	2.34E-02	2.34E-02	2.97E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	7.05E+00	1.36E+01	5.31E+01	3.82E-01	5.33E-01	1.01E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.83E+00	1.31E+01	2.76E+01	7.76E-02	9.12E-02	0.00E+00
TEENAGE	GROUND	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
TEENAGE	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
TEENAGE	VEG. ING	1.31E-01	1.70E+00	1.52E-01	1.52E-01	3.86E-01	0.00E+00
TEENAGE	MEAT ING	1.80E-02	2.40E-01	3.80E-02	3.80E-02	4.82E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.08E+00	1.51E+01	2.78E+01	3.68E-01	6.26E-01	1.01E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.25E+00	1.27E+01	2.29E+01	6.52E-02	7.24E-02	0.00E+00
ADULT	GROUND	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
ADULT	CLOUD	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07	2.79E-07
ADULT	VEG. ING	1.80E-01	2.34E+00	2.10E-01	2.10E-01	5.33E-01	0.00E+00
ADULT	MEAT ING	3.15E-02	4.19E-01	6.64E-02	6.64E-02	8.42E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.57E+00	1.56E+01	2.33E+01	4.42E-01	7.91E-01	1.01E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 2 NAME=CPP NNE X= 1.3KM, Y= 2.8KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.48E+01	1.43E+01	1.10E+02	4.55E-01	4.58E-01	1.31E+01
INFANT	GROUND	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
INFANT	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.60E+01	1.55E+01	1.11E+02	1.62E+00	1.62E+00	1.43E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	7.65E+00	1.24E+01	5.29E+01	1.92E-01	1.78E-01	1.31E+01
CHILD	GROUND	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
CHILD	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
CHILD	VEG. ING	8.08E-02	1.05E+00	9.69E-02	9.69E-02	2.38E-01	0.00E+00
CHILD	MEAT ING	1.13E-02	1.50E-01	2.40E-02	2.40E-02	3.01E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	8.90E+00	1.47E+01	5.42E+01	1.48E+00	1.61E+00	1.43E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.62E+00	1.31E+01	2.76E+01	8.95E-02	9.70E-02	1.31E+01
TEENAGE	GROUND	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
TEENAGE	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
TEENAGE	VEG. ING	1.32E-01	1.72E+00	1.57E-01	1.57E-01	3.90E-01	0.00E+00
TEENAGE	MEAT ING	1.83E-02	2.43E-01	3.89E-02	3.89E-02	4.89E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.93E+00	1.62E+01	2.89E+01	1.45E+00	1.70E+00	1.43E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.04E+00	1.27E+01	2.29E+01	7.51E-02	7.72E-02	1.31E+01
ADULT	GROUND	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
ADULT	CLOUD	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02	8.01E-02
ADULT	VEG. ING	1.82E-01	2.36E+00	2.17E-01	2.17E-01	5.39E-01	0.00E+00
ADULT	MEAT ING	3.20E-02	4.25E-01	6.80E-02	6.80E-02	8.55E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.42E+00	1.67E+01	2.44E+01	1.52E+00	1.86E+00	1.43E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 3 NAME=CPP NE X= 1.3KM, Y= 1.2KM, Z= 0.0M, DIST= 1.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.67E+01	3.73E+01	2.87E+02	1.02E+00	1.13E+00	0.00E+00
INFANT	GROUND	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01
INFANT	CLOUD	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.69E+01	3.75E+01	2.88E+02	1.29E+00	1.40E+00	2.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.79E+01	3.22E+01	1.38E+02	4.28E-01	4.35E-01	0.00E+00
CHILD	GROUND	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01
CHILD	CLOUD	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07
CHILD	VEG. ING	2.08E-01	2.70E+00	2.45E-01	2.45E-01	6.15E-01	0.00E+00
CHILD	MEAT ING	2.90E-02	3.86E-01	6.11E-02	6.11E-02	7.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.84E+01	3.55E+01	1.39E+02	9.97E-01	1.39E+00	2.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.99E+00	3.42E+01	7.19E+01	2.02E-01	2.38E-01	0.00E+00
TEENAGE	GROUND	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01
TEENAGE	CLOUD	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07
TEENAGE	VEG. ING	3.41E-01	4.43E+00	3.96E-01	3.96E-01	1.01E+00	0.00E+00
TEENAGE	MEAT ING	4.71E-02	6.26E-01	9.91E-02	9.91E-02	1.26E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.06E+01	3.95E+01	7.27E+01	9.61E-01	1.63E+00	2.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.50E+00	3.32E+01	5.99E+01	1.70E-01	1.89E-01	0.00E+00
ADULT	GROUND	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01	2.63E-01
ADULT	CLOUD	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07	7.29E-07
ADULT	VEG. ING	4.71E-01	6.11E+00	5.47E-01	5.47E-01	1.39E+00	0.00E+00
ADULT	MEAT ING	8.22E-02	1.09E+00	1.73E-01	1.73E-01	2.20E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.31E+00	4.06E+01	6.08E+01	1.15E+00	2.06E+00	2.63E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 3 NAME=CPP NE X= 1.3KM, Y= 1.2KM, Z= 0.0M, DIST= 1.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.80E+01	3.73E+01	2.87E+02	1.09E+00	1.16E+00	2.22E+01
INFANT	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
INFANT	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.09E+01	4.02E+01	2.90E+02	4.00E+00	4.07E+00	2.51E+01
AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.92E+01	3.22E+01	1.38E+02	4.57E-01	4.47E-01	2.22E+01
CHILD	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
CHILD	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
CHILD	VEG. ING	2.09E-01	2.72E+00	2.48E-01	2.48E-01	6.18E-01	0.00E+00
CHILD	MEAT ING	2.92E-02	3.88E-01	6.17E-02	6.17E-02	7.79E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.24E+01	3.82E+01	1.41E+02	3.68E+00	4.06E+00	2.51E+01
AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.13E+01	3.42E+01	7.19E+01	2.15E-01	2.44E-01	2.22E+01
TEENAGE	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
TEENAGE	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
TEENAGE	VEG. ING	3.43E-01	4.45E+00	4.01E-01	4.01E-01	1.01E+00	0.00E+00
TEENAGE	MEAT ING	4.73E-02	6.29E-01	1.00E-01	1.00E-01	1.26E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.46E+01	4.22E+01	7.53E+01	3.63E+00	4.30E+00	2.51E+01
AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.83E+00	3.32E+01	5.99E+01	1.80E-01	1.94E-01	2.22E+01
ADULT	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
ADULT	CLOUD	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02	9.16E-02
ADULT	VEG. ING	4.73E-01	6.13E+00	5.55E-01	5.55E-01	1.40E+00	0.00E+00
ADULT	MEAT ING	8.27E-02	1.10E+00	1.75E-01	1.75E-01	2.21E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.33E+01	4.33E+01	6.35E+01	3.82E+00	4.73E+00	2.51E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 4 NAME=CPP ENE X= 2.9KM, Y= 1.1KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.66E+01	1.69E+01	1.30E+02	4.63E-01	5.12E-01	0.00E+00
INFANT	GROUND	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01
INFANT	CLOUD	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.67E+01	1.70E+01	1.30E+02	5.82E-01	6.31E-01	1.19E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.09E+00	1.46E+01	6.24E+01	1.94E-01	1.97E-01	0.00E+00
CHILD	GROUND	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01
CHILD	CLOUD	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07
CHILD	VEG. ING	9.43E-02	1.22E+00	1.11E-01	1.11E-01	2.78E-01	0.00E+00
CHILD	MEAT ING	1.31E-02	1.74E-01	2.76E-02	2.76E-02	3.50E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	8.32E+00	1.61E+01	6.27E+01	4.51E-01	6.29E-01	1.19E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.52E+00	1.55E+01	3.25E+01	9.16E-02	1.08E-01	0.00E+00
TEENAGE	GROUND	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01
TEENAGE	CLOUD	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07
TEENAGE	VEG. ING	1.54E-01	2.00E+00	1.79E-01	1.79E-01	4.56E-01	0.00E+00
TEENAGE	MEAT ING	2.13E-02	2.83E-01	4.49E-02	4.49E-02	5.69E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.81E+00	1.79E+01	3.29E+01	4.35E-01	7.39E-01	1.19E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.84E+00	1.50E+01	2.71E+01	7.69E-02	8.55E-02	0.00E+00
ADULT	GROUND	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01
ADULT	CLOUD	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07	3.30E-07
ADULT	VEG. ING	2.13E-01	2.76E+00	2.48E-01	2.48E-01	6.30E-01	0.00E+00
ADULT	MEAT ING	3.72E-02	4.95E-01	7.84E-02	7.84E-02	9.94E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.21E+00	1.84E+01	2.75E+01	5.22E-01	9.34E-01	1.19E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 4 NAME=CPP ENE X= 2.9KM, Y= 1.1KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.75E+01	1.69E+01	1.30E+02	5.31E-01	5.39E-01	1.46E+01
INFANT	GROUND	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
INFANT	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.88E+01	1.82E+01	1.31E+02	1.88E+00	1.89E+00	1.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.97E+00	1.46E+01	6.24E+01	2.24E-01	2.09E-01	1.46E+01
CHILD	GROUND	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
CHILD	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
CHILD	VEG. ING	9.53E-02	1.24E+00	1.14E-01	1.14E-01	2.81E-01	0.00E+00
CHILD	MEAT ING	1.33E-02	1.77E-01	2.82E-02	2.82E-02	3.55E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.04E+01	1.73E+01	6.39E+01	1.72E+00	1.88E+00	1.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.40E+00	1.55E+01	3.25E+01	1.04E-01	1.14E-01	1.46E+01
TEENAGE	GROUND	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
TEENAGE	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
TEENAGE	VEG. ING	1.56E-01	2.02E+00	1.85E-01	1.85E-01	4.60E-01	0.00E+00
TEENAGE	MEAT ING	2.16E-02	2.87E-01	4.59E-02	4.59E-02	5.77E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.93E+00	1.92E+01	3.41E+01	1.69E+00	1.98E+00	1.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.72E+00	1.50E+01	2.71E+01	8.76E-02	9.06E-02	1.46E+01
ADULT	GROUND	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
ADULT	CLOUD	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02	7.21E-02
ADULT	VEG. ING	2.15E-01	2.79E+00	2.55E-01	2.55E-01	6.36E-01	0.00E+00
ADULT	MEAT ING	3.77E-02	5.01E-01	8.01E-02	8.01E-02	1.01E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.33E+00	1.97E+01	2.88E+01	1.77E+00	2.18E+00	1.60E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 5 NAME=CPP E X= 2.8KM, Y= -0.1KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.36E+01	2.40E+01	1.85E+02	6.58E-01	7.29E-01	0.00E+00
INFANT	GROUND	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01
INFANT	CLOUD	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.38E+01	2.42E+01	1.85E+02	8.28E-01	8.98E-01	1.69E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.15E+01	2.07E+01	8.88E+01	2.76E-01	2.80E-01	0.00E+00
CHILD	GROUND	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01
CHILD	CLOUD	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07
CHILD	VEG. ING	1.34E-01	1.74E+00	1.57E-01	1.57E-01	3.96E-01	0.00E+00
CHILD	MEAT ING	1.87E-02	2.48E-01	3.93E-02	3.93E-02	4.98E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.18E+01	2.29E+01	8.92E+01	6.42E-01	8.95E-01	1.69E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.43E+00	2.20E+01	4.63E+01	1.30E-01	1.53E-01	0.00E+00
TEENAGE	GROUND	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01
TEENAGE	CLOUD	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07
TEENAGE	VEG. ING	2.20E-01	2.85E+00	2.55E-01	2.55E-01	6.48E-01	0.00E+00
TEENAGE	MEAT ING	3.03E-02	4.03E-01	6.38E-02	6.38E-02	8.09E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.85E+00	2.54E+01	4.68E+01	6.18E-01	1.05E+00	1.69E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.47E+00	2.13E+01	3.85E+01	1.09E-01	1.22E-01	0.00E+00
ADULT	GROUND	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01	1.69E-01
ADULT	CLOUD	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07	4.69E-07
ADULT	VEG. ING	3.03E-01	3.93E+00	3.52E-01	3.52E-01	8.96E-01	0.00E+00
ADULT	MEAT ING	5.29E-02	7.04E-01	1.12E-01	1.12E-01	1.41E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.99E+00	2.61E+01	3.91E+01	7.43E-01	1.33E+00	1.69E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 5 NAME=CPP E X= 2.8KM, Y= -0.1KM, Z= 0.0M, DIST= 2.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.51E+01	2.40E+01	1.85E+02	7.32E-01	7.57E-01	2.48E+01
INFANT	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
INFANT	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.70E+01	2.59E+01	1.87E+02	2.63E+00	2.65E+00	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.30E+01	2.07E+01	8.88E+01	3.08E-01	2.93E-01	2.48E+01
CHILD	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
CHILD	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
CHILD	VEG. ING	1.35E-01	1.75E+00	1.61E-01	1.61E-01	3.99E-01	0.00E+00
CHILD	MEAT ING	1.89E-02	2.50E-01	4.00E-02	4.00E-02	5.04E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.51E+01	2.46E+01	9.09E+01	2.41E+00	2.64E+00	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.92E+00	2.20E+01	4.63E+01	1.44E-01	1.60E-01	2.48E+01
TEENAGE	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
TEENAGE	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
TEENAGE	VEG. ING	2.21E-01	2.87E+00	2.61E-01	2.61E-01	6.53E-01	0.00E+00
TEENAGE	MEAT ING	3.06E-02	4.06E-01	6.49E-02	6.49E-02	8.17E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.01E+01	2.72E+01	4.85E+01	2.37E+00	2.79E+00	2.67E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.96E+00	2.14E+01	3.85E+01	1.21E-01	1.27E-01	2.48E+01
ADULT	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
ADULT	CLOUD	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02	7.81E-02
ADULT	VEG. ING	3.05E-01	3.96E+00	3.61E-01	3.61E-01	9.03E-01	0.00E+00
ADULT	MEAT ING	5.35E-02	7.10E-01	1.13E-01	1.13E-01	1.43E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.21E+00	2.79E+01	4.09E+01	2.49E+00	3.07E+00	2.67E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 6 NAME=CPP ESE X= 2.8KM, Y= -1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.36E+01	2.40E+01	1.85E+02	6.59E-01	7.29E-01	0.00E+00
INFANT	GROUND	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
INFANT	CLOUD	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.38E+01	2.42E+01	1.85E+02	8.28E-01	8.99E-01	1.70E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.15E+01	2.07E+01	8.89E+01	2.76E-01	2.80E-01	0.00E+00
CHILD	GROUND	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
CHILD	CLOUD	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07
CHILD	VEG. ING	1.34E-01	1.74E+00	1.58E-01	1.58E-01	3.96E-01	0.00E+00
CHILD	MEAT ING	1.87E-02	2.48E-01	3.93E-02	3.93E-02	4.99E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.18E+01	2.29E+01	8.93E+01	6.42E-01	8.95E-01	1.70E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.43E+00	2.20E+01	4.63E+01	1.30E-01	1.53E-01	0.00E+00
TEENAGE	GROUND	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
TEENAGE	CLOUD	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07
TEENAGE	VEG. ING	2.20E-01	2.85E+00	2.55E-01	2.55E-01	6.49E-01	0.00E+00
TEENAGE	MEAT ING	3.03E-02	4.03E-01	6.39E-02	6.39E-02	8.09E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.85E+00	2.54E+01	4.68E+01	6.19E-01	1.05E+00	1.70E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.47E+00	2.14E+01	3.85E+01	1.09E-01	1.22E-01	0.00E+00
ADULT	GROUND	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
ADULT	CLOUD	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07	4.70E-07
ADULT	VEG. ING	3.03E-01	3.93E+00	3.53E-01	3.53E-01	8.96E-01	0.00E+00
ADULT	MEAT ING	5.30E-02	7.05E-01	1.12E-01	1.12E-01	1.41E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.00E+00	2.62E+01	3.92E+01	7.43E-01	1.33E+00	1.70E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 6 NAME=CPP ESE X= 2.8KM, Y= -1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.67E+01	2.40E+01	1.85E+02	7.52E-01	7.66E-01	5.20E+01
INFANT	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
INFANT	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.87E+01	2.60E+01	1.87E+02	2.70E+00	2.71E+00	5.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.46E+01	2.07E+01	8.89E+01	3.18E-01	2.97E-01	5.20E+01
CHILD	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
CHILD	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
CHILD	VEG. ING	1.36E-01	1.76E+00	1.62E-01	1.62E-01	4.00E-01	0.00E+00
CHILD	MEAT ING	1.89E-02	2.51E-01	4.02E-02	4.02E-02	5.05E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.67E+01	2.47E+01	9.10E+01	2.47E+00	2.70E+00	5.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.55E+00	2.20E+01	4.63E+01	1.48E-01	1.62E-01	5.20E+01
TEENAGE	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
TEENAGE	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
TEENAGE	VEG. ING	2.22E-01	2.88E+00	2.63E-01	2.63E-01	6.55E-01	0.00E+00
TEENAGE	MEAT ING	3.07E-02	4.08E-01	6.52E-02	6.52E-02	8.20E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.18E+01	2.73E+01	4.86E+01	2.42E+00	2.85E+00	5.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.59E+00	2.14E+01	3.85E+01	1.24E-01	1.29E-01	5.20E+01
ADULT	GROUND	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
ADULT	CLOUD	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
ADULT	VEG. ING	3.06E-01	3.97E+00	3.63E-01	3.63E-01	9.05E-01	0.00E+00
ADULT	MEAT ING	5.37E-02	7.13E-01	1.14E-01	1.14E-01	1.43E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.09E+01	2.80E+01	4.10E+01	2.55E+00	3.12E+00	5.39E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 7 NAME=CPP SSE X= 1.0KM, Y= -2.5KM, Z= 0.0M, DIST= 2.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	4.17E+01	4.24E+01	3.27E+02	1.16E+00	1.29E+00	0.00E+00
INFANT	GROUND	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
INFANT	CLOUD	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.20E+01	4.27E+01	3.27E+02	1.46E+00	1.59E+00	2.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.03E+01	3.66E+01	1.57E+02	4.87E-01	4.94E-01	0.00E+00
CHILD	GROUND	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
CHILD	CLOUD	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07
CHILD	VEG. ING	2.37E-01	3.08E+00	2.78E-01	2.78E-01	6.99E-01	0.00E+00
CHILD	MEAT ING	3.30E-02	4.39E-01	6.95E-02	6.95E-02	8.81E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.09E+01	4.04E+01	1.58E+02	1.13E+00	1.58E+00	2.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.14E+01	3.89E+01	8.18E+01	2.30E-01	2.71E-01	0.00E+00
TEENAGE	GROUND	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
TEENAGE	CLOUD	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07
TEENAGE	VEG. ING	3.88E-01	5.04E+00	4.51E-01	4.51E-01	1.15E+00	0.00E+00
TEENAGE	MEAT ING	5.35E-02	7.12E-01	1.13E-01	1.13E-01	1.43E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.21E+01	4.49E+01	8.26E+01	1.09E+00	1.86E+00	2.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.66E+00	3.77E+01	6.80E+01	1.93E-01	2.15E-01	0.00E+00
ADULT	GROUND	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
ADULT	CLOUD	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07	8.29E-07
ADULT	VEG. ING	5.35E-01	6.95E+00	6.23E-01	6.23E-01	1.58E+00	0.00E+00
ADULT	MEAT ING	9.36E-02	1.24E+00	1.97E-01	1.97E-01	2.50E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.06E+01	4.62E+01	6.92E+01	1.31E+00	2.35E+00	2.99E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 7 NAME=CPP SSE X= 1.0KM, Y= -2.5KM, Z= 0.0M, DIST= 2.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	4.45E+01	4.24E+01	3.27E+02	1.32E+00	1.35E+00	4.71E+01
INFANT	GROUND	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00
INFANT	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.80E+01	4.59E+01	3.30E+02	4.75E+00	4.78E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.32E+01	3.66E+01	1.57E+02	5.57E-01	5.23E-01	4.71E+01
CHILD	GROUND	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00
CHILD	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
CHILD	VEG. ING	2.39E-01	3.10E+00	2.86E-01	2.86E-01	7.06E-01	0.00E+00
CHILD	MEAT ING	3.34E-02	4.43E-01	7.09E-02	7.09E-02	8.92E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.69E+01	4.36E+01	1.61E+02	4.35E+00	4.75E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.42E+01	3.89E+01	8.18E+01	2.60E-01	2.85E-01	4.71E+01
TEENAGE	GROUND	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00
TEENAGE	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
TEENAGE	VEG. ING	3.92E-01	5.08E+00	4.64E-01	4.64E-01	1.16E+00	0.00E+00
TEENAGE	MEAT ING	5.42E-02	7.20E-01	1.15E-01	1.15E-01	1.45E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.81E+01	4.82E+01	8.58E+01	4.27E+00	5.02E+00	5.06E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.25E+01	3.77E+01	6.80E+01	2.18E-01	2.27E-01	4.71E+01
ADULT	GROUND	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00	3.22E+00
ADULT	CLOUD	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
ADULT	VEG. ING	5.41E-01	7.01E+00	6.41E-01	6.41E-01	1.60E+00	0.00E+00
ADULT	MEAT ING	9.48E-02	1.26E+00	2.01E-01	2.01E-01	2.53E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.66E+01	4.94E+01	7.23E+01	4.49E+00	5.51E+00	5.06E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 8 NAME=CPP SE X= 2.0KM, Y= -2.1KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.78E+01	2.83E+01	2.18E+02	7.75E-01	8.58E-01	0.00E+00
INFANT	GROUND	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
INFANT	CLOUD	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.80E+01	2.85E+01	2.18E+02	9.75E-01	1.06E+00	1.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.36E+01	2.44E+01	1.05E+02	3.25E-01	3.29E-01	0.00E+00
CHILD	GROUND	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
CHILD	CLOUD	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07
CHILD	VEG. ING	1.58E-01	2.05E+00	1.85E-01	1.85E-01	4.66E-01	0.00E+00
CHILD	MEAT ING	2.20E-02	2.92E-01	4.63E-02	4.63E-02	5.87E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.39E+01	2.69E+01	1.05E+02	7.56E-01	1.05E+00	1.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.57E+00	2.59E+01	5.45E+01	1.53E-01	1.80E-01	0.00E+00
TEENAGE	GROUND	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
TEENAGE	CLOUD	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07
TEENAGE	VEG. ING	2.59E-01	3.36E+00	3.00E-01	3.00E-01	7.63E-01	0.00E+00
TEENAGE	MEAT ING	3.57E-02	4.74E-01	7.52E-02	7.52E-02	9.52E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.06E+00	2.99E+01	5.51E+01	7.28E-01	1.24E+00	1.99E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.44E+00	2.51E+01	4.53E+01	1.29E-01	1.43E-01	0.00E+00
ADULT	GROUND	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
ADULT	CLOUD	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07	5.53E-07
ADULT	VEG. ING	3.57E-01	4.63E+00	4.15E-01	4.15E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	6.24E-02	8.29E-01	1.31E-01	1.31E-01	1.66E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.06E+00	3.08E+01	4.61E+01	8.75E-01	1.56E+00	1.99E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 8 NAME=CPP SE X= 2.0KM, Y= -2.1KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.15E+01	2.83E+01	2.18E+02	9.06E-01	9.09E-01	6.15E+01
INFANT	GROUND	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
INFANT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.38E+01	3.06E+01	2.20E+02	3.25E+00	3.25E+00	6.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.73E+01	2.44E+01	1.05E+02	3.83E-01	3.53E-01	6.15E+01
CHILD	GROUND	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
CHILD	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
CHILD	VEG. ING	1.60E-01	2.07E+00	1.92E-01	1.92E-01	4.71E-01	0.00E+00
CHILD	MEAT ING	2.23E-02	2.96E-01	4.75E-02	4.75E-02	5.96E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.98E+01	2.91E+01	1.07E+02	2.97E+00	3.23E+00	6.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.13E+01	2.60E+01	5.45E+01	1.78E-01	1.92E-01	6.15E+01
TEENAGE	GROUND	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
TEENAGE	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
TEENAGE	VEG. ING	2.62E-01	3.40E+00	3.11E-01	3.11E-01	7.72E-01	0.00E+00
TEENAGE	MEAT ING	3.62E-02	4.81E-01	7.71E-02	7.71E-02	9.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.39E+01	3.22E+01	5.72E+01	2.91E+00	3.41E+00	6.39E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.01E+01	2.52E+01	4.53E+01	1.50E-01	1.53E-01	6.15E+01
ADULT	GROUND	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
ADULT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
ADULT	VEG. ING	3.61E-01	4.68E+00	4.30E-01	4.30E-01	1.07E+00	0.00E+00
ADULT	MEAT ING	6.33E-02	8.41E-01	1.35E-01	1.35E-01	1.69E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.29E+01	3.30E+01	4.83E+01	3.06E+00	3.74E+00	6.39E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 9 NAME=CPP S X= -0.1KM, Y= -2.9KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.24E+01	9.39E+01	7.24E+02	2.58E+00	2.85E+00	0.00E+00
INFANT	GROUND	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01
INFANT	CLOUD	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	9.30E+01	9.45E+01	7.24E+02	3.24E+00	3.51E+00	6.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.51E+01	8.11E+01	3.48E+02	1.08E+00	1.09E+00	0.00E+00
CHILD	GROUND	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01
CHILD	CLOUD	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06
CHILD	VEG. ING	5.25E-01	6.82E+00	6.16E-01	6.16E-01	1.55E+00	0.00E+00
CHILD	MEAT ING	7.31E-02	9.72E-01	1.54E-01	1.54E-01	1.95E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.63E+01	8.95E+01	3.49E+02	2.51E+00	3.50E+00	6.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.51E+01	8.61E+01	1.81E+02	5.10E-01	5.99E-01	0.00E+00
TEENAGE	GROUND	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01
TEENAGE	CLOUD	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06
TEENAGE	VEG. ING	8.60E-01	1.12E+01	9.98E-01	9.98E-01	2.54E+00	0.00E+00
TEENAGE	MEAT ING	1.19E-01	1.58E+00	2.50E-01	2.50E-01	3.17E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.68E+01	9.95E+01	1.83E+02	2.42E+00	4.12E+00	6.63E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.14E+01	8.35E+01	1.51E+02	4.28E-01	4.76E-01	0.00E+00
ADULT	GROUND	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01	6.63E-01
ADULT	CLOUD	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06	1.84E-06
ADULT	VEG. ING	1.19E+00	1.54E+01	1.38E+00	1.38E+00	3.51E+00	0.00E+00
ADULT	MEAT ING	2.07E-01	2.76E+00	4.37E-01	4.37E-01	5.53E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.34E+01	1.02E+02	1.53E+02	2.91E+00	5.20E+00	6.63E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 9 NAME=CPP S X= -0.1KM, Y= -2.9KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.45E+01	9.39E+01	7.24E+02	2.75E+00	2.92E+00	3.50E+01
INFANT	GROUND	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00
INFANT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.02E+02	1.01E+02	7.31E+02	1.01E+01	1.02E+01	4.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.72E+01	8.11E+01	3.48E+02	1.16E+00	1.13E+00	3.50E+01
CHILD	GROUND	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00
CHILD	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
CHILD	VEG. ING	5.28E-01	6.85E+00	6.25E-01	6.25E-01	1.56E+00	0.00E+00
CHILD	MEAT ING	7.35E-02	9.77E-01	1.56E-01	1.56E-01	1.96E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	5.51E+01	9.62E+01	3.56E+02	9.26E+00	1.02E+01	4.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.72E+01	8.61E+01	1.81E+02	5.43E-01	6.16E-01	3.50E+01
TEENAGE	GROUND	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00
TEENAGE	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
TEENAGE	VEG. ING	8.64E-01	1.12E+01	1.01E+00	1.01E+00	2.55E+00	0.00E+00
TEENAGE	MEAT ING	1.19E-01	1.59E+00	2.52E-01	2.52E-01	3.19E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.55E+01	1.06E+02	1.90E+02	9.13E+00	1.08E+01	4.23E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.35E+01	8.35E+01	1.51E+02	4.56E-01	4.89E-01	3.50E+01
ADULT	GROUND	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00	7.12E+00
ADULT	CLOUD	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
ADULT	VEG. ING	1.19E+00	1.55E+01	1.40E+00	1.40E+00	3.52E+00	0.00E+00
ADULT	MEAT ING	2.09E-01	2.77E+00	4.41E-01	4.41E-01	5.57E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.22E+01	1.09E+02	1.60E+02	9.61E+00	1.19E+01	4.23E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 10 NAME=CPP SSW X= -1.3KM, Y= -2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.82E+01	2.87E+01	2.21E+02	7.88E-01	8.72E-01	0.00E+00
INFANT	GROUND	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01
INFANT	CLOUD	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.84E+01	2.89E+01	2.21E+02	9.90E-01	1.07E+00	2.03E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.38E+01	2.48E+01	1.06E+02	3.30E-01	3.35E-01	0.00E+00
CHILD	GROUND	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01
CHILD	CLOUD	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07
CHILD	VEG. ING	1.61E-01	2.08E+00	1.88E-01	1.88E-01	4.73E-01	0.00E+00
CHILD	MEAT ING	2.23E-02	2.97E-01	4.71E-02	4.71E-02	5.96E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.42E+01	2.74E+01	1.07E+02	7.68E-01	1.07E+00	2.03E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.69E+00	2.63E+01	5.53E+01	1.56E-01	1.83E-01	0.00E+00
TEENAGE	GROUND	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01
TEENAGE	CLOUD	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07
TEENAGE	VEG. ING	2.63E-01	3.41E+00	3.05E-01	3.05E-01	7.75E-01	0.00E+00
TEENAGE	MEAT ING	3.63E-02	4.82E-01	7.64E-02	7.64E-02	9.68E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.19E+00	3.04E+01	5.59E+01	7.40E-01	1.26E+00	2.03E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.54E+00	2.55E+01	4.61E+01	1.31E-01	1.45E-01	0.00E+00
ADULT	GROUND	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01	2.03E-01
ADULT	CLOUD	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07	5.61E-07
ADULT	VEG. ING	3.62E-01	4.70E+00	4.22E-01	4.22E-01	1.07E+00	0.00E+00
ADULT	MEAT ING	6.34E-02	8.43E-01	1.34E-01	1.34E-01	1.69E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.17E+00	3.13E+01	4.68E+01	8.89E-01	1.59E+00	2.03E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 10 NAME=CPP SSW X= -1.3KM, Y= -2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.97E+01	2.87E+01	2.21E+02	9.78E-01	9.46E-01	2.51E+01
INFANT	GROUND	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00
INFANT	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.21E+01	3.11E+01	2.23E+02	3.32E+00	3.29E+00	2.75E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.53E+01	2.48E+01	1.06E+02	4.14E-01	3.69E-01	2.51E+01
CHILD	GROUND	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00
CHILD	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
CHILD	VEG. ING	1.63E-01	2.12E+00	1.98E-01	1.98E-01	4.81E-01	0.00E+00
CHILD	MEAT ING	2.28E-02	3.03E-01	4.88E-02	4.88E-02	6.10E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.78E+01	2.96E+01	1.09E+02	3.01E+00	3.26E+00	2.75E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.20E+00	2.64E+01	5.53E+01	1.92E-01	2.01E-01	2.51E+01
TEENAGE	GROUND	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00
TEENAGE	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
TEENAGE	VEG. ING	2.67E-01	3.47E+00	3.21E-01	3.21E-01	7.88E-01	0.00E+00
TEENAGE	MEAT ING	3.71E-02	4.92E-01	7.92E-02	7.92E-02	9.90E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.19E+01	3.27E+01	5.81E+01	2.94E+00	3.44E+00	2.75E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.05E+00	2.56E+01	4.61E+01	1.61E-01	1.60E-01	2.51E+01
ADULT	GROUND	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00	2.18E+00
ADULT	CLOUD	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
ADULT	VEG. ING	3.69E-01	4.78E+00	4.44E-01	4.44E-01	1.09E+00	0.00E+00
ADULT	MEAT ING	6.48E-02	8.59E-01	1.38E-01	1.38E-01	1.73E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.08E+01	3.36E+01	4.90E+01	3.09E+00	3.77E+00	2.75E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 11 NAME=CPP SW X= -2.1KM, Y= -2.0KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.01E+01	2.04E+01	1.57E+02	5.60E-01	6.20E-01	0.00E+00
INFANT	GROUND	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
INFANT	CLOUD	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.02E+01	2.06E+01	1.57E+02	7.04E-01	7.64E-01	1.44E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.79E+00	1.76E+01	7.55E+01	2.35E-01	2.38E-01	0.00E+00
CHILD	GROUND	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
CHILD	CLOUD	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07
CHILD	VEG. ING	1.14E-01	1.48E+00	1.34E-01	1.34E-01	3.36E-01	0.00E+00
CHILD	MEAT ING	1.59E-02	2.11E-01	3.35E-02	3.35E-02	4.24E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.01E+01	1.95E+01	7.58E+01	5.46E-01	7.61E-01	1.44E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.46E+00	1.87E+01	3.93E+01	1.11E-01	1.30E-01	0.00E+00
TEENAGE	GROUND	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
TEENAGE	CLOUD	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07
TEENAGE	VEG. ING	1.87E-01	2.43E+00	2.17E-01	2.17E-01	5.51E-01	0.00E+00
TEENAGE	MEAT ING	2.58E-02	3.43E-01	5.43E-02	5.43E-02	6.88E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.82E+00	2.16E+01	3.97E+01	5.26E-01	8.94E-01	1.44E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.65E+00	1.82E+01	3.27E+01	9.31E-02	1.03E-01	0.00E+00
ADULT	GROUND	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
ADULT	CLOUD	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07	3.99E-07
ADULT	VEG. ING	2.58E-01	3.34E+00	3.00E-01	3.00E-01	7.61E-01	0.00E+00
ADULT	MEAT ING	4.50E-02	5.99E-01	9.49E-02	9.49E-02	1.20E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.09E+00	2.22E+01	3.33E+01	6.32E-01	1.13E+00	1.44E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 11 NAME=CPP SW X= -2.1KM, Y= -2.0KM, Z= 0.0M, DIST= 2.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.15E+01	2.04E+01	1.57E+02	7.27E-01	6.85E-01	2.39E+01
INFANT	GROUND	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00
INFANT	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.32E+01	2.22E+01	1.59E+02	2.44E+00	2.40E+00	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.12E+01	1.77E+01	7.55E+01	3.09E-01	2.68E-01	2.39E+01
CHILD	GROUND	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00
CHILD	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
CHILD	VEG. ING	1.17E-01	1.51E+00	1.42E-01	1.42E-01	3.43E-01	0.00E+00
CHILD	MEAT ING	1.63E-02	2.16E-01	3.50E-02	3.50E-02	4.36E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.31E+01	2.11E+01	7.74E+01	2.20E+00	2.37E+00	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.90E+00	1.88E+01	3.93E+01	1.43E-01	1.46E-01	2.39E+01
TEENAGE	GROUND	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00
TEENAGE	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
TEENAGE	VEG. ING	1.91E-01	2.47E+00	2.31E-01	2.31E-01	5.62E-01	0.00E+00
TEENAGE	MEAT ING	2.65E-02	3.51E-01	5.68E-02	5.68E-02	7.08E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.83E+00	2.33E+01	4.13E+01	2.14E+00	2.49E+00	2.56E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.08E+00	1.82E+01	3.27E+01	1.20E-01	1.16E-01	2.39E+01
ADULT	GROUND	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.55E+00
ADULT	CLOUD	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
ADULT	VEG. ING	2.63E-01	3.41E+00	3.19E-01	3.19E-01	7.77E-01	0.00E+00
ADULT	MEAT ING	4.63E-02	6.13E-01	9.92E-02	9.92E-02	1.24E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.10E+00	2.39E+01	3.49E+01	2.25E+00	2.73E+00	2.56E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 12 NAME=CPP WSW X= -1.3KM, Y= -0.5KM, Z= 0.0M, DIST= 1.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	5.27E+01	5.36E+01	4.13E+02	1.47E+00	1.63E+00	0.00E+00
INFANT	GROUND	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01
INFANT	CLOUD	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	5.31E+01	5.40E+01	4.13E+02	1.85E+00	2.01E+00	3.78E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.57E+01	4.63E+01	1.98E+02	6.16E-01	6.25E-01	0.00E+00
CHILD	GROUND	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01
CHILD	CLOUD	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
CHILD	VEG. ING	3.00E-01	3.89E+00	3.52E-01	3.52E-01	8.84E-01	0.00E+00
CHILD	MEAT ING	4.17E-02	5.55E-01	8.79E-02	8.79E-02	1.11E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.64E+01	5.11E+01	1.99E+02	1.43E+00	2.00E+00	3.78E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.44E+01	4.91E+01	1.03E+02	2.91E-01	3.42E-01	0.00E+00
TEENAGE	GROUND	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01
TEENAGE	CLOUD	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
TEENAGE	VEG. ING	4.91E-01	6.37E+00	5.70E-01	5.70E-01	1.45E+00	0.00E+00
TEENAGE	MEAT ING	6.77E-02	9.00E-01	1.43E-01	1.43E-01	1.81E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.53E+01	5.68E+01	1.04E+02	1.38E+00	2.35E+00	3.78E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.22E+01	4.77E+01	8.60E+01	2.44E-01	2.71E-01	0.00E+00
ADULT	GROUND	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01	3.78E-01
ADULT	CLOUD	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
ADULT	VEG. ING	6.77E-01	8.78E+00	7.87E-01	7.87E-01	2.00E+00	0.00E+00
ADULT	MEAT ING	1.18E-01	1.57E+00	2.49E-01	2.49E-01	3.16E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.34E+01	5.84E+01	8.74E+01	1.66E+00	2.97E+00	3.78E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 12 NAME=CPP WSW X= -1.3KM, Y= -0.5KM, Z= 0.0M, DIST= 1.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	5.43E+01	5.36E+01	4.13E+02	1.57E+00	1.67E+00	2.68E+01
INFANT	GROUND	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00
INFANT	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	5.85E+01	5.78E+01	4.17E+02	5.76E+00	5.86E+00	3.10E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.73E+01	4.63E+01	1.98E+02	6.60E-01	6.43E-01	2.68E+01
CHILD	GROUND	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00
CHILD	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
CHILD	VEG. ING	3.01E-01	3.91E+00	3.57E-01	3.57E-01	8.88E-01	0.00E+00
CHILD	MEAT ING	4.20E-02	5.58E-01	8.88E-02	8.88E-02	1.12E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.19E+01	5.49E+01	2.03E+02	5.30E+00	5.83E+00	3.10E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.60E+01	4.92E+01	1.03E+02	3.10E-01	3.51E-01	2.68E+01
TEENAGE	GROUND	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00
TEENAGE	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
TEENAGE	VEG. ING	4.93E-01	6.40E+00	5.78E-01	5.78E-01	1.45E+00	0.00E+00
TEENAGE	MEAT ING	6.81E-02	9.05E-01	1.44E-01	1.44E-01	1.82E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.07E+01	6.07E+01	1.08E+02	5.22E+00	6.18E+00	3.10E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.38E+01	4.77E+01	8.60E+01	2.60E-01	2.79E-01	2.68E+01
ADULT	GROUND	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00
ADULT	CLOUD	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
ADULT	VEG. ING	6.80E-01	8.82E+00	7.99E-01	7.99E-01	2.01E+00	0.00E+00
ADULT	MEAT ING	1.19E-01	1.58E+00	2.52E-01	2.52E-01	3.18E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.88E+01	6.23E+01	9.12E+01	5.50E+00	6.80E+00	3.10E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 13 NAME=CPP W X= -2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.01E+01	3.07E+01	2.36E+02	8.41E-01	9.31E-01	0.00E+00
INFANT	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
INFANT	CLOUD	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.03E+01	3.09E+01	2.36E+02	1.06E+00	1.15E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.47E+01	2.65E+01	1.13E+02	3.52E-01	3.57E-01	0.00E+00
CHILD	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
CHILD	CLOUD	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07
CHILD	VEG. ING	1.71E-01	2.22E+00	2.01E-01	2.01E-01	5.05E-01	0.00E+00
CHILD	MEAT ING	2.38E-02	3.17E-01	5.02E-02	5.02E-02	6.36E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.51E+01	2.92E+01	1.14E+02	8.20E-01	1.14E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.20E+00	2.81E+01	5.91E+01	1.66E-01	1.96E-01	0.00E+00
TEENAGE	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
TEENAGE	CLOUD	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07
TEENAGE	VEG. ING	2.80E-01	3.64E+00	3.26E-01	3.26E-01	8.28E-01	0.00E+00
TEENAGE	MEAT ING	3.87E-02	5.15E-01	8.15E-02	8.15E-02	1.03E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.74E+00	3.25E+01	5.97E+01	7.90E-01	1.34E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.98E+00	2.73E+01	4.91E+01	1.40E-01	1.55E-01	0.00E+00
ADULT	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
ADULT	CLOUD	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07	5.99E-07
ADULT	VEG. ING	3.87E-01	5.02E+00	4.50E-01	4.50E-01	1.14E+00	0.00E+00
ADULT	MEAT ING	6.76E-02	8.99E-01	1.43E-01	1.43E-01	1.81E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.65E+00	3.34E+01	4.99E+01	9.49E-01	1.70E+00	2.16E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 13 NAME=CPP W X= -2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.19E+01	3.07E+01	2.36E+02	9.46E-01	9.71E-01	2.94E+01
INFANT	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
INFANT	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.44E+01	3.32E+01	2.38E+02	3.43E+00	3.45E+00	3.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.65E+01	2.65E+01	1.13E+02	3.99E-01	3.76E-01	2.94E+01
CHILD	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
CHILD	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
CHILD	VEG. ING	1.73E-01	2.24E+00	2.06E-01	2.06E-01	5.09E-01	0.00E+00
CHILD	MEAT ING	2.41E-02	3.20E-01	5.12E-02	5.12E-02	6.44E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.91E+01	3.15E+01	1.16E+02	3.14E+00	3.43E+00	3.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.97E+00	2.82E+01	5.91E+01	1.86E-01	2.05E-01	2.94E+01
TEENAGE	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
TEENAGE	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
TEENAGE	VEG. ING	2.83E-01	3.67E+00	3.34E-01	3.34E-01	8.35E-01	0.00E+00
TEENAGE	MEAT ING	3.91E-02	5.20E-01	8.31E-02	8.31E-02	1.05E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.28E+01	3.48E+01	6.20E+01	3.09E+00	3.63E+00	3.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.74E+00	2.73E+01	4.91E+01	1.56E-01	1.63E-01	2.94E+01
ADULT	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
ADULT	CLOUD	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
ADULT	VEG. ING	3.90E-01	5.06E+00	4.62E-01	4.62E-01	1.15E+00	0.00E+00
ADULT	MEAT ING	6.84E-02	9.09E-01	1.45E-01	1.45E-01	1.83E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.17E+01	3.57E+01	5.22E+01	3.25E+00	3.98E+00	3.19E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 14 NAME=CPP WNW X= -2.1KM, Y= 0.9KM, Z= 0.0M, DIST= 2.2KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.41E+01	3.47E+01	2.67E+02	9.52E-01	1.05E+00	0.00E+00
INFANT	GROUND	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
INFANT	CLOUD	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.43E+01	3.50E+01	2.67E+02	1.20E+00	1.30E+00	2.45E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.66E+01	3.00E+01	1.28E+02	3.99E-01	4.04E-01	0.00E+00
CHILD	GROUND	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
CHILD	CLOUD	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07
CHILD	VEG. ING	1.94E-01	2.52E+00	2.28E-01	2.28E-01	5.72E-01	0.00E+00
CHILD	MEAT ING	2.70E-02	3.59E-01	5.69E-02	5.69E-02	7.20E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.71E+01	3.31E+01	1.29E+02	9.28E-01	1.29E+00	2.45E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.28E+00	3.18E+01	6.68E+01	1.88E-01	2.21E-01	0.00E+00
TEENAGE	GROUND	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
TEENAGE	CLOUD	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07
TEENAGE	VEG. ING	3.17E-01	4.12E+00	3.69E-01	3.69E-01	9.37E-01	0.00E+00
TEENAGE	MEAT ING	4.38E-02	5.83E-01	9.23E-02	9.23E-02	1.17E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.89E+00	3.68E+01	6.76E+01	8.94E-01	1.52E+00	2.45E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.90E+00	3.09E+01	5.56E+01	1.58E-01	1.76E-01	0.00E+00
ADULT	GROUND	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
ADULT	CLOUD	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07	6.78E-07
ADULT	VEG. ING	4.38E-01	5.68E+00	5.10E-01	5.10E-01	1.29E+00	0.00E+00
ADULT	MEAT ING	7.66E-02	1.02E+00	1.61E-01	1.61E-01	2.04E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.66E+00	3.78E+01	5.65E+01	1.07E+00	1.92E+00	2.45E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 14 NAME=CPP WNW X= -2.1KM, Y= 0.9KM, Z= 0.0M, DIST= 2.2KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.60E+01	3.47E+01	2.67E+02	1.03E+00	1.08E+00	3.09E+01
INFANT	GROUND	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00
INFANT	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.87E+01	3.75E+01	2.70E+02	3.81E+00	3.86E+00	3.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.85E+01	3.00E+01	1.28E+02	4.35E-01	4.19E-01	3.09E+01
CHILD	GROUND	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00
CHILD	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
CHILD	VEG. ING	1.95E-01	2.53E+00	2.32E-01	2.32E-01	5.75E-01	0.00E+00
CHILD	MEAT ING	2.72E-02	3.61E-01	5.76E-02	5.76E-02	7.26E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.15E+01	3.57E+01	1.31E+02	3.50E+00	3.85E+00	3.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.11E+01	3.19E+01	6.68E+01	2.04E-01	2.29E-01	3.09E+01
TEENAGE	GROUND	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00
TEENAGE	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
TEENAGE	VEG. ING	3.19E-01	4.14E+00	3.75E-01	3.75E-01	9.42E-01	0.00E+00
TEENAGE	MEAT ING	4.41E-02	5.86E-01	9.35E-02	9.35E-02	1.18E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.43E+01	3.94E+01	7.01E+01	3.45E+00	4.07E+00	3.37E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.76E+00	3.09E+01	5.56E+01	1.71E-01	1.82E-01	3.09E+01
ADULT	GROUND	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00	2.63E+00
ADULT	CLOUD	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01	1.51E-01
ADULT	VEG. ING	4.41E-01	5.71E+00	5.19E-01	5.19E-01	1.30E+00	0.00E+00
ADULT	MEAT ING	7.72E-02	1.03E+00	1.63E-01	1.63E-01	2.06E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.31E+01	4.04E+01	5.91E+01	3.63E+00	4.47E+00	3.37E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 15 NAME=CPP NW X= -2.4KM, Y= 2.5KM, Z= 0.0M, DIST= 3.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.45E+01	3.51E+01	2.70E+02	9.64E-01	1.07E+00	0.00E+00
INFANT	GROUND	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01
INFANT	CLOUD	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.47E+01	3.54E+01	2.70E+02	1.21E+00	1.31E+00	2.47E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.68E+01	3.03E+01	1.30E+02	4.04E-01	4.09E-01	0.00E+00
CHILD	GROUND	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01
CHILD	CLOUD	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07
CHILD	VEG. ING	1.96E-01	2.55E+00	2.30E-01	2.30E-01	5.78E-01	0.00E+00
CHILD	MEAT ING	2.73E-02	3.63E-01	5.75E-02	5.75E-02	7.29E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.73E+01	3.35E+01	1.30E+02	9.39E-01	1.31E+00	2.47E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.39E+00	3.22E+01	6.76E+01	1.91E-01	2.24E-01	0.00E+00
TEENAGE	GROUND	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01
TEENAGE	CLOUD	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07
TEENAGE	VEG. ING	3.21E-01	4.17E+00	3.73E-01	3.73E-01	9.47E-01	0.00E+00
TEENAGE	MEAT ING	4.43E-02	5.89E-01	9.34E-02	9.34E-02	1.18E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.00E+01	3.72E+01	6.83E+01	9.05E-01	1.54E+00	2.47E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.99E+00	3.12E+01	5.63E+01	1.60E-01	1.78E-01	0.00E+00
ADULT	GROUND	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01	2.47E-01
ADULT	CLOUD	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07	6.85E-07
ADULT	VEG. ING	4.43E-01	5.75E+00	5.16E-01	5.16E-01	1.31E+00	0.00E+00
ADULT	MEAT ING	7.74E-02	1.03E+00	1.63E-01	1.63E-01	2.07E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.76E+00	3.83E+01	5.72E+01	1.09E+00	1.94E+00	2.47E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 15 NAME=CPP NW X= -2.4KM, Y= 2.5KM, Z= 0.0M, DIST= 3.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.66E+01	3.51E+01	2.70E+02	1.01E+00	1.08E+00	3.55E+01
INFANT	GROUND	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
INFANT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.94E+01	3.79E+01	2.73E+02	3.78E+00	3.86E+00	3.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.90E+01	3.03E+01	1.30E+02	4.23E-01	4.17E-01	3.55E+01
CHILD	GROUND	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
CHILD	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
CHILD	VEG. ING	1.97E-01	2.55E+00	2.33E-01	2.33E-01	5.80E-01	0.00E+00
CHILD	MEAT ING	2.74E-02	3.64E-01	5.79E-02	5.79E-02	7.32E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.20E+01	3.60E+01	1.33E+02	3.49E+00	3.85E+00	3.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.15E+01	3.22E+01	6.76E+01	1.99E-01	2.28E-01	3.55E+01
TEENAGE	GROUND	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
TEENAGE	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
TEENAGE	VEG. ING	3.22E-01	4.18E+00	3.77E-01	3.77E-01	9.50E-01	0.00E+00
TEENAGE	MEAT ING	4.45E-02	5.91E-01	9.40E-02	9.40E-02	1.19E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.47E+01	3.98E+01	7.08E+01	3.45E+00	4.07E+00	3.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.01E+01	3.12E+01	5.63E+01	1.67E-01	1.81E-01	3.55E+01
ADULT	GROUND	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
ADULT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
ADULT	VEG. ING	4.44E-01	5.76E+00	5.21E-01	5.21E-01	1.31E+00	0.00E+00
ADULT	MEAT ING	7.78E-02	1.03E+00	1.64E-01	1.64E-01	2.08E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.34E+01	4.08E+01	5.97E+01	3.63E+00	4.48E+00	3.83E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 16 NAME=CPP NNW X= -1.1KM, Y= 2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.59E+01	2.63E+01	2.03E+02	7.23E-01	8.00E-01	0.00E+00
INFANT	GROUND	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
INFANT	CLOUD	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.61E+01	2.65E+01	2.03E+02	9.09E-01	9.86E-01	1.86E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.26E+01	2.28E+01	9.75E+01	3.03E-01	3.07E-01	0.00E+00
CHILD	GROUND	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
CHILD	CLOUD	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07
CHILD	VEG. ING	1.47E-01	1.91E+00	1.73E-01	1.73E-01	4.34E-01	0.00E+00
CHILD	MEAT ING	2.05E-02	2.72E-01	4.32E-02	4.32E-02	5.47E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.30E+01	2.51E+01	9.79E+01	7.05E-01	9.82E-01	1.86E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.05E+00	2.42E+01	5.08E+01	1.43E-01	1.68E-01	0.00E+00
TEENAGE	GROUND	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
TEENAGE	CLOUD	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07
TEENAGE	VEG. ING	2.41E-01	3.13E+00	2.80E-01	2.80E-01	7.11E-01	0.00E+00
TEENAGE	MEAT ING	3.33E-02	4.42E-01	7.01E-02	7.01E-02	8.88E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.51E+00	2.79E+01	5.13E+01	6.79E-01	1.15E+00	1.86E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.00E+00	2.34E+01	4.23E+01	1.20E-01	1.33E-01	0.00E+00
ADULT	GROUND	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
ADULT	CLOUD	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.15E-07
ADULT	VEG. ING	3.32E-01	4.31E+00	3.87E-01	3.87E-01	9.83E-01	0.00E+00
ADULT	MEAT ING	5.81E-02	7.73E-01	1.22E-01	1.22E-01	1.55E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.58E+00	2.87E+01	4.30E+01	8.15E-01	1.46E+00	1.86E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 16 NAME=CPP NNW X= -1.1KM, Y= 2.9KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.71E+01	2.64E+01	2.03E+02	7.76E-01	8.21E-01	1.98E+01
INFANT	GROUND	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
INFANT	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.92E+01	2.85E+01	2.05E+02	2.87E+00	2.91E+00	2.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.38E+01	2.28E+01	9.75E+01	3.26E-01	3.17E-01	1.98E+01
CHILD	GROUND	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
CHILD	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
CHILD	VEG. ING	1.48E-01	1.92E+00	1.76E-01	1.76E-01	4.36E-01	0.00E+00
CHILD	MEAT ING	2.06E-02	2.74E-01	4.36E-02	4.36E-02	5.51E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.61E+01	2.70E+01	9.98E+01	2.64E+00	2.90E+00	2.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.24E+00	2.42E+01	5.08E+01	1.53E-01	1.73E-01	1.98E+01
TEENAGE	GROUND	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
TEENAGE	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
TEENAGE	VEG. ING	2.42E-01	3.14E+00	2.84E-01	2.84E-01	7.15E-01	0.00E+00
TEENAGE	MEAT ING	3.35E-02	4.45E-01	7.08E-02	7.08E-02	8.94E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.06E+01	2.99E+01	5.32E+01	2.60E+00	3.07E+00	2.19E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.19E+00	2.34E+01	4.23E+01	1.29E-01	1.37E-01	1.98E+01
ADULT	GROUND	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
ADULT	CLOUD	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
ADULT	VEG. ING	3.34E-01	4.33E+00	3.93E-01	3.93E-01	9.88E-01	0.00E+00
ADULT	MEAT ING	5.85E-02	7.78E-01	1.24E-01	1.24E-01	1.56E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.67E+00	3.07E+01	4.49E+01	2.74E+00	3.37E+00	2.19E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 17 NAME=SF N X= -5.0KM, Y= 4.6KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.46E+01	2.51E+01	1.93E+02	6.88E-01	7.60E-01	0.00E+00
INFANT	GROUND	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01
INFANT	CLOUD	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.48E+01	2.52E+01	1.93E+02	8.64E-01	9.36E-01	1.76E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.20E+01	2.16E+01	9.25E+01	2.88E-01	2.92E-01	0.00E+00
CHILD	GROUND	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01
CHILD	CLOUD	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07
CHILD	VEG. ING	1.40E-01	1.82E+00	1.64E-01	1.64E-01	4.12E-01	0.00E+00
CHILD	MEAT ING	1.95E-02	2.59E-01	4.10E-02	4.10E-02	5.20E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.23E+01	2.39E+01	9.29E+01	6.70E-01	9.32E-01	1.76E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.69E+00	2.30E+01	4.82E+01	1.36E-01	1.60E-01	0.00E+00
TEENAGE	GROUND	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01
TEENAGE	CLOUD	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07
TEENAGE	VEG. ING	2.29E-01	2.97E+00	2.66E-01	2.66E-01	6.75E-01	0.00E+00
TEENAGE	MEAT ING	3.16E-02	4.20E-01	6.66E-02	6.66E-02	8.43E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.13E+00	2.65E+01	4.87E+01	6.45E-01	1.10E+00	1.76E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.69E+00	2.23E+01	4.01E+01	1.14E-01	1.27E-01	0.00E+00
ADULT	GROUND	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01	1.76E-01
ADULT	CLOUD	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07	4.89E-07
ADULT	VEG. ING	3.16E-01	4.10E+00	3.68E-01	3.68E-01	9.33E-01	0.00E+00
ADULT	MEAT ING	5.52E-02	7.35E-01	1.16E-01	1.16E-01	1.47E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.24E+00	2.73E+01	4.08E+01	7.75E-01	1.38E+00	1.76E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 17 NAME=SF N X= -5.0KM, Y= 4.6KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.62E+01	2.51E+01	1.93E+02	7.20E-01	7.73E-01	2.64E+01
INFANT	GROUND	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
INFANT	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.81E+01	2.70E+01	1.94E+02	2.68E+00	2.73E+00	2.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.36E+01	2.16E+01	9.25E+01	3.03E-01	2.98E-01	2.64E+01
CHILD	GROUND	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
CHILD	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
CHILD	VEG. ING	1.40E-01	1.82E+00	1.66E-01	1.66E-01	4.14E-01	0.00E+00
CHILD	MEAT ING	1.96E-02	2.60E-01	4.13E-02	4.13E-02	5.22E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.57E+01	2.57E+01	9.46E+01	2.47E+00	2.72E+00	2.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.28E+00	2.30E+01	4.82E+01	1.42E-01	1.63E-01	2.64E+01
TEENAGE	GROUND	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
TEENAGE	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
TEENAGE	VEG. ING	2.30E-01	2.98E+00	2.69E-01	2.69E-01	6.78E-01	0.00E+00
TEENAGE	MEAT ING	3.17E-02	4.22E-01	6.71E-02	6.71E-02	8.47E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.05E+01	2.83E+01	5.05E+01	2.43E+00	2.88E+00	2.83E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.28E+00	2.23E+01	4.01E+01	1.19E-01	1.29E-01	2.64E+01
ADULT	GROUND	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
ADULT	CLOUD	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02	5.86E-02
ADULT	VEG. ING	3.17E-01	4.11E+00	3.72E-01	3.72E-01	9.36E-01	0.00E+00
ADULT	MEAT ING	5.55E-02	7.37E-01	1.17E-01	1.17E-01	1.48E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.61E+00	2.91E+01	4.25E+01	2.56E+00	3.17E+00	2.83E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 18 NAME=SF NNE X= -4.6KM, Y= 4.6KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.76E+01	2.81E+01	2.16E+02	7.71E-01	8.52E-01	0.00E+00
INFANT	GROUND	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
INFANT	CLOUD	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.78E+01	2.83E+01	2.16E+02	9.69E-01	1.05E+00	1.98E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.34E+01	2.43E+01	1.04E+02	3.23E-01	3.27E-01	0.00E+00
CHILD	GROUND	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
CHILD	CLOUD	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07
CHILD	VEG. ING	1.57E-01	2.04E+00	1.84E-01	1.84E-01	4.62E-01	0.00E+00
CHILD	MEAT ING	2.18E-02	2.90E-01	4.60E-02	4.60E-02	5.83E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.38E+01	2.68E+01	1.04E+02	7.51E-01	1.05E+00	1.98E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.51E+00	2.58E+01	5.40E+01	1.53E-01	1.79E-01	0.00E+00
TEENAGE	GROUND	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
TEENAGE	CLOUD	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07
TEENAGE	VEG. ING	2.57E-01	3.33E+00	2.98E-01	2.98E-01	7.57E-01	0.00E+00
TEENAGE	MEAT ING	3.54E-02	4.71E-01	7.47E-02	7.47E-02	9.46E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.00E+00	2.98E+01	5.46E+01	7.23E-01	1.23E+00	1.98E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.38E+00	2.50E+01	4.50E+01	1.28E-01	1.42E-01	0.00E+00
ADULT	GROUND	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
ADULT	CLOUD	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07	5.48E-07
ADULT	VEG. ING	3.54E-01	4.59E+00	4.12E-01	4.12E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	6.19E-02	8.24E-01	1.31E-01	1.31E-01	1.65E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.00E+00	3.06E+01	4.57E+01	8.69E-01	1.55E+00	1.98E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 18 NAME=SF NNE X= -4.6KM, Y= 4.6KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.91E+01	2.81E+01	2.16E+02	8.03E-01	8.65E-01	2.52E+01
INFANT	GROUND	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
INFANT	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.13E+01	3.03E+01	2.18E+02	2.99E+00	3.05E+00	2.74E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.50E+01	2.43E+01	1.04E+02	3.37E-01	3.33E-01	2.52E+01
CHILD	GROUND	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
CHILD	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
CHILD	VEG. ING	1.57E-01	2.04E+00	1.86E-01	1.86E-01	4.64E-01	0.00E+00
CHILD	MEAT ING	2.19E-02	2.91E-01	4.63E-02	4.63E-02	5.85E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.73E+01	2.88E+01	1.06E+02	2.75E+00	3.04E+00	2.74E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.02E+00	2.58E+01	5.40E+01	1.59E-01	1.82E-01	2.52E+01
TEENAGE	GROUND	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
TEENAGE	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
TEENAGE	VEG. ING	2.58E-01	3.34E+00	3.01E-01	3.01E-01	7.59E-01	0.00E+00
TEENAGE	MEAT ING	3.56E-02	4.73E-01	7.52E-02	7.52E-02	9.49E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.15E+01	3.18E+01	5.66E+01	2.72E+00	3.22E+00	2.74E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.90E+00	2.50E+01	4.50E+01	1.33E-01	1.44E-01	2.52E+01
ADULT	GROUND	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
ADULT	CLOUD	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02	5.59E-02
ADULT	VEG. ING	3.55E-01	4.61E+00	4.16E-01	4.16E-01	1.05E+00	0.00E+00
ADULT	MEAT ING	6.22E-02	8.26E-01	1.31E-01	1.31E-01	1.66E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.05E+01	3.26E+01	4.77E+01	2.86E+00	3.54E+00	2.74E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 19 NAME=SF NE X= -4.0KM, Y= 4.5KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.63E+01	2.68E+01	2.06E+02	7.36E-01	8.14E-01	0.00E+00
INFANT	GROUND	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01
INFANT	CLOUD	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.65E+01	2.70E+01	2.06E+02	9.25E-01	1.00E+00	1.89E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.28E+01	2.32E+01	9.90E+01	3.08E-01	3.12E-01	0.00E+00
CHILD	GROUND	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01
CHILD	CLOUD	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07
CHILD	VEG. ING	1.50E-01	1.94E+00	1.76E-01	1.76E-01	4.41E-01	0.00E+00
CHILD	MEAT ING	2.08E-02	2.77E-01	4.39E-02	4.39E-02	5.56E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.32E+01	2.56E+01	9.94E+01	7.17E-01	9.98E-01	1.89E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.17E+00	2.46E+01	5.16E+01	1.46E-01	1.71E-01	0.00E+00
TEENAGE	GROUND	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01
TEENAGE	CLOUD	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07
TEENAGE	VEG. ING	2.45E-01	3.18E+00	2.85E-01	2.85E-01	7.23E-01	0.00E+00
TEENAGE	MEAT ING	3.38E-02	4.50E-01	7.13E-02	7.13E-02	9.03E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.64E+00	2.84E+01	5.21E+01	6.91E-01	1.17E+00	1.89E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.10E+00	2.39E+01	4.29E+01	1.22E-01	1.36E-01	0.00E+00
ADULT	GROUND	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01	1.89E-01
ADULT	CLOUD	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07
ADULT	VEG. ING	3.38E-01	4.39E+00	3.94E-01	3.94E-01	9.99E-01	0.00E+00
ADULT	MEAT ING	5.91E-02	7.86E-01	1.25E-01	1.25E-01	1.58E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.68E+00	2.92E+01	4.36E+01	8.30E-01	1.48E+00	1.89E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 19 NAME=SF NE X= -4.0KM, Y= 4.5KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.79E+01	2.68E+01	2.06E+02	7.69E-01	8.27E-01	2.65E+01
INFANT	GROUND	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00
INFANT	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.00E+01	2.89E+01	2.08E+02	2.86E+00	2.92E+00	2.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.44E+01	2.32E+01	9.90E+01	3.23E-01	3.18E-01	2.65E+01
CHILD	GROUND	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00
CHILD	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
CHILD	VEG. ING	1.50E-01	1.95E+00	1.78E-01	1.78E-01	4.43E-01	0.00E+00
CHILD	MEAT ING	2.09E-02	2.78E-01	4.42E-02	4.42E-02	5.59E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.67E+01	2.75E+01	1.01E+02	2.64E+00	2.91E+00	2.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.76E+00	2.46E+01	5.16E+01	1.52E-01	1.74E-01	2.65E+01
TEENAGE	GROUND	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00
TEENAGE	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
TEENAGE	VEG. ING	2.46E-01	3.19E+00	2.88E-01	2.88E-01	7.25E-01	0.00E+00
TEENAGE	MEAT ING	3.40E-02	4.52E-01	7.18E-02	7.18E-02	9.07E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.11E+01	3.03E+01	5.40E+01	2.60E+00	3.08E+00	2.86E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.69E+00	2.39E+01	4.29E+01	1.28E-01	1.38E-01	2.65E+01
ADULT	GROUND	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00
ADULT	CLOUD	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02	5.91E-02
ADULT	VEG. ING	3.39E-01	4.40E+00	3.98E-01	3.98E-01	1.00E+00	0.00E+00
ADULT	MEAT ING	5.94E-02	7.89E-01	1.25E-01	1.25E-01	1.58E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.02E+01	3.11E+01	4.55E+01	2.74E+00	3.39E+00	2.86E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 20 NAME=SF ENE X= -3.2KM, Y= 4.2KM, Z= 0.0M, DIST= 5.3KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.24E+01	2.28E+01	1.76E+02	6.27E-01	6.93E-01	0.00E+00
INFANT	GROUND	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01
INFANT	CLOUD	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.26E+01	2.30E+01	1.76E+02	7.88E-01	8.54E-01	1.61E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.09E+01	1.97E+01	8.43E+01	2.63E-01	2.66E-01	0.00E+00
CHILD	GROUND	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01
CHILD	CLOUD	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07
CHILD	VEG. ING	1.28E-01	1.65E+00	1.50E-01	1.50E-01	3.76E-01	0.00E+00
CHILD	MEAT ING	1.77E-02	2.36E-01	3.74E-02	3.74E-02	4.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.12E+01	2.18E+01	8.47E+01	6.11E-01	8.50E-01	1.61E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.10E+00	2.09E+01	4.39E+01	1.24E-01	1.46E-01	0.00E+00
TEENAGE	GROUND	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01
TEENAGE	CLOUD	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07
TEENAGE	VEG. ING	2.09E-01	2.71E+00	2.43E-01	2.43E-01	6.16E-01	0.00E+00
TEENAGE	MEAT ING	2.88E-02	3.83E-01	6.07E-02	6.07E-02	7.69E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.50E+00	2.42E+01	4.44E+01	5.88E-01	9.99E-01	1.61E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.19E+00	2.03E+01	3.66E+01	1.04E-01	1.16E-01	0.00E+00
ADULT	GROUND	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01	1.61E-01
ADULT	CLOUD	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07
ADULT	VEG. ING	2.88E-01	3.74E+00	3.35E-01	3.35E-01	8.51E-01	0.00E+00
ADULT	MEAT ING	5.04E-02	6.70E-01	1.06E-01	1.06E-01	1.34E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.69E+00	2.49E+01	3.72E+01	7.06E-01	1.26E+00	1.61E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 20 NAME=SF ENE X= -3.2KM, Y= 4.2KM, Z= 0.0M, DIST= 5.3KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.38E+01	2.28E+01	1.76E+02	6.62E-01	7.07E-01	2.26E+01
INFANT	GROUND	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00
INFANT	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.56E+01	2.46E+01	1.77E+02	2.45E+00	2.50E+00	2.44E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.23E+01	1.97E+01	8.43E+01	2.78E-01	2.72E-01	2.26E+01
CHILD	GROUND	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00
CHILD	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
CHILD	VEG. ING	1.28E-01	1.66E+00	1.52E-01	1.52E-01	3.77E-01	0.00E+00
CHILD	MEAT ING	1.78E-02	2.37E-01	3.77E-02	3.77E-02	4.76E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.42E+01	2.34E+01	8.63E+01	2.26E+00	2.49E+00	2.44E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.46E+00	2.10E+01	4.39E+01	1.31E-01	1.49E-01	2.26E+01
TEENAGE	GROUND	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00
TEENAGE	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
TEENAGE	VEG. ING	2.10E-01	2.72E+00	2.46E-01	2.46E-01	6.18E-01	0.00E+00
TEENAGE	MEAT ING	2.90E-02	3.85E-01	6.12E-02	6.12E-02	7.73E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.49E+00	2.58E+01	4.60E+01	2.23E+00	2.63E+00	2.44E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.55E+00	2.03E+01	3.66E+01	1.10E-01	1.18E-01	2.26E+01
ADULT	GROUND	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00	1.73E+00
ADULT	CLOUD	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02	5.95E-02
ADULT	VEG. ING	2.89E-01	3.75E+00	3.39E-01	3.39E-01	8.54E-01	0.00E+00
ADULT	MEAT ING	5.06E-02	6.73E-01	1.07E-01	1.07E-01	1.35E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.68E+00	2.65E+01	3.88E+01	2.35E+00	2.90E+00	2.44E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 21 NAME=SF E X= -2.8KM, Y= 3.5KM, Z= 0.0M, DIST= 4.5KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.00E+01	3.06E+01	2.35E+02	8.40E-01	9.29E-01	0.00E+00
INFANT	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
INFANT	CLOUD	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.03E+01	3.08E+01	2.36E+02	1.06E+00	1.14E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.47E+01	2.64E+01	1.13E+02	3.52E-01	3.56E-01	0.00E+00
CHILD	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
CHILD	CLOUD	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07
CHILD	VEG. ING	1.71E-01	2.22E+00	2.01E-01	2.01E-01	5.04E-01	0.00E+00
CHILD	MEAT ING	2.38E-02	3.16E-01	5.01E-02	5.01E-02	6.35E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.51E+01	2.92E+01	1.13E+02	8.18E-01	1.14E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.18E+00	2.81E+01	5.89E+01	1.66E-01	1.95E-01	0.00E+00
TEENAGE	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
TEENAGE	CLOUD	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07
TEENAGE	VEG. ING	2.80E-01	3.63E+00	3.25E-01	3.25E-01	8.25E-01	0.00E+00
TEENAGE	MEAT ING	3.86E-02	5.14E-01	8.14E-02	8.14E-02	1.03E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.72E+00	3.24E+01	5.95E+01	7.88E-01	1.34E+00	2.16E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.96E+00	2.72E+01	4.90E+01	1.40E-01	1.55E-01	0.00E+00
ADULT	GROUND	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01	2.16E-01
ADULT	CLOUD	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07
ADULT	VEG. ING	3.86E-01	5.01E+00	4.49E-01	4.49E-01	1.14E+00	0.00E+00
ADULT	MEAT ING	6.75E-02	8.98E-01	1.42E-01	1.42E-01	1.80E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.63E+00	3.33E+01	4.98E+01	9.47E-01	1.69E+00	2.16E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 21 NAME=SF E X= -2.8KM, Y= 3.5KM, Z= 0.0M, DIST= 4.5KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.20E+01	3.06E+01	2.35E+02	8.75E-01	9.42E-01	3.28E+01
INFANT	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
INFANT	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.44E+01	3.30E+01	2.38E+02	3.27E+00	3.34E+00	3.52E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.66E+01	2.64E+01	1.13E+02	3.68E-01	3.63E-01	3.28E+01
CHILD	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
CHILD	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
CHILD	VEG. ING	1.71E-01	2.22E+00	2.03E-01	2.03E-01	5.05E-01	0.00E+00
CHILD	MEAT ING	2.39E-02	3.17E-01	5.05E-02	5.05E-02	6.37E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.92E+01	3.14E+01	1.16E+02	3.02E+00	3.33E+00	3.52E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.01E+01	2.81E+01	5.89E+01	1.73E-01	1.98E-01	3.28E+01
TEENAGE	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
TEENAGE	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
TEENAGE	VEG. ING	2.81E-01	3.64E+00	3.28E-01	3.28E-01	8.28E-01	0.00E+00
TEENAGE	MEAT ING	3.88E-02	5.15E-01	8.19E-02	8.19E-02	1.03E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.29E+01	3.46E+01	6.17E+01	2.98E+00	3.52E+00	3.52E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.93E+00	2.72E+01	4.90E+01	1.45E-01	1.58E-01	3.28E+01
ADULT	GROUND	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00	2.32E+00
ADULT	CLOUD	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02	7.65E-02
ADULT	VEG. ING	3.87E-01	5.02E+00	4.53E-01	4.53E-01	1.14E+00	0.00E+00
ADULT	MEAT ING	6.78E-02	9.01E-01	1.43E-01	1.43E-01	1.81E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.18E+01	3.55E+01	5.20E+01	3.14E+00	3.88E+00	3.52E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 22 NAME=SF SSE X= -3.7KM, Y= 0.2KM, Z= 0.0M, DIST= 3.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.53E+01	2.58E+01	1.98E+02	7.07E-01	7.81E-01	0.00E+00
INFANT	GROUND	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01
INFANT	CLOUD	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.55E+01	2.59E+01	1.98E+02	8.88E-01	9.63E-01	1.81E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.23E+01	2.22E+01	9.51E+01	2.96E-01	3.00E-01	0.00E+00
CHILD	GROUND	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01
CHILD	CLOUD	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07
CHILD	VEG. ING	1.44E-01	1.87E+00	1.69E-01	1.69E-01	4.24E-01	0.00E+00
CHILD	MEAT ING	2.00E-02	2.66E-01	4.22E-02	4.22E-02	5.34E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.27E+01	2.46E+01	9.55E+01	6.89E-01	9.59E-01	1.81E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.88E+00	2.36E+01	4.96E+01	1.40E-01	1.64E-01	0.00E+00
TEENAGE	GROUND	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01
TEENAGE	CLOUD	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07
TEENAGE	VEG. ING	2.35E-01	3.06E+00	2.74E-01	2.74E-01	6.94E-01	0.00E+00
TEENAGE	MEAT ING	3.25E-02	4.32E-01	6.85E-02	6.85E-02	8.67E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	7.33E+00	2.73E+01	5.01E+01	6.63E-01	1.13E+00	1.81E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.86E+00	2.29E+01	4.12E+01	1.17E-01	1.30E-01	0.00E+00
ADULT	GROUND	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01	1.81E-01
ADULT	CLOUD	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07	5.02E-07
ADULT	VEG. ING	3.25E-01	4.21E+00	3.78E-01	3.78E-01	9.59E-01	0.00E+00
ADULT	MEAT ING	5.68E-02	7.55E-01	1.20E-01	1.20E-01	1.52E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.42E+00	2.81E+01	4.19E+01	7.97E-01	1.42E+00	1.81E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 22 NAME=SF SSE X= -3.7KM, Y= 0.2KM, Z= 0.0M, DIST= 3.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.75E+01	2.58E+01	1.98E+02	8.25E-01	8.27E-01	3.67E+01
INFANT	GROUND	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
INFANT	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.96E+01	2.79E+01	2.00E+02	2.98E+00	2.99E+00	3.89E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.45E+01	2.23E+01	9.51E+01	3.49E-01	3.21E-01	3.67E+01
CHILD	GROUND	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
CHILD	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
CHILD	VEG. ING	1.46E-01	1.89E+00	1.75E-01	1.75E-01	4.29E-01	0.00E+00
CHILD	MEAT ING	2.03E-02	2.70E-01	4.33E-02	4.33E-02	5.43E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.69E+01	2.66E+01	9.75E+01	2.73E+00	2.96E+00	3.89E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.09E+00	2.37E+01	4.96E+01	1.62E-01	1.75E-01	3.67E+01
TEENAGE	GROUND	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
TEENAGE	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
TEENAGE	VEG. ING	2.38E-01	3.09E+00	2.83E-01	2.83E-01	7.03E-01	0.00E+00
TEENAGE	MEAT ING	3.30E-02	4.38E-01	7.02E-02	7.02E-02	8.81E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.15E+01	2.93E+01	5.21E+01	2.68E+00	3.12E+00	3.89E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.06E+00	2.29E+01	4.12E+01	1.36E-01	1.39E-01	3.67E+01
ADULT	GROUND	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
ADULT	CLOUD	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
ADULT	VEG. ING	3.29E-01	4.26E+00	3.92E-01	3.92E-01	9.71E-01	0.00E+00
ADULT	MEAT ING	5.77E-02	7.65E-01	1.23E-01	1.23E-01	1.54E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.06E+01	3.01E+01	4.39E+01	2.81E+00	3.42E+00	3.89E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 23 NAME=SF SE X= -2.8KM, Y= 1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.68E+01	3.75E+01	2.89E+02	1.03E+00	1.14E+00	0.00E+00
INFANT	GROUND	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01
INFANT	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.71E+01	3.78E+01	2.89E+02	1.29E+00	1.40E+00	2.64E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.80E+01	3.24E+01	1.39E+02	4.31E-01	4.37E-01	0.00E+00
CHILD	GROUND	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01
CHILD	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
CHILD	VEG. ING	2.10E-01	2.72E+00	2.46E-01	2.46E-01	6.18E-01	0.00E+00
CHILD	MEAT ING	2.92E-02	3.88E-01	6.15E-02	6.15E-02	7.78E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.85E+01	3.58E+01	1.39E+02	1.00E+00	1.40E+00	2.64E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.00E+01	3.44E+01	7.22E+01	2.04E-01	2.39E-01	0.00E+00
TEENAGE	GROUND	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01
TEENAGE	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
TEENAGE	VEG. ING	3.43E-01	4.45E+00	3.99E-01	3.99E-01	1.01E+00	0.00E+00
TEENAGE	MEAT ING	4.73E-02	6.30E-01	9.98E-02	9.98E-02	1.26E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.07E+01	3.98E+01	7.30E+01	9.66E-01	1.64E+00	2.64E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.53E+00	3.34E+01	6.01E+01	1.71E-01	1.90E-01	0.00E+00
ADULT	GROUND	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01	2.64E-01
ADULT	CLOUD	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07	7.32E-07
ADULT	VEG. ING	4.73E-01	6.14E+00	5.51E-01	5.51E-01	1.40E+00	0.00E+00
ADULT	MEAT ING	8.27E-02	1.10E+00	1.74E-01	1.74E-01	2.21E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.35E+00	4.09E+01	6.11E+01	1.16E+00	2.07E+00	2.64E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 23 NAME=SF SE X= -2.8KM, Y= 1.3KM, Z= 0.0M, DIST= 3.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.94E+01	3.75E+01	2.89E+02	1.11E+00	1.17E+00	4.32E+01
INFANT	GROUND	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00
INFANT	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.25E+01	4.06E+01	2.92E+02	4.14E+00	4.20E+00	4.63E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.06E+01	3.24E+01	1.39E+02	4.67E-01	4.51E-01	4.32E+01
CHILD	GROUND	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00
CHILD	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
CHILD	VEG. ING	2.11E-01	2.73E+00	2.50E-01	2.50E-01	6.21E-01	0.00E+00
CHILD	MEAT ING	2.94E-02	3.90E-01	6.22E-02	6.22E-02	7.84E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.38E+01	3.86E+01	1.42E+02	3.81E+00	4.18E+00	4.63E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.26E+01	3.44E+01	7.22E+01	2.19E-01	2.47E-01	4.32E+01
TEENAGE	GROUND	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00
TEENAGE	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
TEENAGE	VEG. ING	3.45E-01	4.48E+00	4.05E-01	4.05E-01	1.02E+00	0.00E+00
TEENAGE	MEAT ING	4.77E-02	6.33E-01	1.01E-01	1.01E-01	1.27E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.60E+01	4.26E+01	7.57E+01	3.75E+00	4.42E+00	4.63E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.11E+01	3.34E+01	6.01E+01	1.84E-01	1.96E-01	4.32E+01
ADULT	GROUND	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00	2.84E+00
ADULT	CLOUD	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
ADULT	VEG. ING	4.76E-01	6.17E+00	5.60E-01	5.60E-01	1.41E+00	0.00E+00
ADULT	MEAT ING	8.33E-02	1.11E+00	1.76E-01	1.76E-01	2.22E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.47E+01	4.37E+01	6.39E+01	3.95E+00	4.85E+00	4.63E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 24 NAME=SF S X= -5.1KM, Y= -0.3KM, Z= 0.0M, DIST= 5.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.42E+01	1.44E+01	1.11E+02	3.96E-01	4.38E-01	0.00E+00
INFANT	GROUND	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
INFANT	CLOUD	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.43E+01	1.45E+01	1.11E+02	4.97E-01	5.39E-01	1.02E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.91E+00	1.25E+01	5.33E+01	1.66E-01	1.68E-01	0.00E+00
CHILD	GROUND	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
CHILD	CLOUD	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07
CHILD	VEG. ING	8.06E-02	1.05E+00	9.46E-02	9.46E-02	2.37E-01	0.00E+00
CHILD	MEAT ING	1.12E-02	1.49E-01	2.36E-02	2.36E-02	2.99E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	7.10E+00	1.38E+01	5.35E+01	3.86E-01	5.37E-01	1.02E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.86E+00	1.32E+01	2.78E+01	7.83E-02	9.20E-02	0.00E+00
TEENAGE	GROUND	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
TEENAGE	CLOUD	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07
TEENAGE	VEG. ING	1.32E-01	1.71E+00	1.53E-01	1.53E-01	3.89E-01	0.00E+00
TEENAGE	MEAT ING	1.82E-02	2.42E-01	3.84E-02	3.84E-02	4.86E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.11E+00	1.53E+01	2.81E+01	3.72E-01	6.31E-01	1.02E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.28E+00	1.28E+01	2.31E+01	6.58E-02	7.30E-02	0.00E+00
ADULT	GROUND	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
ADULT	CLOUD	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07	2.81E-07
ADULT	VEG. ING	1.82E-01	2.36E+00	2.12E-01	2.12E-01	5.37E-01	0.00E+00
ADULT	MEAT ING	3.18E-02	4.23E-01	6.70E-02	6.70E-02	8.49E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.60E+00	1.57E+01	2.35E+01	4.46E-01	7.97E-01	1.02E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 24 NAME=SF S X= -5.1KM, Y= -0.3KM, Z= 0.0M, DIST= 5.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.57E+01	1.44E+01	1.11E+02	5.17E-01	4.85E-01	2.48E+01
INFANT	GROUND	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
INFANT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.69E+01	1.57E+01	1.12E+02	1.77E+00	1.74E+00	2.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.40E+00	1.25E+01	5.33E+01	2.19E-01	1.90E-01	2.48E+01
CHILD	GROUND	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
CHILD	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
CHILD	VEG. ING	8.24E-02	1.07E+00	1.01E-01	1.01E-01	2.42E-01	0.00E+00
CHILD	MEAT ING	1.15E-02	1.53E-01	2.47E-02	2.47E-02	3.08E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.75E+00	1.49E+01	5.47E+01	1.60E+00	1.72E+00	2.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.35E+00	1.33E+01	2.78E+01	1.01E-01	1.03E-01	2.48E+01
TEENAGE	GROUND	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
TEENAGE	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
TEENAGE	VEG. ING	1.35E-01	1.75E+00	1.63E-01	1.63E-01	3.97E-01	0.00E+00
TEENAGE	MEAT ING	1.87E-02	2.48E-01	4.01E-02	4.01E-02	5.00E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.76E+00	1.65E+01	2.92E+01	1.56E+00	1.81E+00	2.60E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.77E+00	1.29E+01	2.31E+01	8.49E-02	8.22E-02	2.48E+01
ADULT	GROUND	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
ADULT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
ADULT	VEG. ING	1.86E-01	2.41E+00	2.26E-01	2.26E-01	5.49E-01	0.00E+00
ADULT	MEAT ING	3.27E-02	4.33E-01	7.01E-02	7.01E-02	8.74E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.24E+00	1.70E+01	2.47E+01	1.64E+00	1.97E+00	2.60E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 25 NAME=SF SSW X= -6.0KM, Y= 1.3KM, Z= 0.0M, DIST= 6.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.84E+01	1.88E+01	1.44E+02	5.15E-01	5.70E-01	0.00E+00
INFANT	GROUND	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01
INFANT	CLOUD	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.86E+01	1.89E+01	1.45E+02	6.48E-01	7.02E-01	1.32E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	8.99E+00	1.62E+01	6.94E+01	2.16E-01	2.19E-01	0.00E+00
CHILD	GROUND	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01
CHILD	CLOUD	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07
CHILD	VEG. ING	1.05E-01	1.36E+00	1.23E-01	1.23E-01	3.09E-01	0.00E+00
CHILD	MEAT ING	1.46E-02	1.94E-01	3.08E-02	3.08E-02	3.90E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.24E+00	1.79E+01	6.96E+01	5.02E-01	6.99E-01	1.32E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.02E+00	1.72E+01	3.61E+01	1.02E-01	1.20E-01	0.00E+00
TEENAGE	GROUND	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01
TEENAGE	CLOUD	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07
TEENAGE	VEG. ING	1.72E-01	2.23E+00	2.00E-01	2.00E-01	5.06E-01	0.00E+00
TEENAGE	MEAT ING	2.37E-02	3.15E-01	4.99E-02	4.99E-02	6.32E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.35E+00	1.99E+01	3.65E+01	4.84E-01	8.22E-01	1.32E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.27E+00	1.67E+01	3.01E+01	8.56E-02	9.50E-02	0.00E+00
ADULT	GROUND	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01	1.32E-01
ADULT	CLOUD	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07	3.66E-07
ADULT	VEG. ING	2.37E-01	3.07E+00	2.76E-01	2.76E-01	7.00E-01	0.00E+00
ADULT	MEAT ING	4.14E-02	5.51E-01	8.73E-02	8.73E-02	1.11E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.68E+00	2.05E+01	3.06E+01	5.81E-01	1.04E+00	1.32E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 25 NAME=SF SSW X= -6.0KM, Y= 1.3KM, Z= 0.0M, DIST= 6.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.97E+01	1.88E+01	1.44E+02	5.78E-01	5.94E-01	2.14E+01
INFANT	GROUND	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00
INFANT	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.13E+01	2.03E+01	1.46E+02	2.11E+00	2.13E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.03E+01	1.62E+01	6.94E+01	2.44E-01	2.30E-01	2.14E+01
CHILD	GROUND	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00
CHILD	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
CHILD	VEG. ING	1.06E-01	1.37E+00	1.26E-01	1.26E-01	3.12E-01	0.00E+00
CHILD	MEAT ING	1.48E-02	1.96E-01	3.13E-02	3.13E-02	3.94E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.19E+01	1.93E+01	7.10E+01	1.94E+00	2.12E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.31E+00	1.72E+01	3.61E+01	1.14E-01	1.25E-01	2.14E+01
TEENAGE	GROUND	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00
TEENAGE	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
TEENAGE	VEG. ING	1.73E-01	2.25E+00	2.05E-01	2.05E-01	5.11E-01	0.00E+00
TEENAGE	MEAT ING	2.40E-02	3.18E-01	5.09E-02	5.09E-02	6.40E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.04E+00	2.13E+01	3.79E+01	1.90E+00	2.23E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.56E+00	1.67E+01	3.01E+01	9.56E-02	9.98E-02	2.14E+01
ADULT	GROUND	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00
ADULT	CLOUD	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
ADULT	VEG. ING	2.39E-01	3.10E+00	2.83E-01	2.83E-01	7.06E-01	0.00E+00
ADULT	MEAT ING	4.19E-02	5.56E-01	8.89E-02	8.89E-02	1.12E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.37E+00	2.19E+01	3.20E+01	2.00E+00	2.45E+00	2.30E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 26 NAME=SF SW X= -6.1KM, Y= 2.5KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.07E+01	3.13E+01	2.41E+02	8.60E-01	9.50E-01	0.00E+00
INFANT	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
INFANT	CLOUD	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.09E+01	3.15E+01	2.41E+02	1.08E+00	1.17E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.50E+01	2.70E+01	1.16E+02	3.60E-01	3.65E-01	0.00E+00
CHILD	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
CHILD	CLOUD	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07
CHILD	VEG. ING	1.75E-01	2.27E+00	2.05E-01	2.05E-01	5.15E-01	0.00E+00
CHILD	MEAT ING	2.43E-02	3.24E-01	5.13E-02	5.13E-02	6.49E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.54E+01	2.99E+01	1.16E+02	8.37E-01	1.17E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.37E+00	2.87E+01	6.02E+01	1.70E-01	2.00E-01	0.00E+00
TEENAGE	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
TEENAGE	CLOUD	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07
TEENAGE	VEG. ING	2.86E-01	3.72E+00	3.33E-01	3.33E-01	8.44E-01	0.00E+00
TEENAGE	MEAT ING	3.95E-02	5.25E-01	8.33E-02	8.33E-02	1.05E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.91E+00	3.32E+01	6.09E+01	8.07E-01	1.37E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.12E+00	2.79E+01	5.01E+01	1.43E-01	1.58E-01	0.00E+00
ADULT	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
ADULT	CLOUD	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07	6.11E-07
ADULT	VEG. ING	3.95E-01	5.12E+00	4.60E-01	4.60E-01	1.17E+00	0.00E+00
ADULT	MEAT ING	6.91E-02	9.18E-01	1.46E-01	1.46E-01	1.84E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.80E+00	3.41E+01	5.09E+01	9.69E-01	1.73E+00	2.20E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 26 NAME=SF SW X= -6.1KM, Y= 2.5KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.19E+01	3.13E+01	2.41E+02	9.01E-01	9.66E-01	2.03E+01
INFANT	GROUND	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
INFANT	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.44E+01	3.38E+01	2.43E+02	3.34E+00	3.41E+00	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.62E+01	2.71E+01	1.16E+02	3.79E-01	3.72E-01	2.03E+01
CHILD	GROUND	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
CHILD	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
CHILD	VEG. ING	1.76E-01	2.28E+00	2.08E-01	2.08E-01	5.17E-01	0.00E+00
CHILD	MEAT ING	2.45E-02	3.25E-01	5.17E-02	5.17E-02	6.53E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.89E+01	3.21E+01	1.18E+02	3.08E+00	3.40E+00	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.59E+00	2.87E+01	6.02E+01	1.78E-01	2.03E-01	2.03E+01
TEENAGE	GROUND	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
TEENAGE	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
TEENAGE	VEG. ING	2.87E-01	3.73E+00	3.36E-01	3.36E-01	8.47E-01	0.00E+00
TEENAGE	MEAT ING	3.97E-02	5.27E-01	8.39E-02	8.39E-02	1.06E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.24E+01	3.54E+01	6.31E+01	3.04E+00	3.60E+00	2.28E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.34E+00	2.79E+01	5.01E+01	1.49E-01	1.62E-01	2.03E+01
ADULT	GROUND	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
ADULT	CLOUD	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
ADULT	VEG. ING	3.96E-01	5.14E+00	4.65E-01	4.65E-01	1.17E+00	0.00E+00
ADULT	MEAT ING	6.94E-02	9.22E-01	1.47E-01	1.47E-01	1.85E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.12E+01	3.64E+01	5.32E+01	3.20E+00	3.96E+00	2.28E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 27 NAME=SF WSW X= -6.0KM, Y= 3.2KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.65E+01	3.72E+01	2.86E+02	1.02E+00	1.13E+00	0.00E+00
INFANT	GROUND	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01
INFANT	CLOUD	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.68E+01	3.75E+01	2.86E+02	1.28E+00	1.39E+00	2.62E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.78E+01	3.21E+01	1.37E+02	4.28E-01	4.33E-01	0.00E+00
CHILD	GROUND	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01
CHILD	CLOUD	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07
CHILD	VEG. ING	2.08E-01	2.70E+00	2.44E-01	2.44E-01	6.12E-01	0.00E+00
CHILD	MEAT ING	2.89E-02	3.85E-01	6.10E-02	6.10E-02	7.72E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.83E+01	3.55E+01	1.38E+02	9.95E-01	1.38E+00	2.62E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.94E+00	3.41E+01	7.16E+01	2.02E-01	2.37E-01	0.00E+00
TEENAGE	GROUND	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01
TEENAGE	CLOUD	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07
TEENAGE	VEG. ING	3.40E-01	4.42E+00	3.95E-01	3.95E-01	1.00E+00	0.00E+00
TEENAGE	MEAT ING	4.69E-02	6.24E-01	9.90E-02	9.90E-02	1.25E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.06E+01	3.94E+01	7.23E+01	9.58E-01	1.63E+00	2.62E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.46E+00	3.31E+01	5.96E+01	1.70E-01	1.88E-01	0.00E+00
ADULT	GROUND	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01	2.62E-01
ADULT	CLOUD	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07	7.26E-07
ADULT	VEG. ING	4.69E-01	6.09E+00	5.46E-01	5.46E-01	1.39E+00	0.00E+00
ADULT	MEAT ING	8.21E-02	1.09E+00	1.73E-01	1.73E-01	2.19E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.27E+00	4.05E+01	6.05E+01	1.15E+00	2.05E+00	2.62E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 27 NAME=SF WSW X= -6.0KM, Y= 3.2KM, Z= 0.0M, DIST= 6.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.76E+01	3.72E+01	2.86E+02	1.06E+00	1.14E+00	1.83E+01
INFANT	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
INFANT	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.05E+01	4.01E+01	2.89E+02	3.93E+00	4.01E+00	2.12E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.89E+01	3.21E+01	1.37E+02	4.44E-01	4.40E-01	1.83E+01
CHILD	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
CHILD	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
CHILD	VEG. ING	2.08E-01	2.70E+00	2.46E-01	2.46E-01	6.14E-01	0.00E+00
CHILD	MEAT ING	2.90E-02	3.86E-01	6.13E-02	6.13E-02	7.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.20E+01	3.81E+01	1.41E+02	3.62E+00	4.00E+00	2.12E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.10E+01	3.41E+01	7.16E+01	2.09E-01	2.40E-01	1.83E+01
TEENAGE	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
TEENAGE	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
TEENAGE	VEG. ING	3.41E-01	4.43E+00	3.98E-01	3.98E-01	1.01E+00	0.00E+00
TEENAGE	MEAT ING	4.71E-02	6.26E-01	9.95E-02	9.95E-02	1.26E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.43E+01	4.21E+01	7.49E+01	3.58E+00	4.24E+00	2.12E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.56E+00	3.31E+01	5.96E+01	1.75E-01	1.91E-01	1.83E+01
ADULT	GROUND	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
ADULT	CLOUD	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02	5.30E-02
ADULT	VEG. ING	4.70E-01	6.10E+00	5.50E-01	5.50E-01	1.39E+00	0.00E+00
ADULT	MEAT ING	8.23E-02	1.09E+00	1.74E-01	1.74E-01	2.20E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.30E+01	4.32E+01	6.32E+01	3.77E+00	4.67E+00	2.12E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 28 NAME=SF W X= -6.0KM, Y= 3.6KM, Z= 0.0M, DIST= 7.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	6.03E+01	6.15E+01	4.72E+02	1.69E+00	1.86E+00	0.00E+00
INFANT	GROUND	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01
INFANT	CLOUD	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	6.07E+01	6.19E+01	4.73E+02	2.12E+00	2.30E+00	4.33E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.94E+01	5.31E+01	2.27E+02	7.07E-01	7.16E-01	0.00E+00
CHILD	GROUND	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01
CHILD	CLOUD	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06
CHILD	VEG. ING	3.43E-01	4.45E+00	4.03E-01	4.03E-01	1.01E+00	0.00E+00
CHILD	MEAT ING	4.78E-02	6.35E-01	1.01E-01	1.01E-01	1.27E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.02E+01	5.86E+01	2.28E+02	1.64E+00	2.29E+00	4.33E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.64E+01	5.64E+01	1.18E+02	3.34E-01	3.92E-01	0.00E+00
TEENAGE	GROUND	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01
TEENAGE	CLOUD	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06
TEENAGE	VEG. ING	5.62E-01	7.30E+00	6.53E-01	6.53E-01	1.66E+00	0.00E+00
TEENAGE	MEAT ING	7.76E-02	1.03E+00	1.63E-01	1.63E-01	2.07E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.75E+01	6.51E+01	1.19E+02	1.58E+00	2.69E+00	4.33E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.40E+01	5.47E+01	9.84E+01	2.80E-01	3.11E-01	0.00E+00
ADULT	GROUND	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01	4.33E-01
ADULT	CLOUD	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06
ADULT	VEG. ING	7.75E-01	1.01E+01	9.03E-01	9.03E-01	2.29E+00	0.00E+00
ADULT	MEAT ING	1.36E-01	1.80E+00	2.86E-01	2.86E-01	3.62E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.53E+01	6.70E+01	1.00E+02	1.90E+00	3.39E+00	4.33E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 28 NAME=SF W X= -6.0KM, Y= 3.6KM, Z= 0.0M, DIST= 7.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	6.14E+01	6.15E+01	4.72E+02	1.72E+00	1.88E+00	1.83E+01
INFANT	GROUND	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00
INFANT	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	6.61E+01	6.62E+01	4.77E+02	6.42E+00	6.58E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	3.05E+01	5.31E+01	2.27E+02	7.22E-01	7.22E-01	1.83E+01
CHILD	GROUND	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00
CHILD	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
CHILD	VEG. ING	3.44E-01	4.46E+00	4.05E-01	4.05E-01	1.01E+00	0.00E+00
CHILD	MEAT ING	4.79E-02	6.36E-01	1.01E-01	1.01E-01	1.28E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.56E+01	6.29E+01	2.32E+02	5.93E+00	6.56E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.75E+01	5.64E+01	1.18E+02	3.40E-01	3.95E-01	1.83E+01
TEENAGE	GROUND	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00
TEENAGE	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
TEENAGE	VEG. ING	5.63E-01	7.30E+00	6.56E-01	6.56E-01	1.66E+00	0.00E+00
TEENAGE	MEAT ING	7.77E-02	1.03E+00	1.64E-01	1.64E-01	2.07E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.29E+01	6.94E+01	1.24E+02	5.86E+00	6.96E+00	2.30E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.51E+01	5.47E+01	9.84E+01	2.86E-01	3.13E-01	1.83E+01
ADULT	GROUND	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00
ADULT	CLOUD	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02	4.68E-02
ADULT	VEG. ING	7.76E-01	1.01E+01	9.06E-01	9.06E-01	2.29E+00	0.00E+00
ADULT	MEAT ING	1.36E-01	1.81E+00	2.87E-01	2.87E-01	3.62E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.07E+01	7.13E+01	1.04E+02	6.18E+00	7.67E+00	2.30E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 29 NAME=SF WNW X= -5.4KM, Y= 3.7KM, Z= 0.0M, DIST= 6.5KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.21E+02	2.25E+02	1.73E+03	6.18E+00	6.83E+00	0.00E+00
INFANT	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
INFANT	CLOUD	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.22E+02	2.27E+02	1.73E+03	7.77E+00	8.42E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.08E+02	1.94E+02	8.31E+02	2.59E+00	2.62E+00	0.00E+00
CHILD	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
CHILD	CLOUD	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06
CHILD	VEG. ING	1.26E+00	1.63E+01	1.48E+00	1.48E+00	3.70E+00	0.00E+00
CHILD	MEAT ING	1.75E-01	2.33E+00	3.69E-01	3.69E-01	4.67E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+02	2.15E+02	8.34E+02	6.02E+00	8.38E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.02E+01	2.07E+02	4.33E+02	1.22E+00	1.44E+00	0.00E+00
TEENAGE	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
TEENAGE	CLOUD	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06
TEENAGE	VEG. ING	2.06E+00	2.67E+01	2.39E+00	2.39E+00	6.07E+00	0.00E+00
TEENAGE	MEAT ING	2.84E-01	3.78E+00	5.99E-01	5.99E-01	7.58E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.41E+01	2.39E+02	4.38E+02	5.80E+00	9.85E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.12E+01	2.00E+02	3.60E+02	1.03E+00	1.14E+00	0.00E+00
ADULT	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
ADULT	CLOUD	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06	4.39E-06
ADULT	VEG. ING	2.84E+00	3.68E+01	3.31E+00	3.31E+00	8.38E+00	0.00E+00
ADULT	MEAT ING	4.97E-01	6.60E+00	1.05E+00	1.05E+00	1.32E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.61E+01	2.45E+02	3.66E+02	6.96E+00	1.24E+01	1.59E+00

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 29 NAME=SF WNW X= -5.4KM, Y= 3.7KM, Z= 0.0M, DIST= 6.5KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.22E+02	2.25E+02	1.73E+03	6.21E+00	6.84E+00	2.46E+01
INFANT	GROUND	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01
INFANT	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.39E+02	2.42E+02	1.75E+03	2.33E+01	2.39E+01	4.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.09E+02	1.95E+02	8.31E+02	2.60E+00	2.63E+00	2.46E+01
CHILD	GROUND	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01
CHILD	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
CHILD	VEG. ING	1.26E+00	1.63E+01	1.48E+00	1.48E+00	3.71E+00	0.00E+00
CHILD	MEAT ING	1.75E-01	2.33E+00	3.69E-01	3.69E-01	4.67E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.28E+02	2.30E+02	8.50E+02	2.15E+01	2.39E+01	4.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.16E+01	2.07E+02	4.33E+02	1.23E+00	1.44E+00	2.46E+01
TEENAGE	GROUND	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01
TEENAGE	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
TEENAGE	VEG. ING	2.06E+00	2.67E+01	2.39E+00	2.39E+00	6.07E+00	0.00E+00
TEENAGE	MEAT ING	2.84E-01	3.78E+00	5.99E-01	5.99E-01	7.58E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.10E+01	2.54E+02	4.53E+02	2.13E+01	2.53E+01	4.16E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.26E+01	2.00E+02	3.60E+02	1.03E+00	1.14E+00	2.46E+01
ADULT	GROUND	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01	1.70E+01
ADULT	CLOUD	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
ADULT	VEG. ING	2.84E+00	3.68E+01	3.31E+00	3.31E+00	8.39E+00	0.00E+00
ADULT	MEAT ING	4.97E-01	6.61E+00	1.05E+00	1.05E+00	1.33E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.31E+01	2.61E+02	3.82E+02	2.25E+01	2.79E+01	4.16E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 30 NAME=SF NW X= -5.2KM, Y= 3.8KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.27E+02	2.32E+02	1.78E+03	6.35E+00	7.02E+00	0.00E+00
INFANT	GROUND	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
INFANT	CLOUD	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.29E+02	2.33E+02	1.78E+03	7.98E+00	8.65E+00	1.63E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.11E+02	2.00E+02	8.54E+02	2.66E+00	2.69E+00	0.00E+00
CHILD	GROUND	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
CHILD	CLOUD	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06
CHILD	VEG. ING	1.29E+00	1.68E+01	1.52E+00	1.52E+00	3.81E+00	0.00E+00
CHILD	MEAT ING	1.80E-01	2.39E+00	3.79E-01	3.79E-01	4.80E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.14E+02	2.21E+02	8.58E+02	6.19E+00	8.61E+00	1.63E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.18E+01	2.12E+02	4.45E+02	1.26E+00	1.48E+00	0.00E+00
TEENAGE	GROUND	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
TEENAGE	CLOUD	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06
TEENAGE	VEG. ING	2.12E+00	2.75E+01	2.46E+00	2.46E+00	6.24E+00	0.00E+00
TEENAGE	MEAT ING	2.92E-01	3.88E+00	6.16E-01	6.16E-01	7.79E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.59E+01	2.45E+02	4.50E+02	5.96E+00	1.01E+01	1.63E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.26E+01	2.06E+02	3.70E+02	1.06E+00	1.17E+00	0.00E+00
ADULT	GROUND	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
ADULT	CLOUD	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.51E-06
ADULT	VEG. ING	2.92E+00	3.79E+01	3.40E+00	3.40E+00	8.62E+00	0.00E+00
ADULT	MEAT ING	5.10E-01	6.79E+00	1.08E+00	1.08E+00	1.36E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.77E+01	2.52E+02	3.77E+02	7.16E+00	1.28E+01	1.63E+00

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 30 NAME=SF NW X= -5.2KM, Y= 3.8KM, Z= 0.0M, DIST= 6.4KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.29E+02	2.32E+02	1.78E+03	6.38E+00	7.03E+00	3.04E+01
INFANT	GROUND	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01
INFANT	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.46E+02	2.49E+02	1.80E+03	2.39E+01	2.46E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.13E+02	2.00E+02	8.54E+02	2.67E+00	2.70E+00	3.04E+01
CHILD	GROUND	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01
CHILD	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
CHILD	VEG. ING	1.29E+00	1.68E+01	1.52E+00	1.52E+00	3.81E+00	0.00E+00
CHILD	MEAT ING	1.80E-01	2.39E+00	3.80E-01	3.80E-01	4.80E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.32E+02	2.37E+02	8.74E+02	2.21E+01	2.45E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.37E+01	2.12E+02	4.45E+02	1.26E+00	1.48E+00	3.04E+01
TEENAGE	GROUND	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01
TEENAGE	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
TEENAGE	VEG. ING	2.12E+00	2.75E+01	2.46E+00	2.46E+00	6.24E+00	0.00E+00
TEENAGE	MEAT ING	2.92E-01	3.89E+00	6.16E-01	6.16E-01	7.80E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.36E+01	2.61E+02	4.66E+02	2.19E+01	2.61E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.44E+01	2.06E+02	3.70E+02	1.06E+00	1.17E+00	3.04E+01
ADULT	GROUND	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01
ADULT	CLOUD	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02	3.88E-02
ADULT	VEG. ING	2.92E+00	3.79E+01	3.40E+00	3.40E+00	8.62E+00	0.00E+00
ADULT	MEAT ING	5.11E-01	6.79E+00	1.08E+00	1.08E+00	1.36E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.54E+01	2.68E+02	3.92E+02	2.31E+01	2.87E+01	4.80E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 31 NAME=SF NNW X= -5.2KM, Y= 4.1KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.22E+02	2.26E+02	1.74E+03	6.20E+00	6.86E+00	0.00E+00
INFANT	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
INFANT	CLOUD	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.23E+02	2.28E+02	1.74E+03	7.79E+00	8.45E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.08E+02	1.95E+02	8.34E+02	2.60E+00	2.63E+00	0.00E+00
CHILD	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
CHILD	CLOUD	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06
CHILD	VEG. ING	1.26E+00	1.64E+01	1.48E+00	1.48E+00	3.72E+00	0.00E+00
CHILD	MEAT ING	1.76E-01	2.34E+00	3.70E-01	3.70E-01	4.69E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.11E+02	2.15E+02	8.37E+02	6.04E+00	8.41E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.04E+01	2.07E+02	4.35E+02	1.23E+00	1.44E+00	0.00E+00
TEENAGE	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
TEENAGE	CLOUD	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06
TEENAGE	VEG. ING	2.07E+00	2.68E+01	2.40E+00	2.40E+00	6.09E+00	0.00E+00
TEENAGE	MEAT ING	2.85E-01	3.79E+00	6.01E-01	6.01E-01	7.61E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.43E+01	2.39E+02	4.39E+02	5.82E+00	9.88E+00	1.59E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.14E+01	2.01E+02	3.62E+02	1.03E+00	1.14E+00	0.00E+00
ADULT	GROUND	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00	1.59E+00
ADULT	CLOUD	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06	4.41E-06
ADULT	VEG. ING	2.85E+00	3.70E+01	3.32E+00	3.32E+00	8.41E+00	0.00E+00
ADULT	MEAT ING	4.98E-01	6.63E+00	1.05E+00	1.05E+00	1.33E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.63E+01	2.46E+02	3.68E+02	6.99E+00	1.25E+01	1.59E+00

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 31 NAME=SF NNW X= -5.2KM, Y= 4.1KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.24E+02	2.26E+02	1.74E+03	6.23E+00	6.87E+00	3.09E+01
INFANT	GROUND	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01
INFANT	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.41E+02	2.43E+02	1.75E+03	2.34E+01	2.40E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.10E+02	1.95E+02	8.34E+02	2.61E+00	2.64E+00	3.09E+01
CHILD	GROUND	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01
CHILD	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
CHILD	VEG. ING	1.26E+00	1.64E+01	1.48E+00	1.48E+00	3.72E+00	0.00E+00
CHILD	MEAT ING	1.76E-01	2.34E+00	3.71E-01	3.71E-01	4.69E-01	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.29E+02	2.31E+02	8.53E+02	2.16E+01	2.40E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.22E+01	2.07E+02	4.35E+02	1.23E+00	1.44E+00	3.09E+01
TEENAGE	GROUND	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01
TEENAGE	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
TEENAGE	VEG. ING	2.07E+00	2.68E+01	2.40E+00	2.40E+00	6.09E+00	0.00E+00
TEENAGE	MEAT ING	2.85E-01	3.79E+00	6.01E-01	6.01E-01	7.61E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.17E+01	2.55E+02	4.55E+02	2.14E+01	2.54E+01	4.80E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.32E+01	2.01E+02	3.62E+02	1.04E+00	1.15E+00	3.09E+01
ADULT	GROUND	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01	1.71E+01
ADULT	CLOUD	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02	4.51E-02
ADULT	VEG. ING	2.85E+00	3.70E+01	3.32E+00	3.32E+00	8.42E+00	0.00E+00
ADULT	MEAT ING	4.98E-01	6.63E+00	1.05E+00	1.05E+00	1.33E+00	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.37E+01	2.62E+02	3.83E+02	2.25E+01	2.80E+01	4.80E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 32 NAME=SF ESE X= -2.8KM, Y= 2.6KM, Z= 0.0M, DIST= 3.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.72E+01	3.79E+01	2.91E+02	1.04E+00	1.15E+00	0.00E+00
INFANT	GROUND	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
INFANT	CLOUD	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.74E+01	3.81E+01	2.91E+02	1.31E+00	1.42E+00	2.67E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.81E+01	3.27E+01	1.40E+02	4.35E-01	4.41E-01	0.00E+00
CHILD	GROUND	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
CHILD	CLOUD	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07
CHILD	VEG. ING	2.12E-01	2.75E+00	2.48E-01	2.48E-01	6.24E-01	0.00E+00
CHILD	MEAT ING	2.94E-02	3.92E-01	6.21E-02	6.21E-02	7.86E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.86E+01	3.61E+01	1.40E+02	1.01E+00	1.41E+00	2.67E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.01E+01	3.47E+01	7.29E+01	2.06E-01	2.42E-01	0.00E+00
TEENAGE	GROUND	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
TEENAGE	CLOUD	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07
TEENAGE	VEG. ING	3.46E-01	4.50E+00	4.02E-01	4.02E-01	1.02E+00	0.00E+00
TEENAGE	MEAT ING	4.78E-02	6.36E-01	1.01E-01	1.01E-01	1.28E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.08E+01	4.01E+01	7.37E+01	9.76E-01	1.66E+00	2.67E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.61E+00	3.37E+01	6.07E+01	1.73E-01	1.92E-01	0.00E+00
ADULT	GROUND	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
ADULT	CLOUD	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07	7.39E-07
ADULT	VEG. ING	4.78E-01	6.20E+00	5.56E-01	5.56E-01	1.41E+00	0.00E+00
ADULT	MEAT ING	8.35E-02	1.11E+00	1.76E-01	1.76E-01	2.23E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	9.44E+00	4.13E+01	6.17E+01	1.17E+00	2.09E+00	2.67E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 32 NAME=SF ESE X= -2.8KM, Y= 2.6KM, Z= 0.0M, DIST= 3.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	4.02E+01	3.79E+01	2.91E+02	1.08E+00	1.16E+00	5.03E+01
INFANT	GROUND	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
INFANT	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	4.32E+01	4.09E+01	2.94E+02	4.07E+00	4.16E+00	5.32E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	2.12E+01	3.27E+01	1.40E+02	4.53E-01	4.48E-01	5.03E+01
CHILD	GROUND	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
CHILD	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
CHILD	VEG. ING	2.12E-01	2.75E+00	2.51E-01	2.51E-01	6.25E-01	0.00E+00
CHILD	MEAT ING	2.95E-02	3.93E-01	6.24E-02	6.24E-02	7.89E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.44E+01	3.89E+01	1.43E+02	3.76E+00	4.14E+00	5.32E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.31E+01	3.48E+01	7.29E+01	2.13E-01	2.45E-01	5.03E+01
TEENAGE	GROUND	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
TEENAGE	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
TEENAGE	VEG. ING	3.47E-01	4.51E+00	4.06E-01	4.06E-01	1.02E+00	0.00E+00
TEENAGE	MEAT ING	4.80E-02	6.38E-01	1.01E-01	1.01E-01	1.28E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.65E+01	4.29E+01	7.64E+01	3.71E+00	4.39E+00	5.32E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.16E+01	3.37E+01	6.07E+01	1.79E-01	1.95E-01	5.03E+01
ADULT	GROUND	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00	2.87E+00
ADULT	CLOUD	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01	1.21E-01
ADULT	VEG. ING	4.79E-01	6.21E+00	5.61E-01	5.61E-01	1.41E+00	0.00E+00
ADULT	MEAT ING	8.38E-02	1.11E+00	1.77E-01	1.77E-01	2.24E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.52E+01	4.40E+01	6.44E+01	3.91E+00	4.82E+00	5.32E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 33 NAME=Daniels Ranch X= 2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.06E+01	3.11E+01	2.40E+02	8.55E-01	9.46E-01	0.00E+00
INFANT	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
INFANT	CLOUD	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.09E+01	3.14E+01	2.40E+02	1.07E+00	1.17E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.50E+01	2.69E+01	1.15E+02	3.58E-01	3.63E-01	0.00E+00
CHILD	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
CHILD	CLOUD	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
CHILD	VEG. ING	1.74E-01	2.26E+00	2.04E-01	2.04E-01	5.14E-01	0.00E+00
CHILD	MEAT ING	2.42E-02	3.22E-01	5.10E-02	5.10E-02	6.47E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.54E+01	2.97E+01	1.16E+02	8.33E-01	1.16E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.34E+00	2.86E+01	6.01E+01	1.69E-01	1.99E-01	0.00E+00
TEENAGE	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
TEENAGE	CLOUD	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
TEENAGE	VEG. ING	2.85E-01	3.70E+00	3.31E-01	3.31E-01	8.42E-01	0.00E+00
TEENAGE	MEAT ING	3.93E-02	5.23E-01	8.28E-02	8.28E-02	1.05E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.89E+00	3.30E+01	6.07E+01	8.03E-01	1.37E+00	2.20E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.10E+00	2.77E+01	5.00E+01	1.42E-01	1.58E-01	0.00E+00
ADULT	GROUND	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
ADULT	CLOUD	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
ADULT	VEG. ING	3.93E-01	5.10E+00	4.57E-01	4.57E-01	1.16E+00	0.00E+00
ADULT	MEAT ING	6.87E-02	9.14E-01	1.45E-01	1.45E-01	1.83E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.78E+00	3.39E+01	5.08E+01	9.64E-01	1.72E+00	2.20E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 33 NAME=Daniels Ranch X= 2.1KM, Y= 0.0KM, Z= 0.0M, DIST= 2.1KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.23E+01	3.12E+01	2.40E+02	9.24E-01	9.73E-01	2.75E+01
INFANT	GROUND	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
INFANT	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.47E+01	3.36E+01	2.43E+02	3.36E+00	3.41E+00	2.99E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.66E+01	2.69E+01	1.15E+02	3.89E-01	3.76E-01	2.75E+01
CHILD	GROUND	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
CHILD	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
CHILD	VEG. ING	1.75E-01	2.27E+00	2.08E-01	2.08E-01	5.17E-01	0.00E+00
CHILD	MEAT ING	2.44E-02	3.24E-01	5.17E-02	5.17E-02	6.52E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.92E+01	3.19E+01	1.18E+02	3.08E+00	3.39E+00	2.99E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.00E+01	2.86E+01	6.01E+01	1.82E-01	2.05E-01	2.75E+01
TEENAGE	GROUND	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
TEENAGE	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
TEENAGE	VEG. ING	2.87E-01	3.72E+00	3.37E-01	3.37E-01	8.47E-01	0.00E+00
TEENAGE	MEAT ING	3.96E-02	5.26E-01	8.38E-02	8.38E-02	1.06E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.28E+01	3.53E+01	6.30E+01	3.04E+00	3.59E+00	2.99E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.75E+00	2.77E+01	5.00E+01	1.53E-01	1.63E-01	2.75E+01
ADULT	GROUND	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
ADULT	CLOUD	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02	7.61E-02
ADULT	VEG. ING	3.96E-01	5.13E+00	4.65E-01	4.65E-01	1.17E+00	0.00E+00
ADULT	MEAT ING	6.92E-02	9.20E-01	1.47E-01	1.47E-01	1.85E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.16E+01	3.62E+01	5.31E+01	3.20E+00	3.95E+00	2.99E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 34 NAME=Spencer Ranch X= -2.0KM, Y= 1.2KM, Z= 0.0M, DIST= 2.3KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.47E+01	3.53E+01	2.71E+02	9.68E-01	1.07E+00	0.00E+00
INFANT	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
INFANT	CLOUD	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.49E+01	3.55E+01	2.72E+02	1.22E+00	1.32E+00	2.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.69E+01	3.05E+01	1.30E+02	4.05E-01	4.11E-01	0.00E+00
CHILD	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
CHILD	CLOUD	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07
CHILD	VEG. ING	1.97E-01	2.56E+00	2.31E-01	2.31E-01	5.81E-01	0.00E+00
CHILD	MEAT ING	2.74E-02	3.65E-01	5.78E-02	5.78E-02	7.32E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.74E+01	3.36E+01	1.31E+02	9.43E-01	1.31E+00	2.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	9.44E+00	3.23E+01	6.79E+01	1.91E-01	2.25E-01	0.00E+00
TEENAGE	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
TEENAGE	CLOUD	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07
TEENAGE	VEG. ING	3.23E-01	4.19E+00	3.75E-01	3.75E-01	9.52E-01	0.00E+00
TEENAGE	MEAT ING	4.45E-02	5.92E-01	9.38E-02	9.38E-02	1.19E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.01E+01	3.74E+01	6.87E+01	9.09E-01	1.54E+00	2.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	8.03E+00	3.14E+01	5.65E+01	1.61E-01	1.79E-01	0.00E+00
ADULT	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
ADULT	CLOUD	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07	6.89E-07
ADULT	VEG. ING	4.45E-01	5.77E+00	5.18E-01	5.18E-01	1.32E+00	0.00E+00
ADULT	MEAT ING	7.78E-02	1.03E+00	1.64E-01	1.64E-01	2.08E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.80E+00	3.84E+01	5.75E+01	1.09E+00	1.95E+00	2.49E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 34 NAME=Spencer Ranch X= -2.0KM, Y= 1.2KM, Z= 0.0M, DIST= 2.3KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.66E+01	3.53E+01	2.71E+02	1.04E+00	1.10E+00	3.17E+01
INFANT	GROUND	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
INFANT	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.94E+01	3.81E+01	2.74E+02	3.86E+00	3.92E+00	3.45E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.88E+01	3.05E+01	1.30E+02	4.38E-01	4.24E-01	3.17E+01
CHILD	GROUND	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
CHILD	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
CHILD	VEG. ING	1.98E-01	2.57E+00	2.35E-01	2.35E-01	5.84E-01	0.00E+00
CHILD	MEAT ING	2.76E-02	3.67E-01	5.84E-02	5.84E-02	7.37E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.19E+01	3.62E+01	1.33E+02	3.55E+00	3.90E+00	3.45E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.13E+01	3.24E+01	6.79E+01	2.05E-01	2.32E-01	3.17E+01
TEENAGE	GROUND	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
TEENAGE	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
TEENAGE	VEG. ING	3.24E-01	4.21E+00	3.81E-01	3.81E-01	9.57E-01	0.00E+00
TEENAGE	MEAT ING	4.48E-02	5.96E-01	9.49E-02	9.49E-02	1.20E-01	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.45E+01	4.00E+01	7.12E+01	3.50E+00	4.13E+00	3.45E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	9.93E+00	3.14E+01	5.65E+01	1.72E-01	1.84E-01	3.17E+01
ADULT	GROUND	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
ADULT	CLOUD	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01	1.47E-01
ADULT	VEG. ING	4.47E-01	5.80E+00	5.26E-01	5.26E-01	1.32E+00	0.00E+00
ADULT	MEAT ING	7.83E-02	1.04E+00	1.66E-01	1.66E-01	2.09E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.33E+01	4.10E+01	6.00E+01	3.68E+00	4.53E+00	3.45E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 35 NAME=BC Ranch X= -6.6KM, Y= 3.8KM, Z= 0.0M, DIST= 7.7KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.40E+01	2.44E+01	1.88E+02	6.71E-01	7.41E-01	0.00E+00
INFANT	GROUND	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01
INFANT	CLOUD	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.41E+01	2.46E+01	1.88E+02	8.42E-01	9.13E-01	1.72E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.17E+01	2.11E+01	9.02E+01	2.81E-01	2.84E-01	0.00E+00
CHILD	GROUND	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01
CHILD	CLOUD	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07
CHILD	VEG. ING	1.36E-01	1.77E+00	1.60E-01	1.60E-01	4.02E-01	0.00E+00
CHILD	MEAT ING	1.90E-02	2.53E-01	4.00E-02	4.00E-02	5.07E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.20E+01	2.33E+01	9.05E+01	6.53E-01	9.09E-01	1.72E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.53E+00	2.24E+01	4.70E+01	1.33E-01	1.56E-01	0.00E+00
TEENAGE	GROUND	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01
TEENAGE	CLOUD	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07
TEENAGE	VEG. ING	2.23E-01	2.90E+00	2.60E-01	2.60E-01	6.59E-01	0.00E+00
TEENAGE	MEAT ING	3.08E-02	4.10E-01	6.50E-02	6.50E-02	8.22E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.95E+00	2.59E+01	4.75E+01	6.29E-01	1.07E+00	1.72E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.55E+00	2.17E+01	3.91E+01	1.11E-01	1.24E-01	0.00E+00
ADULT	GROUND	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01	1.72E-01
ADULT	CLOUD	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07	4.76E-07
ADULT	VEG. ING	3.08E-01	4.00E+00	3.59E-01	3.59E-01	9.10E-01	0.00E+00
ADULT	MEAT ING	5.39E-02	7.16E-01	1.14E-01	1.14E-01	1.44E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	6.09E+00	2.66E+01	3.97E+01	7.56E-01	1.35E+00	1.72E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 35 NAME=BC Ranch X= -6.6KM, Y= 3.8KM, Z= 0.0M, DIST= 7.7KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.47E+01	2.44E+01	1.88E+02	7.08E-01	7.56E-01	1.28E+01
INFANT	GROUND	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
INFANT	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.66E+01	2.63E+01	1.90E+02	2.61E+00	2.65E+00	1.47E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.25E+01	2.11E+01	9.02E+01	2.98E-01	2.91E-01	1.28E+01
CHILD	GROUND	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
CHILD	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
CHILD	VEG. ING	1.37E-01	1.78E+00	1.62E-01	1.62E-01	4.04E-01	0.00E+00
CHILD	MEAT ING	1.91E-02	2.54E-01	4.04E-02	4.04E-02	5.09E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.45E+01	2.50E+01	9.23E+01	2.40E+00	2.64E+00	1.47E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.30E+00	2.24E+01	4.70E+01	1.40E-01	1.59E-01	1.28E+01
TEENAGE	GROUND	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
TEENAGE	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
TEENAGE	VEG. ING	2.24E-01	2.91E+00	2.63E-01	2.63E-01	6.61E-01	0.00E+00
TEENAGE	MEAT ING	3.10E-02	4.12E-01	6.55E-02	6.55E-02	8.27E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.45E+00	2.76E+01	4.92E+01	2.37E+00	2.80E+00	1.47E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.32E+00	2.17E+01	3.91E+01	1.17E-01	1.26E-01	1.28E+01
ADULT	GROUND	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
ADULT	CLOUD	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02	4.80E-02
ADULT	VEG. ING	3.09E-01	4.01E+00	3.63E-01	3.63E-01	9.13E-01	0.00E+00
ADULT	MEAT ING	5.41E-02	7.20E-01	1.15E-01	1.15E-01	1.45E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.58E+00	2.84E+01	4.15E+01	2.49E+00	3.08E+00	1.47E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 36 NAME=Puttman Ranch X= -5.2KM, Y= 7.2KM, Z= 0.0M, DIST= 8.9KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	9.48E+00	9.66E+00	7.42E+01	2.65E-01	2.93E-01	0.00E+00
INFANT	GROUND	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
INFANT	CLOUD	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	9.55E+00	9.73E+00	7.43E+01	3.33E-01	3.61E-01	6.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.62E+00	8.34E+00	3.57E+01	1.11E-01	1.12E-01	0.00E+00
CHILD	GROUND	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
CHILD	CLOUD	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07
CHILD	VEG. ING	5.39E-02	7.00E-01	6.33E-02	6.33E-02	1.59E-01	0.00E+00
CHILD	MEAT ING	7.51E-03	9.98E-02	1.58E-02	1.58E-02	2.00E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.75E+00	9.21E+00	3.58E+01	2.58E-01	3.59E-01	6.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.58E+00	8.86E+00	1.86E+01	5.24E-02	6.16E-02	0.00E+00
TEENAGE	GROUND	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
TEENAGE	CLOUD	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07
TEENAGE	VEG. ING	8.83E-02	1.15E+00	1.03E-01	1.03E-01	2.60E-01	0.00E+00
TEENAGE	MEAT ING	1.22E-02	1.62E-01	2.57E-02	2.57E-02	3.25E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	2.75E+00	1.02E+01	1.88E+01	2.49E-01	4.22E-01	6.80E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.20E+00	8.59E+00	1.55E+01	4.40E-02	4.88E-02	0.00E+00
ADULT	GROUND	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
ADULT	CLOUD	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07	1.88E-07
ADULT	VEG. ING	1.22E-01	1.58E+00	1.42E-01	1.42E-01	3.60E-01	0.00E+00
ADULT	MEAT ING	2.13E-02	2.83E-01	4.49E-02	4.49E-02	5.68E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	2.41E+00	1.05E+01	1.57E+01	2.99E-01	5.33E-01	6.80E-02

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 36 NAME=Puttman Ranch X= -5.2KM, Y= 7.2KM, Z= 0.0M, DIST= 8.9KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.00E+01	9.67E+00	7.42E+01	3.30E-01	3.18E-01	9.47E+00
INFANT	GROUND	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01
INFANT	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.08E+01	1.05E+01	7.50E+01	1.12E+00	1.11E+00	1.03E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	5.19E+00	8.35E+00	3.57E+01	1.40E-01	1.24E-01	9.47E+00
CHILD	GROUND	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01
CHILD	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
CHILD	VEG. ING	5.49E-02	7.11E-01	6.66E-02	6.66E-02	1.62E-01	0.00E+00
CHILD	MEAT ING	7.68E-03	1.02E-01	1.64E-02	1.64E-02	2.05E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	6.05E+00	9.95E+00	3.65E+01	1.02E+00	1.10E+00	1.03E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.15E+00	8.88E+00	1.86E+01	6.48E-02	6.75E-02	9.47E+00
TEENAGE	GROUND	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01
TEENAGE	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
TEENAGE	VEG. ING	8.99E-02	1.16E+00	1.08E-01	1.08E-01	2.65E-01	0.00E+00
TEENAGE	MEAT ING	1.25E-02	1.65E-01	2.66E-02	2.66E-02	3.33E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	4.05E+00	1.10E+01	1.95E+01	9.93E-01	1.16E+00	1.03E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.77E+00	8.60E+00	1.55E+01	5.43E-02	5.38E-02	9.47E+00
ADULT	GROUND	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01	7.32E-01
ADULT	CLOUD	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02	6.20E-02
ADULT	VEG. ING	1.24E-01	1.60E+00	1.49E-01	1.49E-01	3.66E-01	0.00E+00
ADULT	MEAT ING	2.18E-02	2.89E-01	4.65E-02	4.65E-02	5.82E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.70E+00	1.13E+01	1.65E+01	1.04E+00	1.27E+00	1.03E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 37 NAME=Englebert Ranch X= 0.3KM, Y= -4.8KM, Z= 0.0M, DIST= 4.8KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.08E+01	2.11E+01	1.63E+02	5.80E-01	6.41E-01	0.00E+00
INFANT	GROUND	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01
INFANT	CLOUD	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.09E+01	2.13E+01	1.63E+02	7.29E-01	7.90E-01	1.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.01E+01	1.82E+01	7.81E+01	2.43E-01	2.46E-01	0.00E+00
CHILD	GROUND	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01
CHILD	CLOUD	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07
CHILD	VEG. ING	1.18E-01	1.53E+00	1.39E-01	1.39E-01	3.48E-01	0.00E+00
CHILD	MEAT ING	1.64E-02	2.19E-01	3.46E-02	3.46E-02	4.39E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.04E+01	2.01E+01	7.85E+01	5.65E-01	7.87E-01	1.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.65E+00	1.94E+01	4.07E+01	1.15E-01	1.35E-01	0.00E+00
TEENAGE	GROUND	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01
TEENAGE	CLOUD	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07
TEENAGE	VEG. ING	1.93E-01	2.51E+00	2.24E-01	2.24E-01	5.71E-01	0.00E+00
TEENAGE	MEAT ING	2.67E-02	3.55E-01	5.62E-02	5.62E-02	7.12E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.02E+00	2.24E+01	4.11E+01	5.44E-01	9.26E-01	1.49E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.81E+00	1.88E+01	3.39E+01	9.63E-02	1.07E-01	0.00E+00
ADULT	GROUND	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01
ADULT	CLOUD	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07	4.13E-07
ADULT	VEG. ING	2.67E-01	3.46E+00	3.10E-01	3.10E-01	7.88E-01	0.00E+00
ADULT	MEAT ING	4.66E-02	6.20E-01	9.82E-02	9.82E-02	1.24E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.27E+00	2.30E+01	3.44E+01	6.54E-01	1.17E+00	1.49E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 37 NAME=Englebert Ranch X= 0.3KM, Y= -4.8KM, Z= 0.0M, DIST= 4.8KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.23E+01	2.12E+01	1.63E+02	8.28E-01	7.38E-01	2.53E+01
INFANT	GROUND	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
INFANT	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.41E+01	2.30E+01	1.64E+02	2.62E+00	2.53E+00	2.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.17E+01	1.83E+01	7.81E+01	3.53E-01	2.92E-01	2.53E+01
CHILD	GROUND	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
CHILD	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
CHILD	VEG. ING	1.22E-01	1.57E+00	1.51E-01	1.51E-01	3.58E-01	0.00E+00
CHILD	MEAT ING	1.71E-02	2.26E-01	3.69E-02	3.69E-02	4.57E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.36E+01	2.19E+01	8.01E+01	2.33E+00	2.48E+00	2.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	7.18E+00	1.95E+01	4.07E+01	1.62E-01	1.58E-01	2.53E+01
TEENAGE	GROUND	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
TEENAGE	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
TEENAGE	VEG. ING	1.99E-01	2.58E+00	2.45E-01	2.45E-01	5.87E-01	0.00E+00
TEENAGE	MEAT ING	2.77E-02	3.67E-01	5.98E-02	5.98E-02	7.42E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.19E+00	2.42E+01	4.28E+01	2.25E+00	2.61E+00	2.71E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	6.33E+00	1.88E+01	3.39E+01	1.36E-01	1.26E-01	2.53E+01
ADULT	GROUND	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
ADULT	CLOUD	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.85E-01
ADULT	VEG. ING	2.75E-01	3.56E+00	3.39E-01	3.39E-01	8.11E-01	0.00E+00
ADULT	MEAT ING	4.85E-02	6.41E-01	1.05E-01	1.05E-01	1.30E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.44E+00	2.48E+01	3.61E+01	2.37E+00	2.85E+00	2.71E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 38 NAME=Burdock School X= -2.3KM, Y= -2.0KM, Z= 0.0M, DIST= 3.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.90E+01	1.93E+01	1.49E+02	5.31E-01	5.87E-01	0.00E+00
INFANT	GROUND	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
INFANT	CLOUD	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.91E+01	1.95E+01	1.49E+02	6.67E-01	7.24E-01	1.36E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	9.27E+00	1.67E+01	7.15E+01	2.22E-01	2.25E-01	0.00E+00
CHILD	GROUND	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
CHILD	CLOUD	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07
CHILD	VEG. ING	1.08E-01	1.40E+00	1.27E-01	1.27E-01	3.19E-01	0.00E+00
CHILD	MEAT ING	1.50E-02	2.00E-01	3.17E-02	3.17E-02	4.01E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	9.53E+00	1.84E+01	7.18E+01	5.17E-01	7.20E-01	1.36E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	5.17E+00	1.77E+01	3.73E+01	1.05E-01	1.23E-01	0.00E+00
TEENAGE	GROUND	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
TEENAGE	CLOUD	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07
TEENAGE	VEG. ING	1.77E-01	2.30E+00	2.06E-01	2.06E-01	5.22E-01	0.00E+00
TEENAGE	MEAT ING	2.44E-02	3.25E-01	5.14E-02	5.14E-02	6.52E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	5.51E+00	2.05E+01	3.76E+01	4.98E-01	8.47E-01	1.36E-01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.40E+00	1.72E+01	3.10E+01	8.82E-02	9.79E-02	0.00E+00
ADULT	GROUND	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01	1.36E-01
ADULT	CLOUD	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07	3.78E-07
ADULT	VEG. ING	2.44E-01	3.17E+00	2.84E-01	2.84E-01	7.21E-01	0.00E+00
ADULT	MEAT ING	4.27E-02	5.68E-01	8.99E-02	8.99E-02	1.14E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	4.82E+00	2.11E+01	3.15E+01	5.98E-01	1.07E+00	1.36E-01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 38 NAME=Burdock School X= -2.3KM, Y= -2.0KM, Z= 0.0M, DIST= 3.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	2.04E+01	1.94E+01	1.49E+02	6.96E-01	6.51E-01	2.36E+01
INFANT	GROUND	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00
INFANT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	2.21E+01	2.10E+01	1.50E+02	2.32E+00	2.28E+00	2.53E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.07E+01	1.67E+01	7.15E+01	2.96E-01	2.55E-01	2.36E+01
CHILD	GROUND	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00
CHILD	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
CHILD	VEG. ING	1.11E-01	1.43E+00	1.35E-01	1.35E-01	3.25E-01	0.00E+00
CHILD	MEAT ING	1.55E-02	2.05E-01	3.32E-02	3.32E-02	4.14E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.24E+01	2.00E+01	7.33E+01	2.09E+00	2.25E+00	2.53E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	6.60E+00	1.78E+01	3.73E+01	1.36E-01	1.38E-01	2.36E+01
TEENAGE	GROUND	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00
TEENAGE	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
TEENAGE	VEG. ING	1.81E-01	2.34E+00	2.19E-01	2.19E-01	5.33E-01	0.00E+00
TEENAGE	MEAT ING	2.51E-02	3.33E-01	5.39E-02	5.39E-02	6.71E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	8.43E+00	2.21E+01	3.92E+01	2.04E+00	2.37E+00	2.53E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	5.82E+00	1.72E+01	3.10E+01	1.14E-01	1.10E-01	2.36E+01
ADULT	GROUND	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00	1.47E+00
ADULT	CLOUD	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
ADULT	VEG. ING	2.50E-01	3.23E+00	3.03E-01	3.03E-01	7.37E-01	0.00E+00
ADULT	MEAT ING	4.39E-02	5.82E-01	9.41E-02	9.41E-02	1.17E-01	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	7.75E+00	2.27E+01	3.30E+01	2.14E+00	2.59E+00	2.53E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 39 NAME=Heck Ranch X= 1.7KM, Y= -6.4KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.30E+01	1.32E+01	1.02E+02	3.62E-01	4.00E-01	0.00E+00
INFANT	GROUND	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02
INFANT	CLOUD	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.31E+01	1.33E+01	1.02E+02	4.55E-01	4.93E-01	9.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	6.32E+00	1.14E+01	4.88E+01	1.52E-01	1.54E-01	0.00E+00
CHILD	GROUND	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02
CHILD	CLOUD	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07
CHILD	VEG. ING	7.37E-02	9.56E-01	8.65E-02	8.65E-02	2.17E-01	0.00E+00
CHILD	MEAT ING	1.03E-02	1.36E-01	2.16E-02	2.16E-02	2.74E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	6.50E+00	1.26E+01	4.90E+01	3.53E-01	4.91E-01	9.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	3.53E+00	1.21E+01	2.54E+01	7.16E-02	8.41E-02	0.00E+00
TEENAGE	GROUND	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02
TEENAGE	CLOUD	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07
TEENAGE	VEG. ING	1.21E-01	1.57E+00	1.40E-01	1.40E-01	3.56E-01	0.00E+00
TEENAGE	MEAT ING	1.66E-02	2.21E-01	3.51E-02	3.51E-02	4.44E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.76E+00	1.40E+01	2.57E+01	3.40E-01	5.78E-01	9.30E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	3.00E+00	1.17E+01	2.11E+01	6.01E-02	6.68E-02	0.00E+00
ADULT	GROUND	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02	9.30E-02
ADULT	CLOUD	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07
ADULT	VEG. ING	1.66E-01	2.16E+00	1.94E-01	1.94E-01	4.92E-01	0.00E+00
ADULT	MEAT ING	2.91E-02	3.87E-01	6.13E-02	6.13E-02	7.77E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.29E+00	1.44E+01	2.15E+01	4.08E-01	7.29E-01	9.30E-02

NUMBER 39 NAME=Heck Ranch X= 1.7KM, Y= -6.4KM, Z= 0.0M, DIST= 6.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	1.43E+01	1.32E+01	1.02E+02	6.52E-01	5.13E-01	2.13E+01
INFANT	GROUND	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
INFANT	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	1.54E+01	1.44E+01	1.03E+02	1.82E+00	1.68E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	7.61E+00	1.14E+01	4.88E+01	2.80E-01	2.07E-01	2.13E+01
CHILD	GROUND	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
CHILD	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
CHILD	VEG. ING	7.80E-02	1.01E+00	1.01E-01	1.01E-01	2.29E-01	0.00E+00
CHILD	MEAT ING	1.10E-02	1.45E-01	2.42E-02	2.42E-02	2.95E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	8.87E+00	1.37E+01	5.01E+01	1.57E+00	1.63E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	4.82E+00	1.22E+01	2.54E+01	1.27E-01	1.11E-01	2.13E+01
TEENAGE	GROUND	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
TEENAGE	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
TEENAGE	VEG. ING	1.28E-01	1.65E+00	1.64E-01	1.64E-01	3.76E-01	0.00E+00
TEENAGE	MEAT ING	1.79E-02	2.36E-01	3.93E-02	3.93E-02	4.79E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	6.13E+00	1.52E+01	2.68E+01	1.50E+00	1.70E+00	2.25E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	4.29E+00	1.18E+01	2.11E+01	1.06E-01	8.89E-02	2.13E+01
ADULT	GROUND	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
ADULT	CLOUD	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01	1.66E-01
ADULT	VEG. ING	1.76E-01	2.27E+00	2.27E-01	2.27E-01	5.19E-01	0.00E+00
ADULT	MEAT ING	3.13E-02	4.12E-01	6.87E-02	6.87E-02	8.37E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	5.66E+00	1.56E+01	2.26E+01	1.57E+00	1.86E+00	2.25E+01

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 40 NAME=Edgemont X= 11.0KM, Y= -18.6KM, Z= 0.0M, DIST= 21.6KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.22E+00	3.27E+00	2.52E+01	8.98E-02	9.94E-02	0.00E+00
INFANT	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
INFANT	CLOUD	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.24E+00	3.30E+00	2.52E+01	1.13E-01	1.22E-01	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.57E+00	2.83E+00	1.21E+01	3.76E-02	3.81E-02	0.00E+00
CHILD	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
CHILD	CLOUD	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08
CHILD	VEG. ING	1.83E-02	2.37E-01	2.15E-02	2.15E-02	5.39E-02	0.00E+00
CHILD	MEAT ING	2.55E-03	3.39E-02	5.36E-03	5.36E-03	6.79E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	1.61E+00	3.12E+00	1.22E+01	8.76E-02	1.22E-01	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	8.76E-01	3.00E+00	6.31E+00	1.78E-02	2.09E-02	0.00E+00
TEENAGE	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
TEENAGE	CLOUD	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08
TEENAGE	VEG. ING	2.99E-02	3.89E-01	3.48E-02	3.48E-02	8.84E-02	0.00E+00
TEENAGE	MEAT ING	4.13E-03	5.50E-02	8.71E-03	8.71E-03	1.10E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	9.33E-01	3.47E+00	6.37E+00	8.43E-02	1.43E-01	2.31E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	7.45E-01	2.91E+00	5.25E+00	1.49E-02	1.66E-02	0.00E+00
ADULT	GROUND	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02	2.31E-02
ADULT	CLOUD	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08	6.40E-08
ADULT	VEG. ING	4.13E-02	5.36E-01	4.81E-02	4.81E-02	1.22E-01	0.00E+00
ADULT	MEAT ING	7.22E-03	9.60E-02	1.52E-02	1.52E-02	1.93E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	8.17E-01	3.57E+00	5.34E+00	1.01E-01	1.81E-01	2.31E-02

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 40 NAME=Edgemont X= 11.0KM, Y= -18.6KM, Z= 0.0M, DIST= 21.6KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	3.54E+00	3.33E+00	2.52E+01	3.68E-01	2.07E-01	5.04E+00
INFANT	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
INFANT	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	3.83E+00	3.62E+00	2.55E+01	6.59E-01	4.99E-01	5.33E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	1.88E+00	2.87E+00	1.21E+01	1.61E-01	8.90E-02	5.04E+00
CHILD	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
CHILD	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
CHILD	VEG. ING	2.24E-02	2.85E-01	3.56E-02	3.56E-02	6.54E-02	0.00E+00
CHILD	MEAT ING	3.28E-03	4.23E-02	7.87E-03	7.87E-03	8.84E-03	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	2.20E+00	3.49E+00	1.24E+01	4.96E-01	4.54E-01	5.33E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.19E+00	3.10E+00	6.31E+00	7.07E-02	4.63E-02	5.04E+00
TEENAGE	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
TEENAGE	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
TEENAGE	VEG. ING	3.67E-02	4.67E-01	5.80E-02	5.80E-02	1.07E-01	0.00E+00
TEENAGE	MEAT ING	5.32E-03	6.87E-02	1.28E-02	1.28E-02	1.43E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.52E+00	3.93E+00	6.67E+00	4.33E-01	4.59E-01	5.33E+00

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.05E+00	2.97E+00	5.25E+00	5.90E-02	3.78E-02	5.04E+00
ADULT	GROUND	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01
ADULT	CLOUD	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02	4.25E-02
ADULT	VEG. ING	5.06E-02	6.44E-01	8.01E-02	8.01E-02	1.48E-01	0.00E+00
ADULT	MEAT ING	9.29E-03	1.20E-01	2.23E-02	2.23E-02	2.51E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.41E+00	4.02E+00	5.64E+00	4.53E-01	5.02E-01	5.33E+00

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 41 NAME=Background X= -5.3KM, Y= -3.0KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	6.87E+00	7.00E+00	5.38E+01	1.92E-01	2.12E-01	0.00E+00
INFANT	GROUND	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02
INFANT	CLOUD	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	6.92E+00	7.05E+00	5.39E+01	2.41E-01	2.62E-01	4.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	3.35E+00	6.05E+00	2.59E+01	8.05E-02	8.15E-02	0.00E+00
CHILD	GROUND	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02
CHILD	CLOUD	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07
CHILD	VEG. ING	3.91E-02	5.07E-01	4.59E-02	4.59E-02	1.15E-01	0.00E+00
CHILD	MEAT ING	5.44E-03	7.24E-02	1.15E-02	1.15E-02	1.45E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	3.45E+00	6.68E+00	2.60E+01	1.87E-01	2.61E-01	4.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	1.87E+00	6.42E+00	1.35E+01	3.80E-02	4.46E-02	0.00E+00
TEENAGE	GROUND	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02
TEENAGE	CLOUD	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07
TEENAGE	VEG. ING	6.40E-02	8.31E-01	7.44E-02	7.44E-02	1.89E-01	0.00E+00
TEENAGE	MEAT ING	8.83E-03	1.17E-01	1.86E-02	1.86E-02	2.36E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	1.99E+00	7.42E+00	1.36E+01	1.80E-01	3.06E-01	4.93E-02

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	1.59E+00	6.23E+00	1.12E+01	3.19E-02	3.54E-02	0.00E+00
ADULT	GROUND	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02
ADULT	CLOUD	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07	1.37E-07
ADULT	VEG. ING	8.83E-02	1.15E+00	1.03E-01	1.03E-01	2.61E-01	0.00E+00
ADULT	MEAT ING	1.54E-02	2.05E-01	3.25E-02	3.25E-02	4.12E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	1.75E+00	7.63E+00	1.14E+01	2.17E-01	3.87E-01	4.93E-02

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

NUMBER 41 NAME=Background X= -5.3KM, Y= -3.0KM, Z= 0.0M, DIST= 6.0KM, IRTYPE=10

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	INHAL.	7.75E+00	7.03E+00	5.38E+01	3.58E-01	2.77E-01	1.44E+01
INFANT	GROUND	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01
INFANT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
INFANT	VEG. ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MEAT ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT	TOTALS	8.40E+00	7.68E+00	5.45E+01	1.00E+00	9.24E-01	1.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
CHILD	INHAL.	4.22E+00	6.07E+00	2.59E+01	1.54E-01	1.12E-01	1.44E+01
CHILD	GROUND	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01
CHILD	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
CHILD	VEG. ING	4.16E-02	5.36E-01	5.43E-02	5.43E-02	1.22E-01	0.00E+00
CHILD	MEAT ING	5.88E-03	7.74E-02	1.30E-02	1.30E-02	1.57E-02	0.00E+00
CHILD	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	4.92E+00	7.33E+00	2.66E+01	8.68E-01	8.96E-01	1.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
TEENAGE	INHAL.	2.74E+00	6.48E+00	1.35E+01	6.96E-02	5.98E-02	1.44E+01
TEENAGE	GROUND	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01
TEENAGE	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
TEENAGE	VEG. ING	6.81E-02	8.78E-01	8.82E-02	8.82E-02	2.00E-01	0.00E+00
TEENAGE	MEAT ING	9.54E-03	1.26E-01	2.11E-02	2.11E-02	2.56E-02	0.00E+00
TEENAGE	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	3.47E+00	8.13E+00	1.42E+01	8.25E-01	9.32E-01	1.51E+01

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
ADULT	INHAL.	2.46E+00	6.26E+00	1.12E+01	5.83E-02	4.81E-02	1.44E+01
ADULT	GROUND	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01	5.32E-01
ADULT	CLOUD	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
ADULT	VEG. ING	9.39E-02	1.21E+00	1.22E-01	1.22E-01	2.76E-01	0.00E+00
ADULT	MEAT ING	1.67E-02	2.20E-01	3.68E-02	3.68E-02	4.47E-02	0.00E+00
ADULT	MILK ING	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	3.22E+00	8.34E+00	1.20E+01	8.64E-01	1.02E+00	1.51E+01

0Program execution time = 5.11 seconds

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APPENDIX 5.7-E

MILDOS AREA SIMULATION FOR WASTE DISPOSAL WELL

```
11REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE   1
 METSET:                            DATA: DBNOLA.MIL                  02/23/09
0                             TABLE OF CONTENTS
```

```
1REGION: Dewey Burdock               CODE: MILDOS-AREA (02/97)          PAGE   2
 METSET:                             DATA: DBNOLA.MIL                   02/23/09
     JOINT FREQUENCY IN PERCENT, DIRECTION INDICATES WHERE WIND IS FROM
FREQWS=0.46786,0.23973,0.15172,0.09302,0.03668,0.01100
 MPH  N      NNE    NE     ENE    E      ESE    SE     SSE    S      SSW    SW     WSW    W
WNW    NW     NNW       TOTALS
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 1
  1.5 0.0260 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0260
  5.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0260 0.0000
0.0000 0.0000 0.0000    0.0260
 10.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 ALL  0.0260 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0260 0.0000
0.0000 0.0000 0.0000    0.0520
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 2
  1.5 0.3930 0.2360 0.1310 0.1050 0.0790 0.1830 0.1570 0.3410 0.7340 0.7340 0.7860 0.4980 0.8650
0.8390 0.9170 0.7080    7.7060
  5.5 0.0520 0.0000 0.0000 0.0260 0.0000 0.0260 0.0000 0.0520 0.0790 0.0790 0.0520 0.1050 0.2620
0.0790 0.1830 0.1050    1.1000
 10.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0790 0.0000 0.0000    0.0790
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 ALL  0.4450 0.2360 0.1310 0.1310 0.0790 0.2090 0.1570 0.3930 0.8130 0.8130 0.8380 0.6030 1.1270
0.9970 1.1000 0.8130    8.8850
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 3
  1.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
  5.5 0.0520 0.0000 0.0260 0.0000 0.0260 0.0790 0.3410 0.2360 0.3140 0.0260 0.1050 0.2880 0.6290
1.1010 0.8650 0.6810    4.7690
 10.0 0.0000 0.0000 0.0000 0.0000 0.1050 0.0260 0.2880 0.2360 0.0260 0.0000 0.0260 0.0260 0.1310
0.8390 0.6810 0.4450    2.8290
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 ALL  0.0520 0.0000 0.0260 0.0000 0.1310 0.1050 0.6290 0.4720 0.3400 0.0260 0.1310 0.3140 0.7600
1.9400 1.5460 1.1260    7.5980
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 4
  1.5 1.7600 0.4720 0.1830 0.1570 0.2620 0.2100 0.2880 0.6290 0.8120 0.4720 0.4980 0.6550 0.5770
0.4980 0.9430 1.1790    9.5950
  5.5 1.0200 0.1570 0.1570 0.3410 0.8390 0.6290 0.5240 0.6290 0.2360 0.2360 0.0260 0.1570 0.4980
1.3890 2.0960 1.8870   10.8210
 10.0 0.3140 0.1050 0.1050 0.6030 1.0740 0.5240 0.5500 0.1830 0.0000 0.0000 0.1310 0.0790 0.4720
2.4630 4.1930 1.4680   12.2640
 15.5 0.0260 0.0000 0.0260 0.3930 0.5770 0.1050 0.1050 0.0790 0.0000 0.0000 0.1830 0.1830 0.3140
1.7300 4.7690 0.8120    9.3020
```

```
 21.5 0.0000 0.0000 0.0000 0.0520 0.0260 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0790 0.1830
0.6550 2.5160 0.1570    3.6680
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0260 0.0260
0.0520 0.9700 0.0260    1.1000
 ALL  3.1200 0.7340 0.4710 1.5460 2.7780 1.4680 1.4670 1.5200 1.0480 0.7080 0.8380 1.1790 2.0700
6.787015.4870 5.5290   46.7500
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 5
  1.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
  5.5 0.8120 0.0790 0.1310 0.1830 0.2100 0.1570 0.2620 0.2880 0.0260 0.0000 0.0260 0.0000 0.0520
0.2880 0.6030 0.8650    3.9820
 10.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 ALL  0.8120 0.0790 0.1310 0.1830 0.2100 0.1570 0.2620 0.2880 0.0260 0.0000 0.0260 0.0000 0.0520
0.2880 0.6030 0.8650    3.9820
 -----------------------------------------------------------------------------------------------
-----------------------------------
  STABILITY CLASS 6
  1.5 5.5600 3.3540 2.0700 1.2050 0.8650 0.8390 0.8910 1.2050 1.1270 0.7860 0.5240 0.5770 0.9430
1.4940 2.5940 5.4250   29.4590
  5.5 0.7600 0.1570 0.1050 0.1050 0.1310 0.2100 0.0790 0.1310 0.1830 0.0000 0.0520 0.0260 0.1050
0.1830 0.2880 0.7600    3.2750
 10.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000    0.0000
 ALL  6.3200 3.5110 2.1750 1.3100 0.9960 1.0490 0.9700 1.3360 1.3100 0.7860 0.5760 0.6030 1.0480
1.6770 2.8820 6.1850   32.7340
 -----------------------------------------------------------------------------------------------
-----------------------------------
 ALL 10.7750 4.5600 2.9340 3.1700 4.1940 2.9880 3.4850 4.0090 3.5370 2.3330 2.4090 2.7250
5.057011.689021.618014.5180  100.0010
```

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 3
METSET: DATA: DBNOLA.MIL 02/23/09

--------------------------------INDIVIDUAL RECEPTOR LOCATION DATA, 41 LOCATIONS INPUT THIS RUN-------------------------------

I	LOCATION NAMES	X(KM)	Y(KM)	Z(M)	DIST(KM)	TYPE	I	LOCATION NAMES	X(KM)	Y(KM)	Z(M)	DIST(KM)	TYPE
1	CPP N	0.00	2.82	0.00	2.82	10	22	SF SSE	-3.55	0.15	0.00	3.55	10
2	CPP NNE	1.07	2.78	0.00	2.98	10	23	SF SE	-2.81	1.30	0.00	3.10	10
3	CPP NE	1.16	1.17	0.00	1.65	10	24	SF S	-4.91	-0.25	0.00	4.92	10
4	CPP ENE	2.64	1.01	0.00	2.83	10	25	SF SSW	-5.70	1.38	0.00	5.86	10
5	CPP E	2.60	0.00	0.00	2.60	10	26	SF SW	-6.28	2.06	0.00	6.61	10
6	CPP ESE	2.53	-0.97	0.00	2.71	10	27	SF WSW	-6.24	2.92	0.00	6.89	10
7	CPP SSE	0.85	-2.25	0.00	2.41	10	28	SF W	-7.02	3.43	0.00	7.81	10
8	CPP SE	2.13	-2.14	0.00	3.02	10	29	SF WNW	-6.98	4.21	0.00	8.15	10
9	CPP S	0.00	-2.87	0.00	2.87	10	30	SF NW	-6.24	4.69	0.00	7.81	10
10	CPP SSW	-1.09	-2.84	0.00	3.04	10	31	SF NNW	-5.40	4.67	0.00	7.14	10
11	CPP SW	-2.44	-2.43	0.00	3.44	10	32	SF ESE	-3.00	2.69	0.00	4.03	10
12	CPP WSW	-2.37	-0.90	0.00	2.54	10	33	Daniels Ranch	2.13	0.02	0.00	2.13	10
13	CPP W	-2.32	0.00	0.00	2.32	10	34	Spencer Ranch	-2.00	1.21	0.00	2.34	10
14	CPP WNW	-2.29	0.87	0.00	2.45	10	35	BC Ranch	-6.64	3.81	0.00	7.66	10
15	CPP NW	-2.55	2.52	0.00	3.59	10	36	Puttman Ranch	-5.16	7.23	0.00	8.88	10
16	CPP NNW	-1.42	3.70	0.00	3.96	10	37	Englebert Ranch	0.30	-4.83	0.00	4.84	10
17	SF N	-4.92	5.28	0.00	7.22	10	38	Burdock School	-2.25	-1.96	0.00	2.98	10
18	SF NNE	-4.23	5.25	0.00	6.74	10	39	Heck Ranch	1.73	-6.38	0.00	6.61	10
19	SF NE	-2.70	5.64	0.00	6.25	10	40	Edgemont	11.03	-18.59	0.00	21.62	10
20	SF ENE	-3.35	4.01	0.00	5.23	10	41	Background	-5.25	-3.00	0.00	6.05	10
21	SF E	-2.97	3.43	0.00	4.54	10							

MISCELLANEOUS INPUTABLE PARAMETER VALUES

DMM	DMA	TSTART	FFORI	FHAYI	FFORP	FHAYP	FPR(1)	FPR(2)	FPR(3)	ACTRAT
100.0	100.0	2008.00	0.50	0.50	0.50	0.50	0.00	0.00	0.00	2.50

IPACT EQUALS 0, 0, 0, 1,

JC EQUALS 1, 1, 1, 1, 0, 0, 0, 0, 1, 0

TIME STEP DATA....	STEP NAMES	LENGTH, YRS	IFTODO
1		5.00	1
2		100.00	0

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```
XRHO EQUALS    1.5,   2.5,   3.5,   4.5,   7.5,  15.0,  25.0,  35.0,  45.0,  55.0,  65.0,
75.0,

HDP EQUALS  50.0
```

1REGION: Dewey Burdock　CODE: MILDOS-AREA (02/97)　PAGE 4
METSET:　DATA: DBNOLA.MIL　02/23/09

POPULATION DISTRIBUTION

KILOMETERS	N 0.0	NNE 22.5	NE 45.0	ENE 67.5	E 90.0	ESE 112.5	SE 135.0	SSE 157.5	S 180.0	SSW 202.5	SW 225.0	WSW 247.5	W 270.0	WNW 292.5	NW 315.0	NNW 337.5
1.0- 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.0- 3.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
3.0- 4.0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
4.0- 5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-10.0	0	0	0	0	0	0	0	2	11	3	0	0	0	8	6	2
10.0-20.0	26	12	10	0	24	21	12	18	0	7	0	19	0	6	2	0
20.0-30.0	165	8	15	154	47	26	342	649	7	0	0	14	0	2	0	35
30.0-40.0	54	59	494	282	501	76	18	52	6	2	29	15	2	2	10	234
40.0-50.0	25	64	3852	21	4651	329	32	7	18	2	18	4	10	18	22	4129
50.0-60.0	25	229	391	73	278	183	12	30	2	25	21	28	0	57	30	121
60.0-70.0	39	780	1825	268	70	143	13	20	17	21	23	8	22	58	50	316
70.0-80.0	58	386	3427	539	95	136	34	30	44	48	61	9	18	33	72	77
1.0-80.0	392	1538	10014	1337	5666	914	463	808	106	108	152	103	52	184	192	4914

TOTAL 1-80 KM POPULATION IS 26943 PERSONS

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE   5
 METSET:                              DATA: DBNOLA.MIL                   02/23/09

 NUMBER OF SOURCES= 4


        KM      KM       M       KM2                          CI/YEAR
PSIZE   M/SEC
 NO.     X       Y       Z      AREA     U-238    Th-230    Ra-226    Pb-210    Rn-222     ID
SET   EXIT VEL   SOURCE NAME
 -------------------------------------------------------------------------------------------------
-----------------------------------
  1   -4.92    3.43   16.00  0.0000   0.00E+00  0.00E+00  0.00E+00  0.00E+00  2.15E+02   1001
1    3.30E+00   SF
  2    1.83   -0.56    0.00  0.9130   0.00E+00  0.00E+00  0.00E+00  0.00E+00  2.39E+02   1002
1    0.00E+00   CPP Wellfield
  3   -3.86    3.48    0.00  0.8380   0.00E+00  0.00E+00  0.00E+00  0.00E+00  2.39E+02   1003
1    0.00E+00   SF Wellfield
  4    0.00    0.00   16.00  0.0000   0.00E+00  0.00E+00  0.00E+00  0.00E+00  2.15E+02   1004
1    3.30E+00   CPP

                     INPUT TAILS ACTIVITIES, PCI/G                          AMAD AND FRACTIONAL
DISTRIBUTION
              SET URANIUM   THORIUM    RADIUM     LEAD                  SET    1.5    3.0    7.7
54.0
              ------------------------------------------                -------------------------
----------
               1  0.00E+00  0.00E+00  0.00E+00  0.00E+00                 1     0.000  1.000
0.000  0.000
               2  0.00E+00  0.00E+00  0.00E+00  0.00E+00                 2     1.000  0.000
0.000  0.000
               3  0.00E+00  0.00E+00  0.00E+00  0.00E+00                 3     0.000  0.000
0.300  0.700

                      PARTICULATE SOURCE STRENGTH MULTIPLIERS BY TIME STEP,  2 TIME STEP(S) USED
FOR THIS RUN
  SOURCE     TSTEP 1     TSTEP 2     TSTEP 3     TSTEP 4     TSTEP 5     TSTEP 6     TSTEP 7
TSTEP 8      TSTEP 9     TSTEP10
  NUMBER     5.00YRS   100.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS
5.00YRS      5.00YRS     5.00YRS
  -----------------------------------------------------------------------------------------------
-------------------------------
     1      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     2      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     3      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     4      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00

            RADON SOURCE STRENGTH MULTIPLIERS BY TIME STEP, 2 TIME STEP(S) USED FOR THIS RUN
  SOURCE     TSTEP 1     TSTEP 2     TSTEP 3     TSTEP 4     TSTEP 5     TSTEP 6     TSTEP 7
TSTEP 8      TSTEP 9     TSTEP10
  NUMBER     5.00YRS   100.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS
5.00YRS      5.00YRS     5.00YRS
  -----------------------------------------------------------------------------------------------
-------------------------------
     1      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     2      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     3      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
     4      1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00   1.000E+00
1.000E+00   1.000E+00   1.000E+00
```

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1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 6
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE N DIRECTION, THETA EQUALS 0.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.015E+01	2.002E+01	1.361E+01	9.042E+00	2.174E-05	1.234E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.436E+01	1.432E+01	1.125E+01	8.437E+00	2.093E-05	1.032E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.149E+01	1.147E+01	9.714E+00	7.884E+00	2.270E-05	9.047E-05
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.391E+00	8.387E+00	7.481E+00	6.425E+00	2.245E-05	7.053E-05
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.867E+00	4.868E+00	4.674E+00	4.410E+00	2.687E-05	4.516E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.233E+00	2.234E+00	2.228E+00	2.211E+00	3.423E-05	2.185E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.265E+00	1.265E+00	1.269E+00	1.270E+00	3.703E-05	1.248E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.450E-01	8.455E-01	8.493E-01	8.516E-01	3.721E-05	8.353E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.188E-01	6.192E-01	6.222E-01	6.243E-01	3.672E-05	6.121E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.798E-01	4.801E-01	4.824E-01	4.841E-01	3.603E-05	4.746E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.865E-01	3.867E-01	3.886E-01	3.900E-01	3.530E-05	3.824E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.200E-01	3.202E-01	3.218E-01	3.229E-01	3.456E-05	3.166E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.586E+01	1.586E+01	1.586E+01	4.528E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.134E+01	1.134E+01	1.134E+01	4.361E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.082E+00	9.082E+00	9.082E+00	4.729E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.643E+00	6.643E+00	6.643E+00	4.675E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.856E+00	3.856E+00	3.856E+00	5.597E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.770E+00	1.770E+00	1.770E+00	7.130E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.002E+00	1.002E+00	1.002E+00	7.714E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.696E-01	6.696E-01	6.696E-01	7.752E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.904E-01	4.904E-01	4.904E-01	7.648E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.802E-01	3.802E-01	3.802E-01	7.505E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.063E-01	3.063E-01	3.063E-01	7.352E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.536E-01	2.536E-01	2.536E-01	7.199E+01

POWERTECH (USA) INC.

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	6.521E-08
2.5	0.000E+00	0.000E+00	0.000E+00	6.280E-08
3.5	0.000E+00	0.000E+00	0.000E+00	6.811E-08
4.5	0.000E+00	0.000E+00	0.000E+00	6.734E-08
7.5	0.000E+00	0.000E+00	0.000E+00	8.061E-08
15.0	0.000E+00	0.000E+00	0.000E+00	1.027E-07
25.0	0.000E+00	0.000E+00	0.000E+00	1.111E-07
35.0	0.000E+00	0.000E+00	0.000E+00	1.116E-07
45.0	0.000E+00	0.000E+00	0.000E+00	1.101E-07
55.0	0.000E+00	0.000E+00	0.000E+00	1.081E-07
65.0	0.000E+00	0.000E+00	0.000E+00	1.059E-07
75.0	0.000E+00	0.000E+00	0.000E+00	1.037E-07

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 7
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE E DIRECTION, THETA EQUALS 90.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.813E+01	2.707E+01	1.255E+01	6.714E+00	2.404E-05	1.166E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.110E+01	2.069E+01	1.098E+01	6.450E+00	2.509E-05	1.010E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.374E+01	1.359E+01	9.573E+00	6.680E+00	2.817E-05	8.744E-05
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.006E+01	1.002E+01	8.097E+00	6.398E+00	3.107E-05	7.523E-05
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.991E+00	4.991E+00	4.610E+00	4.237E+00	3.401E-05	4.432E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.277E+00	2.279E+00	2.222E+00	2.149E+00	3.731E-05	2.163E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.261E+00	1.262E+00	1.254E+00	1.237E+00	3.694E-05	1.227E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.466E-01	8.471E-01	8.469E-01	8.430E-01	3.602E-05	8.311E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.242E-01	6.245E-01	6.260E-01	6.254E-01	3.504E-05	6.150E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.870E-01	4.872E-01	4.889E-01	4.894E-01	3.412E-05	4.806E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.945E-01	3.947E-01	3.964E-01	3.972E-01	3.327E-05	3.898E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.284E-01	3.286E-01	3.300E-01	3.309E-01	3.248E-05	3.246E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.144E+01	2.144E+01	2.144E+01	5.007E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.639E+01	1.639E+01	1.639E+01	5.225E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.076E+01	1.076E+01	1.076E+01	5.868E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.933E+00	7.933E+00	7.933E+00	6.472E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.953E+00	3.953E+00	3.953E+00	7.085E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.805E+00	1.805E+00	1.805E+00	7.771E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.993E-01	9.993E-01	9.993E-01	7.695E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.709E-01	6.709E-01	6.709E-01	7.503E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.947E-01	4.947E-01	4.947E-01	7.300E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.859E-01	3.859E-01	3.859E-01	7.108E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.127E-01	3.127E-01	3.127E-01	6.930E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.602E-01	2.602E-01	2.602E-01	6.765E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC				
XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	7.211E-08
2.5	0.000E+00	0.000E+00	0.000E+00	7.526E-08
3.5	0.000E+00	0.000E+00	0.000E+00	8.452E-08
4.5	0.000E+00	0.000E+00	0.000E+00	9.321E-08
7.5	0.000E+00	0.000E+00	0.000E+00	1.020E-07
15.0	0.000E+00	0.000E+00	0.000E+00	1.119E-07
25.0	0.000E+00	0.000E+00	0.000E+00	1.108E-07
35.0	0.000E+00	0.000E+00	0.000E+00	1.081E-07
45.0	0.000E+00	0.000E+00	0.000E+00	1.051E-07
55.0	0.000E+00	0.000E+00	0.000E+00	1.024E-07
65.0	0.000E+00	0.000E+00	0.000E+00	9.980E-08
75.0	0.000E+00	0.000E+00	0.000E+00	9.743E-08

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 8
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE S DIRECTION, THETA EQUALS 180.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.331E+01	4.292E+01	2.648E+01	1.553E+01	4.259E-05	2.364E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.186E+01	3.182E+01	2.485E+01	1.808E+01	5.789E-05	2.262E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.482E+01	2.482E+01	2.152E+01	1.772E+01	7.203E-05	2.008E-04
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.114E+01	2.115E+01	1.937E+01	1.715E+01	8.683E-05	1.840E-04
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.305E+01	1.306E+01	1.272E+01	1.225E+01	1.084E-04	1.236E-04
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.389E+00	6.393E+00	6.370E+00	6.311E+00	1.198E-04	6.242E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E+00	3.550E+00	3.559E+00	3.558E+00	1.175E-04	3.497E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.350E+00	2.352E+00	2.361E+00	2.367E+00	1.128E-04	2.322E-05
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.708E+00	1.709E+00	1.717E+00	1.722E+00	1.082E-04	1.689E-05
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.314E+00	1.315E+00	1.321E+00	1.326E+00	1.040E-04	1.300E-05
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.051E+00	1.052E+00	1.057E+00	1.060E+00	1.003E-04	1.040E-05
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.641E-01	8.646E-01	8.688E-01	8.719E-01	9.691E-05	8.548E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.400E+01	3.400E+01	3.400E+01	8.872E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.520E+01	2.520E+01	2.520E+01	1.206E+02
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.966E+01	1.966E+01	1.966E+01	1.500E+02
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.675E+01	1.675E+01	1.675E+01	1.809E+02
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.034E+01	1.034E+01	1.034E+01	2.257E+02
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.063E+00	5.063E+00	5.063E+00	2.495E+02
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.812E+00	2.812E+00	2.812E+00	2.448E+02
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.863E+00	1.863E+00	1.863E+00	2.350E+02
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.354E+00	1.354E+00	1.354E+00	2.254E+02
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.042E+00	1.042E+00	1.042E+00	2.167E+02
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.329E-01	8.329E-01	8.329E-01	2.089E+02
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.848E-01	6.848E-01	6.848E-01	2.019E+02

POWERTECH (USA) INC.

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	1.278E-07
2.5	0.000E+00	0.000E+00	0.000E+00	1.737E-07
3.5	0.000E+00	0.000E+00	0.000E+00	2.161E-07
4.5	0.000E+00	0.000E+00	0.000E+00	2.605E-07
7.5	0.000E+00	0.000E+00	0.000E+00	3.251E-07
15.0	0.000E+00	0.000E+00	0.000E+00	3.593E-07
25.0	0.000E+00	0.000E+00	0.000E+00	3.526E-07
35.0	0.000E+00	0.000E+00	0.000E+00	3.385E-07
45.0	0.000E+00	0.000E+00	0.000E+00	3.246E-07
55.0	0.000E+00	0.000E+00	0.000E+00	3.121E-07
65.0	0.000E+00	0.000E+00	0.000E+00	3.009E-07
75.0	0.000E+00	0.000E+00	0.000E+00	2.907E-07

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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE   9
 METSET:                            DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 1,                              DURATION IN YRS
IS...  5.0

                                 CONCENTRATION DATA FOR THE W   DIRECTION, THETA EQUALS 270.0
DEGREES
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TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.161E+01	2.118E+01	1.524E+01	1.140E+01	3.217E-05	1.416E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.592E+01	2.577E+01	2.064E+01	1.607E+01	4.130E-05	1.911E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.753E+01	2.749E+01	2.274E+01	1.774E+01	4.408E-05	2.098E-04
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+01	2.419E+01	2.026E+01	1.583E+01	3.989E-05	1.867E-04
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.064E+00	8.066E+00	7.423E+00	6.549E+00	2.777E-05	7.037E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.813E+00	1.814E+00	1.740E+00	1.662E+00	2.181E-05	1.689E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.889E-01	8.894E-01	8.748E-01	8.517E-01	2.081E-05	8.528E-06
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.623E-01	5.626E-01	5.598E-01	5.526E-01	1.963E-05	5.479E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.013E-01	4.016E-01	4.016E-01	3.994E-01	1.866E-05	3.939E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.069E-01	3.071E-01	3.079E-01	3.075E-01	1.785E-05	3.024E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.455E-01	2.456E-01	2.465E-01	2.467E-01	1.717E-05	2.423E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.025E-01	2.027E-01	2.035E-01	2.039E-01	1.657E-05	2.001E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.678E+01	1.678E+01	1.678E+01	6.700E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.041E+01	2.041E+01	2.041E+01	8.603E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.177E+01	2.177E+01	2.177E+01	9.182E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.916E+01	1.916E+01	1.916E+01	8.308E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.389E+00	6.389E+00	6.389E+00	5.785E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.437E+00	1.437E+00	1.437E+00	4.544E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.045E-01	7.045E-01	7.045E-01	4.334E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.456E-01	4.456E-01	4.456E-01	4.089E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.181E-01	3.181E-01	3.181E-01	3.887E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.432E-01	2.432E-01	2.432E-01	3.719E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.945E-01	1.945E-01	1.945E-01	3.576E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.605E-01	1.605E-01	1.605E-01	3.451E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	9.650E-08
2.5	0.000E+00	0.000E+00	0.000E+00	1.239E-07
3.5	0.000E+00	0.000E+00	0.000E+00	1.322E-07
4.5	0.000E+00	0.000E+00	0.000E+00	1.197E-07
7.5	0.000E+00	0.000E+00	0.000E+00	8.332E-08
15.0	0.000E+00	0.000E+00	0.000E+00	6.544E-08
25.0	0.000E+00	0.000E+00	0.000E+00	6.242E-08
35.0	0.000E+00	0.000E+00	0.000E+00	5.889E-08
45.0	0.000E+00	0.000E+00	0.000E+00	5.598E-08
55.0	0.000E+00	0.000E+00	0.000E+00	5.356E-08
65.0	0.000E+00	0.000E+00	0.000E+00	5.150E-08
75.0	0.000E+00	0.000E+00	0.000E+00	4.970E-08

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

CONCENTRATION DATA FOR THE WNW DIRECTION, THETA EQUALS 292.5 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.244E+01	2.212E+01	1.586E+01	1.157E+01	2.895E-05	1.463E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.754E+01	2.725E+01	2.004E+01	1.422E+01	2.894E-05	1.827E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.036E+01	3.983E+01	2.712E+01	1.708E+01	2.768E-05	2.422E-04
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.068E+01	5.017E+01	3.070E+01	1.656E+01	2.276E-05	2.691E-04
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.079E+00	8.976E+00	6.490E+00	4.549E+00	1.514E-05	5.912E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.882E+00	1.883E+00	1.791E+00	1.694E+00	2.013E-05	1.734E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.515E-01	8.520E-01	8.431E-01	8.267E-01	1.998E-05	8.236E-06
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.255E-01	5.258E-01	5.256E-01	5.225E-01	1.909E-05	5.155E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.708E-01	3.710E-01	3.721E-01	3.719E-01	1.831E-05	3.656E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.814E-01	2.816E-01	2.827E-01	2.832E-01	1.762E-05	2.780E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.241E-01	2.242E-01	2.252E-01	2.258E-01	1.704E-05	2.215E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.842E-01	1.843E-01	1.851E-01	1.857E-01	1.652E-05	1.821E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.752E+01	1.752E+01	1.752E+01	6.030E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.158E+01	2.158E+01	2.158E+01	6.027E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.154E+01	3.154E+01	3.154E+01	5.765E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.974E+01	3.974E+01	3.974E+01	4.740E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.109E+00	7.109E+00	7.109E+00	3.154E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.491E+00	1.491E+00	1.491E+00	4.192E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.748E-01	6.748E-01	6.748E-01	4.161E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.165E-01	4.165E-01	4.165E-01	3.977E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.939E-01	2.939E-01	2.939E-01	3.815E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.230E-01	2.230E-01	2.230E-01	3.671E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.776E-01	1.776E-01	1.776E-01	3.550E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.460E-01	1.460E-01	1.460E-01	3.441E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	8.684E-08
2.5	0.000E+00	0.000E+00	0.000E+00	8.681E-08
3.5	0.000E+00	0.000E+00	0.000E+00	8.303E-08
4.5	0.000E+00	0.000E+00	0.000E+00	6.827E-08
7.5	0.000E+00	0.000E+00	0.000E+00	4.542E-08
15.0	0.000E+00	0.000E+00	0.000E+00	6.038E-08
25.0	0.000E+00	0.000E+00	0.000E+00	5.993E-08
35.0	0.000E+00	0.000E+00	0.000E+00	5.728E-08
45.0	0.000E+00	0.000E+00	0.000E+00	5.494E-08
55.0	0.000E+00	0.000E+00	0.000E+00	5.287E-08
65.0	0.000E+00	0.000E+00	0.000E+00	5.113E-08
75.0	0.000E+00	0.000E+00	0.000E+00	4.956E-08

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 11
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.500E-05	4.465E-04	1.469E-04	6.713E-05	6.590E-05	1.008E-04	1.468E-04
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.482E-05	1.706E-05	1.241E-04	1.315E-04	4.589E-04	1.525E-03	7.367E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.857E-05	2.870E-05	9.355E-04	7.161E-03	7.122E-04	3.256E-03	5.992E-03
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.134E-04	5.531E-04	3.978E-05	1.340E-04	4.778E-04	9.357E-04
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.540E-05	1.269E-04	1.319E-03	1.192E-02	6.941E-04	1.705E-04	2.260E-04
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.488E-05	8.890E-05	2.487E-04	1.037E-03	5.584E-04	4.245E-04	3.950E-04
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.460E-05	1.777E-03	9.030E-05	1.554E-04	5.656E-05	5.972E-05	1.524E-04
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.475E-05	1.488E-04	5.282E-03	4.078E-04	5.281E-05	2.181E-04	1.405E-04	2.040E-04
S	0.000E+00	4.227E-06	0.000E+00	0.000E+00	8.705E-05	0.000E+00	6.012E-05	4.949E-05	1.425E-04	1.523E-05	1.248E-04	3.123E-04
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.953E-05	4.513E-05	0.000E+00	1.028E-05	9.458E-06	1.103E-04	8.731E-05	1.894E-04
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.673E-05	4.951E-05	5.388E-05	5.558E-05	1.399E-04
WSW	0.000E+00	0.000E+00	2.345E-05	0.000E+00	0.000E+00	4.401E-05	2.859E-05	2.771E-05	6.827E-06	4.478E-05	1.210E-05	1.297E-05
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.870E-06	1.365E-05	0.000E+00	2.764E-05	2.184E-05
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.844E-06	8.820E-06	2.919E-06	2.791E-06	2.411E-05	7.350E-05	7.236E-05	3.992E-05
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.560E-06	3.344E-06	0.000E+00	1.529E-05	3.212E-05	4.205E-05	6.762E-05	9.474E-05
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.293E-06	0.000E+00	8.803E-05	5.683E-04	9.662E-03	2.735E-04	6.915E-04	1.635E-04

TOTAL DOSE COMMITMENT IS 6.465E-02 PERSON-REM/YR

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 12
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.273E-04	3.621E-03	1.191E-03	5.438E-04	5.337E-04	8.156E-04	1.188E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.014E-04	1.383E-04	1.006E-03	1.065E-03	3.716E-03	1.234E-02	5.960E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.507E-04	2.327E-04	7.582E-03	5.801E-02	5.766E-03	2.635E-02	4.847E-02
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.541E-03	4.482E-03	3.222E-04	1.085E-03	3.867E-03	7.569E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.305E-04	1.029E-03	1.069E-02	9.657E-02	5.620E-03	1.380E-03	1.828E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.073E-04	7.207E-04	2.015E-03	8.400E-03	4.521E-03	3.436E-03	3.195E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.239E-04	1.441E-02	7.318E-04	1.259E-03	4.580E-04	4.833E-04	1.233E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.197E-04	1.207E-03	4.283E-02	3.304E-03	4.278E-04	1.766E-03	1.137E-03	1.650E-03
S	0.000E+00	3.430E-05	0.000E+00	0.000E+00	7.063E-04	0.000E+00	4.875E-04	4.011E-04	1.154E-03	1.233E-04	1.010E-03	2.526E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.584E-04	3.660E-04	0.000E+00	8.328E-05	7.661E-05	8.932E-04	7.066E-04	1.532E-03
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.029E-04	4.011E-04	4.362E-04	4.499E-04	1.131E-03
WSW	0.000E+00	0.000E+00	1.903E-04	0.000E+00	0.000E+00	3.570E-04	2.318E-04	2.246E-04	5.531E-05	3.626E-04	9.797E-05	1.049E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.326E-05	1.106E-04	0.000E+00	2.237E-04	1.767E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.177E-05	7.155E-05	2.367E-05	2.263E-05	1.953E-04	5.952E-04	5.857E-04	3.230E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.323E-05	2.713E-05	0.000E+00	1.240E-04	2.603E-04	3.406E-04	5.473E-04	7.665E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.672E-05	0.000E+00	7.139E-04	4.607E-03	7.828E-02	2.214E-03	5.597E-03	1.323E-03

TOTAL DOSE COMMITMENT IS 5.237E-01 PERSON-REM/YR

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 13
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS AVG.LUNG

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.655E-06	5.395E-05	1.822E-05	8.547E-06	8.610E-06	1.350E-05	2.018E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.929E-06	2.066E-06	1.543E-05	1.678E-05	6.011E-05	2.049E-04	1.015E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.196E-06	3.483E-06	1.166E-04	9.159E-04	9.348E-05	4.385E-04	8.275E-04
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.811E-05	6.902E-05	5.093E-06	1.760E-05	6.437E-05	1.292E-04
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.758E-06	1.544E-05	1.647E-04	1.527E-03	9.115E-05	2.295E-05	3.117E-05
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.883E-06	1.082E-05	3.102E-05	1.326E-04	7.313E-05	5.693E-05	5.421E-05
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.664E-06	2.164E-04	1.128E-05	1.989E-05	7.417E-06	8.020E-06	2.095E-05
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.717E-06	1.765E-05	6.434E-04	5.098E-05	6.774E-06	2.870E-05	1.895E-05	2.820E-05
S	0.000E+00	4.875E-07	0.000E+00	0.000E+00	1.014E-05	0.000E+00	7.322E-06	6.188E-06	1.828E-05	2.005E-06	1.686E-05	4.325E-05
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.272E-06	5.351E-06	0.000E+00	1.283E-06	1.212E-06	1.451E-05	1.178E-05	2.621E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.080E-05	6.329E-06	7.068E-06	7.481E-06	1.930E-05
WSW	0.000E+00	0.000E+00	2.699E-06	0.000E+00	0.000E+00	5.185E-06	3.457E-06	3.438E-06	8.693E-07	5.848E-06	1.621E-06	1.780E-06
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E-07	1.730E-06	0.000E+00	3.677E-06	2.975E-06
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.022E-06	1.035E-06	3.516E-07	3.449E-07	3.056E-06	9.551E-06	9.637E-06	5.447E-06
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.577E-07	3.922E-07	0.000E+00	1.889E-06	4.070E-06	5.463E-06	9.002E-06	1.292E-05
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.804E-07	0.000E+00	1.061E-05	7.029E-05	1.226E-03	3.561E-05	9.233E-05	2.238E-05

TOTAL DOSE COMMITMENT IS 8.346E-03 PERSON-REM/YR

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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)         PAGE  14
 METSET:                            DATA: DBNOLA.MIL                  02/23/09

                             TIME STEP NUMBER 1,                                 DURATION IN YRS
IS...  5.0

                                   EXPOSURE PATHWAY IS INHAL.           EXPOSED ORGAN IS BRONCHI

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION    1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 7.257E-02 2.609E-01 5.704E-02
1.934E-02 1.499E-02 1.884E-02 2.320E-02
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.520E-02 9.344E-03 4.575E-02
3.619E-02 1.000E-01 2.736E-01 1.118E-01
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.810E-02 1.540E-02 3.413E-01
1.961E+00 1.551E-01 5.852E-01 9.126E-01
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.705E-01 2.067E-01
1.123E-02 3.021E-02 8.924E-02 1.485E-01
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.832E-02 7.408E-02 5.302E-01
3.629E+00 1.692E-01 3.452E-02 3.900E-02
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 8.973E-02 6.008E-02 1.171E-01
3.738E-01 1.628E-01 1.038E-01 8.305E-02
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 7.634E-02 1.199E+00 4.271E-02
5.658E-02 1.673E-02 1.486E-02 3.270E-02
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.595E-02 1.479E-01 2.931E+00 1.562E-01
1.538E-02 5.103E-02 2.737E-02 3.395E-02
     S       0.000E+00 3.983E-02 0.000E+00 0.000E+00 1.795E-01 0.000E+00 3.105E-02 1.763E-02
3.843E-02 3.286E-03 2.233E-02 4.753E-02
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.789E-02 3.984E-02 0.000E+00 3.575E-03
2.486E-03 2.312E-02 1.513E-02 2.783E-02
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.115E-02
1.337E-02 1.158E-02 9.870E-03 2.105E-02
     WSW     0.000E+00 0.000E+00 1.444E-01 0.000E+00 0.000E+00 4.897E-02 1.718E-02 1.129E-02
2.094E-03 1.096E-02 2.458E-03 2.244E-03
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.406E-03
5.017E-03 0.000E+00 6.751E-03 4.557E-03
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 9.079E-02 1.412E-02 2.129E-03 1.314E-03
8.344E-03 2.005E-02 1.625E-02 7.597E-03
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.003E-01 5.514E-03 0.000E+00 7.255E-03
1.124E-02 1.163E-02 1.542E-02 1.835E-02
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.713E-02 0.000E+00 5.787E-02 2.434E-01
3.050E+00 6.804E-02 1.414E-01 2.830E-02

                TOTAL DOSE COMMITMENT IS 2.090E+01 PERSON-REM/YR
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POWERTECH (USA) INC.

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 15
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS GROUND EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.169E-05	5.339E-05	1.430E-05	5.772E-06	5.212E-06	7.505E-06	1.045E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.180E-06	1.969E-06	1.181E-05	1.111E-05	3.580E-05	1.123E-04	5.191E-05
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.043E-06	3.277E-06	8.858E-05	6.041E-04	5.553E-05	2.398E-04	4.225E-04
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.605E-05	5.293E-05	3.394E-06	1.056E-05	3.557E-05	6.667E-05
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.123E-05	1.517E-05	1.305E-04	1.047E-03	5.618E-05	1.300E-05	1.645E-05
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.416E-05	1.155E-05	2.653E-05	9.766E-05	4.822E-05	3.438E-05	3.045E-05
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.210E-05	2.307E-04	9.657E-06	1.470E-05	4.911E-06	4.866E-06	1.182E-05
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.860E-06	2.470E-05	6.141E-04	3.945E-05	4.559E-06	1.741E-05	1.059E-05	1.471E-05
S	0.000E+00	4.729E-06	0.000E+00	0.000E+00	2.498E-05	0.000E+00	6.727E-06	4.638E-06	1.195E-05	1.184E-06	9.181E-06	2.202E-05
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.336E-06	6.923E-06	0.000E+00	9.533E-07	7.860E-07	8.501E-06	6.366E-06	1.324E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.157E-06	4.156E-06	4.185E-06	4.080E-06	9.835E-06
WSW	0.000E+00	0.000E+00	1.760E-05	0.000E+00	0.000E+00	7.898E-06	3.472E-06	2.758E-06	6.014E-07	3.630E-06	9.235E-07	9.451E-07
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.124E-07	1.296E-06	0.000E+00	2.238E-06	1.680E-06
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.064E-05	2.070E-06	3.970E-07	2.978E-07	2.231E-06	6.191E-06	5.697E-06	2.988E-06
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.163E-05	8.033E-07	0.000E+00	1.638E-06	2.987E-06	3.560E-06	5.351E-06	7.126E-06
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.116E-06	0.000E+00	1.126E-05	5.790E-05	8.610E-04	2.229E-05	5.288E-05	1.192E-05

TOTAL DOSE COMMITMENT IS 5.815E-03 PERSON-REM/YR

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1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  16
 METSET:                              DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 1,                                DURATION IN YRS
IS...  5.0

                                   EXPOSURE PATHWAY IS CLOUD            EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.301E-04 2.294E-03 5.034E-04
1.708E-04 1.325E-04 1.665E-04 2.050E-04
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.194E-04 8.221E-05 4.037E-04
3.196E-04 8.836E-04 2.417E-03 9.879E-04
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.567E-04 1.348E-04 3.001E-03
1.728E-02 1.368E-03 5.167E-03 8.060E-03
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.486E-03 1.814E-03
9.885E-05 2.663E-04 7.873E-04 1.311E-03
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 5.672E-04 6.380E-04 4.628E-03
3.186E-02 1.490E-03 3.044E-04 3.441E-04
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 7.011E-04 5.003E-04 1.003E-03
3.249E-03 1.425E-03 9.122E-04 7.315E-04
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 5.934E-04 9.827E-03 3.607E-04
4.861E-04 1.452E-04 1.298E-04 2.868E-04
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.821E-04 1.248E-03 2.540E-02 1.367E-03
1.352E-04 4.497E-04 2.415E-04 2.997E-04
     S       0.000E+00 2.074E-04 0.000E+00 0.000E+00 1.483E-03 0.000E+00 2.727E-04 1.555E-04
3.393E-04 2.902E-05 1.973E-04 4.199E-04
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.191E-04 3.485E-04 0.000E+00 3.156E-05
2.196E-05 2.043E-04 1.337E-04 2.459E-04
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.749E-04
1.181E-04 1.023E-04 8.720E-05 1.860E-04
     WSW     0.000E+00 0.000E+00 9.933E-04 0.000E+00 0.000E+00 4.195E-04 1.489E-04 9.869E-05
1.838E-05 9.650E-05 2.167E-05 1.980E-05
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.212E-05
4.377E-05 0.000E+00 5.943E-05 4.019E-05
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 4.200E-04 1.121E-04 1.815E-05 1.145E-05
7.331E-05 1.767E-04 1.434E-04 6.709E-05
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.931E-04 4.433E-05 0.000E+00 6.322E-05
9.871E-05 1.025E-04 1.361E-04 1.621E-04
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.169E-04 0.000E+00 5.039E-04 2.139E-03
2.689E-02 6.006E-04 1.249E-03 2.500E-04

                TOTAL DOSE COMMITMENT IS 1.809E-01 PERSON-REM/YR
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  17
 METSET:                            DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 1,                              DURATION IN YRS
IS...  5.0

                                   EXPOSURE PATHWAY IS VEG. ING         EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
 -------------------------------------------------------------------------------------------------
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     S       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00

                TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

                                         WARNING--POPULATION FOOD INGESTION DOSES SHOWN
                                          ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
                                          FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
                                          BY THE POPULATION OF THIS REGION. SEE SUMMARY
                                          TABLE FOR THIS INFORMATION.
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1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 18
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS VEG. ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 19
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  20
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
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TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

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1REGION: Dewey Burdock               CODE: MILDOS-AREA (02/97)          PAGE  21
 METSET:                             DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

                                   EXPOSURE PATHWAY IS MILK ING         EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
 -----------------------------------------------------------------------------------------------
-----------------------------------
     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     S       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00

                TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

                                         WARNING--POPULATION FOOD INGESTION DOSES SHOWN
                                          ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
                                          FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
                                          BY THE POPULATION OF THIS REGION. SEE SUMMARY
                                          TABLE FOR THIS INFORMATION.
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1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 22
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

EXPOSURE PATHWAY IS MILK ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO	XRHO
DIRECTION	1.5	2.5	3.5	4.5	7.5	15.0	25.0	35.0	45.0	55.0	65.0	75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 23
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

SUMMARY PRINT OF POPULATION DOSES COMPUTED FOR TSTEP 1--DOSES SHOWN ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DOSES RECEIVED BY PEOPLE WITHIN 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	6.465E-02	5.237E-01	8.346E-03	3.928E-01	1.888E-01	2.090E+01
GROUND	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03
CLOUD	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTALS	2.513E-01	7.104E-01	1.950E-01	5.794E-01	3.755E-01	2.108E+01

DOSES RECEIVED BY PEOPLE BEYOND 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
GROUND	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CLOUD	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01
TOTALS	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01

TOTAL DOSES COMPUTED OVER ALL POPULATIONS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI

INHAL.	6.465E-02	5.237E-01	8.346E-03	3.928E-01	1.888E-01	2.090E+01
GROUND	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03
CLOUD	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01
TOTALS	8.236E+00	1.096E+02	2.010E+00	8.564E+00	8.360E+00	7.189E+01

POWERTECH (USA) INC.

```
1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  24
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

                                       INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                     AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME       PTSZ      U-238        Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  1  CPP N                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  1  CPP N                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  1  CPP N                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  1  CPP N                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  2  CPP NNE               1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  2  CPP NNE               2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  2  CPP NNE               3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  2  CPP NNE               4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  3  CPP NE                1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  3  CPP NE                2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  3  CPP NE                3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  3  CPP NE                4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  4  CPP ENE               1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  4  CPP ENE               2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  4  CPP ENE               3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  4  CPP ENE               4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  5  CPP E                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  5  CPP E                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  5  CPP E                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  5  CPP E                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
```

```
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
  6  CPP ESE              1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  6  CPP ESE              2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  6  CPP ESE              3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  6  CPP ESE              4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
  7  CPP SSE              1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  7  CPP SSE              2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  7  CPP SSE              3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  7  CPP SSE              4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
  8  CPP SE               1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  8  CPP SE               2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  8  CPP SE               3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  8  CPP SE               4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
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```
1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)         PAGE  25
 METSET:                            DATA: DBNOLA.MIL                  02/23/09
                            TIME STEP NUMBER 1,                                DURATION IN YRS
IS...  5.0

                                       INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                     AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME        PTSZ      U-238       Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
  9  CPP S                   1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  9  CPP S                   2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  9  CPP S                   3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
  9  CPP S                   4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 10  CPP SSW                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 10  CPP SSW                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 10  CPP SSW                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 10  CPP SSW                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 11  CPP SW                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 11  CPP SW                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 11  CPP SW                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 11  CPP SW                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 12  CPP WSW                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 12  CPP WSW                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 12  CPP WSW                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 12  CPP WSW                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 13  CPP W                   1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 13  CPP W                   2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 13  CPP W                   3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 13  CPP W                   4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
```

```
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 14  CPP WNW                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 14  CPP WNW                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 14  CPP WNW                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 14  CPP WNW                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 15  CPP NW                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 15  CPP NW                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 15  CPP NW                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 15  CPP NW                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 16  CPP NNW                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 16  CPP NNW                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 16  CPP NNW                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 16  CPP NNW                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  26
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

                                       INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                     AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME        PTSZ      U-238        Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 17  SF N                   1   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 17  SF N                   2   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 17  SF N                   3   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 17  SF N                   4   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 18  SF NNE                 1   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 18  SF NNE                 2   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 18  SF NNE                 3   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 18  SF NNE                 4   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 19  SF NE                  1   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 19  SF NE                  2   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 19  SF NE                  3   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 19  SF NE                  4   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 20  SF ENE                 1   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 20  SF ENE                 2   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 20  SF ENE                 3   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 20  SF ENE                 4   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 21  SF E                   1   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 21  SF E                   2   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 21  SF E                   3   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 21  SF E                   4   0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
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    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 22  SF SSE                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 22  SF SSE                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 22  SF SSE                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 22  SF SSE                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 23  SF SE                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 23  SF SE                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 23  SF SE                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 23  SF SE                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 24  SF S                   1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 24  SF S                   2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 24  SF S                   3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 24  SF S                   4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
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```
1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  27
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                                 DURATION IN YRS
IS...  5.0

                                         INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                       AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.        NAME        PTSZ      U-238        Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 25  SF SSW                1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 25  SF SSW                2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 25  SF SSW                3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 25  SF SSW                4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 26  SF SW                 1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 26  SF SW                 2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 26  SF SW                 3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 26  SF SW                 4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 27  SF WSW                1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 27  SF WSW                2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 27  SF WSW                3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 27  SF WSW                4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 28  SF W                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 28  SF W                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 28  SF W                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 28  SF W                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 29  SF WNW                1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 29  SF WNW                2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 29  SF WNW                3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 29  SF WNW                4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
```

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    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 30  SF NW                   1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 30  SF NW                   2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 30  SF NW                   3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 30  SF NW                   4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 31  SF NNW                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 31  SF NNW                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 31  SF NNW                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 31  SF NNW                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 32  SF ESE                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 32  SF ESE                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 32  SF ESE                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 32  SF ESE                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  28
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                                  DURATION IN YRS
IS...  5.0

                                         INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                       AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME        PTSZ      U-238        Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 33  Daniels Ranch         1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 33  Daniels Ranch         2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 33  Daniels Ranch         3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 33  Daniels Ranch         4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 34  Spencer Ranch         1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 34  Spencer Ranch         2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 34  Spencer Ranch         3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 34  Spencer Ranch         4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 35  BC Ranch              1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 35  BC Ranch              2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 35  BC Ranch              3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 35  BC Ranch              4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 36  Puttman Ranch         1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 36  Puttman Ranch         2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 36  Puttman Ranch         3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 36  Puttman Ranch         4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 37  Englebert Ranch       1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 37  Englebert Ranch       2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 37  Englebert Ranch       3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 37  Englebert Ranch       4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
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   CONCENTRATION TOTALS       0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 38  Burdock School       1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 38  Burdock School       2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 38  Burdock School       3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 38  Burdock School       4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
   CONCENTRATION TOTALS       0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 39  Heck Ranch           1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 39  Heck Ranch           2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 39  Heck Ranch           3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 39  Heck Ranch           4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
   CONCENTRATION TOTALS       0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
-----------------------------------
 40  Edgemont             1    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 40  Edgemont             2    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 40  Edgemont             3    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 40  Edgemont             4    0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
   CONCENTRATION TOTALS       0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------   -------------
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  29
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

                                        INDIVIDUAL RECEPTOR PARTICULATE CONCENTRATIONS
                                      AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME        PTSZ      U-238        Th-230       Ra-226       Pb-210        U-238
Th-230       Ra-226       Pb-210
 ----------------------------   ------------------------------------------------    -------------
-----------------------------------
 41  Background           1     0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 41  Background           2     0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 41  Background           3     0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 41  Background           4     0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------    -------------
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1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  30
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                             TIME STEP NUMBER 1,                                DURATION IN YRS
IS...  5.0

                                      INDIVIDUAL RECEPTOR RADON AND RADON DAUGHTER CONCENTRATIONS
                                   AIRBORNE CONCENTRATIONS, PCI/M3
GROUND CONCENTRATIONS, PCI/M2
   NO.     Rn-222    Po-218    Pb-214    Bi-214    Pb-210    Bi-210    Po-210       WL     Po-218
Pb-214    Bi-214    Pb-210
   ---    -------------------------------------------------------------------------------- --------
-------------------------------
    1    1.291E+01 1.288E+01 1.043E+01 8.061E+00 2.086E-05 5.920E-08 4.717E-12 9.621E-05
1.020E+01 1.020E+01 1.020E+01 8.844E+00
    2    1.071E+01 1.070E+01 8.949E+00 7.133E+00 2.169E-05 7.509E-08 7.492E-12 8.300E-05
8.477E+00 8.477E+00 8.477E+00 9.198E+00
    3    1.815E+01 1.802E+01 1.216E+01 7.896E+00 2.277E-05 9.245E-08 1.097E-11 1.096E-04
1.427E+01 1.427E+01 1.427E+01 9.656E+00
    4    1.310E+01 1.305E+01 9.394E+00 6.493E+00 2.411E-05 1.269E-07 1.929E-11 8.529E-05
1.034E+01 1.034E+01 1.034E+01 1.022E+01
    5    2.224E+01 2.158E+01 1.126E+01 6.548E+00 2.525E-05 1.444E-07 2.345E-11 1.038E-04
1.709E+01 1.709E+01 1.709E+01 1.071E+01
    6    4.589E+01 4.303E+01 1.808E+01 8.724E+00 3.023E-05 1.799E-07 3.082E-11 1.685E-04
3.408E+01 3.408E+01 3.408E+01 1.282E+01
    7    3.935E+01 3.916E+01 2.752E+01 1.795E+01 5.151E-05 2.514E-07 3.890E-11 2.468E-04
3.102E+01 3.102E+01 3.102E+01 2.184E+01
    8    4.688E+01 4.611E+01 2.836E+01 1.663E+01 4.686E-05 2.550E-07 4.440E-11 2.533E-04
3.652E+01 3.652E+01 3.652E+01 1.987E+01
    9    2.845E+01 2.843E+01 2.330E+01 1.792E+01 6.303E-05 3.075E-07 4.591E-11 2.142E-04
2.252E+01 2.252E+01 2.252E+01 2.673E+01
   10    2.047E+01 2.047E+01 1.802E+01 1.521E+01 6.580E-05 3.278E-07 4.604E-11 1.692E-04
1.621E+01 1.621E+01 1.621E+01 2.790E+01
   11    1.757E+01 1.757E+01 1.604E+01 1.423E+01 6.340E-05 2.895E-07 3.566E-11 1.525E-04
1.392E+01 1.392E+01 1.392E+01 2.688E+01
   12    2.159E+01 2.153E+01 1.823E+01 1.508E+01 4.915E-05 1.672E-07 1.539E-11 1.708E-04
1.705E+01 1.705E+01 1.705E+01 2.084E+01
   13    2.524E+01 2.507E+01 1.989E+01 1.545E+01 4.020E-05 1.113E-07 8.418E-12 1.843E-04
1.986E+01 1.986E+01 1.986E+01 1.704E+01
   14    2.687E+01 2.659E+01 1.973E+01 1.416E+01 2.957E-05 6.842E-08 4.454E-12 1.802E-04
2.106E+01 2.106E+01 2.106E+01 1.254E+01
   15    3.148E+01 3.045E+01 1.732E+01 9.495E+00 1.473E-05 3.442E-08 2.740E-12 1.546E-04
2.412E+01 2.412E+01 2.412E+01 6.245E+00
   16    1.287E+01 1.278E+01 9.745E+00 7.102E+00 1.720E-05 4.946E-08 4.179E-12 8.906E-05
1.012E+01 1.012E+01 1.012E+01 7.294E+00
   17    1.485E+01 1.477E+01 9.790E+00 5.896E+00 1.484E-05 7.464E-08 1.256E-11 8.683E-05
1.169E+01 1.169E+01 1.169E+01 6.293E+00
   18    1.430E+01 1.423E+01 9.421E+00 5.673E+00 1.514E-05 7.499E-08 1.184E-11 8.358E-05
1.127E+01 1.127E+01 1.127E+01 6.417E+00
   19    9.273E+00 9.261E+00 7.438E+00 5.548E+00 1.806E-05 8.117E-08 1.114E-11 6.794E-05
7.335E+00 7.335E+00 7.335E+00 7.656E+00
   20    2.163E+01 2.102E+01 9.170E+00 4.322E+00 1.114E-05 4.812E-08 6.131E-12 8.427E-05
1.665E+01 1.665E+01 1.665E+01 4.722E+00
   21    3.005E+01 2.819E+01 1.242E+01 5.807E+00 1.147E-05 3.964E-08 4.321E-12 1.137E-04
2.233E+01 2.233E+01 2.233E+01 4.864E+00
   22    2.881E+01 2.876E+01 2.349E+01 1.800E+01 4.244E-05 1.083E-07 7.783E-12 2.158E-04
2.278E+01 2.278E+01 2.278E+01 1.799E+01
   23    3.572E+01 3.523E+01 2.448E+01 1.603E+01 2.774E-05 5.779E-08 3.706E-12 2.202E-04
2.791E+01 2.791E+01 2.791E+01 1.176E+01
   24    2.101E+01 2.101E+01 1.820E+01 1.480E+01 4.195E-05 1.294E-07 1.154E-11 1.691E-04
1.664E+01 1.664E+01 1.664E+01 1.779E+01
   25    1.919E+01 1.918E+01 1.453E+01 9.778E+00 2.076E-05 6.840E-08 8.192E-12 1.299E-04
1.519E+01 1.519E+01 1.519E+01 8.803E+00
   26    1.359E+01 1.355E+01 9.853E+00 6.497E+00 1.613E-05 6.890E-08 1.022E-11 8.815E-05
1.074E+01 1.074E+01 1.074E+01 6.839E+00
   27    1.293E+01 1.266E+01 7.922E+00 4.812E+00 1.365E-05 7.071E-08 1.172E-11 7.115E-05
1.003E+01 1.003E+01 1.003E+01 5.789E+00
   28    8.772E+00 8.641E+00 6.092E+00 4.287E+00 1.488E-05 8.475E-08 1.547E-11 5.578E-05
6.844E+00 6.844E+00 6.844E+00 6.311E+00
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   29    7.502E+00 7.441E+00 5.413E+00 3.869E+00 1.426E-05 8.570E-08 1.630E-11 4.954E-05
5.894E+00 5.894E+00 5.894E+00 6.046E+00
   30    9.708E+00 9.575E+00 6.402E+00 4.193E+00 1.373E-05 7.983E-08 1.470E-11 5.796E-05
7.584E+00 7.584E+00 7.584E+00 5.821E+00
   31    1.616E+01 1.584E+01 8.855E+00 4.754E+00 1.261E-05 6.904E-08 1.188E-11 7.894E-05
1.254E+01 1.254E+01 1.254E+01 5.348E+00
   32    4.841E+01 4.624E+01 2.123E+01 9.407E+00 1.299E-05 3.433E-08 3.239E-12 1.904E-04
3.662E+01 3.662E+01 3.662E+01 5.506E+00
   33    2.186E+01 2.141E+01 1.083E+01 6.301E+00 2.446E-05 1.341E-07 2.054E-11 1.005E-04
1.695E+01 1.695E+01 1.695E+01 1.037E+01
   34    2.538E+01 2.506E+01 1.805E+01 1.268E+01 2.556E-05 5.768E-08 3.680E-12 1.646E-04
1.985E+01 1.985E+01 1.985E+01 1.084E+01
   35    9.755E+00 9.569E+00 6.264E+00 4.097E+00 1.347E-05 7.716E-08 1.399E-11 5.690E-05
7.579E+00 7.579E+00 7.579E+00 5.713E+00
   36    7.446E+00 7.446E+00 6.526E+00 5.463E+00 2.320E-05 1.338E-07 2.484E-11 6.113E-05
5.898E+00 5.898E+00 5.898E+00 9.836E+00
   37    2.007E+01 2.008E+01 1.851E+01 1.655E+01 8.809E-05 5.464E-07 9.988E-11 1.762E-04
1.590E+01 1.590E+01 1.590E+01 3.735E+01
   38    1.888E+01 1.887E+01 1.676E+01 1.446E+01 5.834E-05 2.459E-07 2.811E-11 1.584E-04
1.495E+01 1.495E+01 1.495E+01 2.473E+01
   39    1.699E+01 1.700E+01 1.603E+01 1.492E+01 1.029E-04 7.766E-07 1.701E-10 1.545E-04
1.346E+01 1.346E+01 1.346E+01 4.363E+01
   40    4.011E+00 4.014E+00 3.946E+00 3.852E+00 9.855E-05 2.343E-06 1.432E-09 3.851E-05
3.179E+00 3.179E+00 3.179E+00 4.179E+01
   41    1.149E+01 1.149E+01 1.100E+01 1.035E+01 5.828E-05 3.092E-07 4.274E-11 1.062E-04
9.101E+00 9.101E+00 9.101E+00 2.471E+01
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POWERTECH (USA) INC.

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 31
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 1 NAME=CPP N X= 0.0KM, Y= 2.8KM, Z= 0.0M, DIST= 2.8KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.07E+00	1.05E-01	9.44E-02	1.52E-01	1.16E-01	1.62E+01
CHILD	TOTALS	1.06E+00	1.12E-01	9.69E-02	1.22E-01	1.07E-01	1.62E+01
TEENAGE	TOTALS	1.06E+00	1.31E-01	9.86E-02	1.10E-01	1.03E-01	1.62E+01
ADULT	TOTALS	1.07E+00	1.30E-01	1.01E-01	1.10E-01	1.04E-01	1.62E+01

NUMBER 2 NAME=CPP NNE X= 1.1KM, Y= 2.8KM, Z= 0.0M, DIST= 3.0KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	8.89E-01	9.39E-02	8.32E-02	1.43E-01	1.06E-01	1.35E+01
CHILD	TOTALS	8.88E-01	1.02E-01	8.58E-02	1.12E-01	9.58E-02	1.35E+01
TEENAGE	TOTALS	8.89E-01	1.22E-01	8.76E-02	9.89E-02	9.20E-02	1.35E+01
ADULT	TOTALS	8.89E-01	1.20E-01	8.98E-02	9.93E-02	9.29E-02	1.35E+01

```
1REGION: Dewey Burdock                 CODE: MILDOS-AREA (02/97)          PAGE  32
 METSET:                               DATA: DBNOLA.MIL                   02/23/09
                               TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER  3  NAME=CPP NE                  X=   1.2KM, Y=   1.2KM, Z=   0.0M, DIST=   1.6KM, IRTYPE=
1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.46E+00      1.07E-01      9.61E-02      1.59E-01
1.20E-01      2.28E+01
              CHILD         TOTALS        1.46E+00      1.15E-01      9.88E-02      1.27E-01
1.09E-01      2.28E+01
              TEENAGE       TOTALS        1.46E+00      1.36E-01      1.01E-01      1.13E-01
1.05E-01      2.28E+01
              ADULT         TOTALS        1.46E+00      1.35E-01      1.03E-01      1.13E-01
1.06E-01      2.28E+01

 NUMBER  4  NAME=CPP ENE                 X=   2.6KM, Y=   1.0KM, Z=   0.0M, DIST=   2.8KM, IRTYPE=
1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.06E+00	9.00E-02	7.82E-02	1.44E-01	1.03E-01	1.64E+01
CHILD	TOTALS	1.06E+00	9.87E-02	8.11E-02	1.10E-01	9.22E-02	1.64E+01
TEENAGE	TOTALS	1.06E+00	1.21E-01	8.30E-02	9.56E-02	8.79E-02	1.64E+01
ADULT	TOTALS	1.06E+00	1.19E-01	8.55E-02	9.60E-02	8.89E-02	1.64E+01

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  33
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER  5  NAME=CPP E                  X=   2.6KM, Y=   0.0KM, Z=   0.0M, DIST=   2.6KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ---------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ---------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.75E+00      9.49E-02      8.26E-02      1.52E-01
1.09E-01      2.79E+01
              CHILD         TOTALS        1.75E+00      1.04E-01      8.56E-02      1.16E-01
9.73E-02      2.79E+01
              TEENAGE       TOTALS        1.75E+00      1.27E-01      8.77E-02      1.01E-01
9.27E-02      2.79E+01
              ADULT         TOTALS        1.75E+00      1.26E-01      9.02E-02      1.01E-01
9.38E-02      2.79E+01

 NUMBER  6  NAME=CPP ESE                X=   2.5KM, Y=  -1.0KM, Z=   0.0M, DIST=   2.7KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ---------------------------------------------------------------------------------
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               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
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POWERTECH (USA) INC.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.56E+00	1.31E-01	1.16E-01	1.99E-01	1.48E-01	5.75E+01
CHILD	TOTALS	3.56E+00	1.42E-01	1.20E-01	1.57E-01	1.34E-01	5.75E+01
TEENAGE	TOTALS	3.56E+00	1.70E-01	1.22E-01	1.38E-01	1.28E-01	5.75E+01
ADULT	TOTALS	3.56E+00	1.68E-01	1.25E-01	1.38E-01	1.30E-01	5.75E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 34
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 7 NAME=CPP SSE X= 0.9KM, Y= -2.3KM, Z= 0.0M, DIST= 2.4KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.18E+00	2.43E-01	2.18E-01	3.60E-01	2.71E-01	4.94E+01
CHILD	TOTALS	3.17E+00	2.62E-01	2.24E-01	2.87E-01	2.48E-01	4.94E+01
TEENAGE	TOTALS	3.17E+00	3.09E-01	2.28E-01	2.55E-01	2.39E-01	4.94E+01
ADULT	TOTALS	3.18E+00	3.06E-01	2.34E-01	2.56E-01	2.41E-01	4.94E+01

NUMBER 8 NAME=CPP SE X= 2.1KM, Y= -2.1KM, Z= 0.0M, DIST= 3.0KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.73E+00	2.30E-01	2.07E-01	3.36E-01	2.56E-01	5.88E+01
CHILD	TOTALS	3.73E+00	2.47E-01	2.13E-01	2.70E-01	2.34E-01	5.88E+01
TEENAGE	TOTALS	3.73E+00	2.90E-01	2.17E-01	2.41E-01	2.26E-01	5.88E+01
ADULT	TOTALS	3.73E+00	2.87E-01	2.21E-01	2.42E-01	2.28E-01	5.88E+01

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1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  35
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER  9  NAME=CPP S                  X=   0.0KM, Y=  -2.9KM, Z=   0.0M, DIST=   2.9KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             -----------------------------------------------------------------------------------
----------------------

               AGE         PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             -----------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             -----------------------------------------------------------------------------------
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               AGE         PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             -----------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        2.35E+00      2.42E-01      2.11E-01      3.84E-01
2.76E-01      3.58E+01
              CHILD        TOTALS        2.35E+00      2.64E-01      2.18E-01      2.95E-01
2.47E-01      3.58E+01
              TEENAGE      TOTALS        2.35E+00      3.22E-01      2.24E-01      2.57E-01
2.36E-01      3.58E+01
              ADULT        TOTALS        2.35E+00      3.18E-01      2.30E-01      2.57E-01
2.39E-01      3.58E+01

 NUMBER 10  NAME=CPP SSW                X=  -1.1KM, Y=  -2.8KM, Z=   0.0M, DIST=   3.0KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             -----------------------------------------------------------------------------------
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               AGE         PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             -----------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
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Powertech (USA) Inc.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.72E+00	2.09E-01	1.77E-01	3.58E-01	2.45E-01	2.58E+01
CHILD	TOTALS	1.72E+00	2.33E-01	1.85E-01	2.65E-01	2.15E-01	2.58E+01
TEENAGE	TOTALS	1.72E+00	2.93E-01	1.90E-01	2.24E-01	2.03E-01	2.58E+01
ADULT	TOTALS	1.72E+00	2.89E-01	1.97E-01	2.25E-01	2.06E-01	2.58E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 36
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 11 NAME=CPP SW X= -2.4KM, Y= -2.4KM, Z= 0.0M, DIST= 3.4KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.49E+00	1.95E-01	1.64E-01	3.38E-01	2.30E-01	2.21E+01
CHILD	TOTALS	1.49E+00	2.18E-01	1.72E-01	2.49E-01	2.01E-01	2.21E+01
TEENAGE	TOTALS	1.49E+00	2.76E-01	1.77E-01	2.10E-01	1.89E-01	2.21E+01
ADULT	TOTALS	1.49E+00	2.72E-01	1.83E-01	2.11E-01	1.92E-01	2.21E+01

NUMBER 12 NAME=CPP WSW X= -2.4KM, Y= -0.9KM, Z= 0.0M, DIST= 2.5KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.80E+00	1.99E-01	1.75E-01	3.10E-01	2.26E-01	2.72E+01
CHILD	TOTALS	1.80E+00	2.17E-01	1.81E-01	2.41E-01	2.04E-01	2.72E+01
TEENAGE	TOTALS	1.80E+00	2.62E-01	1.85E-01	2.11E-01	1.95E-01	2.72E+01
ADULT	TOTALS	1.80E+00	2.59E-01	1.90E-01	2.11E-01	1.97E-01	2.72E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 37
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 13 NAME=CPP W X= -2.3KM, Y= 0.0KM, Z= 0.0M, DIST= 2.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.08E+00	2.01E-01	1.81E-01	2.91E-01	2.23E-01	3.17E+01
CHILD	TOTALS	2.08E+00	2.15E-01	1.86E-01	2.35E-01	2.04E-01	3.17E+01
TEENAGE	TOTALS	2.08E+00	2.52E-01	1.89E-01	2.10E-01	1.97E-01	3.17E+01
ADULT	TOTALS	2.08E+00	2.49E-01	1.93E-01	2.11E-01	1.99E-01	3.17E+01

NUMBER 14 NAME=CPP WNW X= -2.3KM, Y= 0.9KM, Z= 0.0M, DIST= 2.4KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.19E+00	1.82E-01	1.68E-01	2.49E-01	1.99E-01	3.37E+01
CHILD	TOTALS	2.19E+00	1.93E-01	1.72E-01	2.08E-01	1.85E-01	3.37E+01
TEENAGE	TOTALS	2.19E+00	2.20E-01	1.74E-01	1.89E-01	1.80E-01	3.37E+01
ADULT	TOTALS	2.19E+00	2.18E-01	1.77E-01	1.90E-01	1.81E-01	3.37E+01

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1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  38
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 15  NAME=CPP NW                 X=  -2.5KM, Y=   2.5KM, Z=   0.0M, DIST=   3.6KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
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                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
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                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        2.48E+00      1.27E-01      1.20E-01      1.60E-01
1.35E-01      3.95E+01
              CHILD         TOTALS        2.48E+00      1.32E-01      1.22E-01      1.40E-01
1.28E-01      3.95E+01
              TEENAGE       TOTALS        2.48E+00      1.46E-01      1.23E-01      1.31E-01
1.26E-01      3.95E+01
              ADULT         TOTALS        2.48E+00      1.45E-01      1.24E-01      1.31E-01
1.26E-01      3.95E+01

 NUMBER 16  NAME=CPP NNW                X=  -1.4KM, Y=   3.7KM, Z=   0.0M, DIST=   4.0KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.05E+00	9.25E-02	8.41E-02	1.31E-01	1.02E-01	1.62E+01
CHILD	TOTALS	1.05E+00	9.87E-02	8.62E-02	1.07E-01	9.41E-02	1.62E+01
TEENAGE	TOTALS	1.05E+00	1.15E-01	8.76E-02	9.66E-02	9.10E-02	1.62E+01
ADULT	TOTALS	1.05E+00	1.13E-01	8.93E-02	9.68E-02	9.17E-02	1.62E+01

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  39
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 17  NAME=SF N                   X=  -4.9KM, Y=   5.3KM, Z=   0.0M, DIST=   7.2KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ------------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.19E+00      8.01E-02      7.28E-02      1.14E-01
8.82E-02      1.86E+01
              CHILD         TOTALS        1.19E+00      8.54E-02      7.46E-02      9.27E-02
8.14E-02      1.86E+01
              TEENAGE       TOTALS        1.19E+00      9.90E-02      7.58E-02      8.35E-02
7.88E-02      1.86E+01
              ADULT         TOTALS        1.19E+00      9.80E-02      7.73E-02      8.38E-02
7.94E-02      1.86E+01

 NUMBER 18  NAME=SF NNE                 X=  -4.2KM, Y=   5.3KM, Z=   0.0M, DIST=   6.7KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
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AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.14E+00	7.75E-02	7.01E-02	1.12E-01	8.58E-02	1.79E+01
CHILD	TOTALS	1.14E+00	8.30E-02	7.19E-02	9.04E-02	7.89E-02	1.79E+01
TEENAGE	TOTALS	1.14E+00	9.68E-02	7.31E-02	8.11E-02	7.62E-02	1.79E+01
ADULT	TOTALS	1.14E+00	9.58E-02	7.47E-02	8.13E-02	7.68E-02	1.79E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 40
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 19 NAME=SF NE X= -2.7KM, Y= 5.6KM, Z= 0.0M, DIST= 6.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	7.63E-01	7.44E-02	6.56E-02	1.15E-01	8.43E-02	1.17E+01
CHILD	TOTALS	7.62E-01	8.09E-02	6.78E-02	8.98E-02	7.61E-02	1.17E+01
TEENAGE	TOTALS	7.63E-01	9.75E-02	6.92E-02	7.87E-02	7.29E-02	1.17E+01
ADULT	TOTALS	7.63E-01	9.63E-02	7.11E-02	7.89E-02	7.36E-02	1.17E+01

NUMBER 20 NAME=SF ENE X= -3.3KM, Y= 4.0KM, Z= 0.0M, DIST= 5.2KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.68E+00	6.30E-02	5.76E-02	8.82E-02	6.92E-02	2.71E+01
CHILD	TOTALS	1.68E+00	6.71E-02	5.89E-02	7.25E-02	6.41E-02	2.71E+01
TEENAGE	TOTALS	1.68E+00	7.73E-02	5.98E-02	6.57E-02	6.21E-02	2.71E+01
ADULT	TOTALS	1.68E+00	7.66E-02	6.10E-02	6.58E-02	6.25E-02	2.71E+01

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1REGION: Dewey Burdock                 CODE: MILDOS-AREA (02/97)           PAGE  41
 METSET:                               DATA: DBNOLA.MIL                    02/23/09
                               TIME STEP NUMBER 1,                                DURATION IN YRS
IS...  5.0

 NUMBER 21  NAME=SF E                    X=  -3.0KM, Y=   3.4KM, Z=   0.0M, DIST=   4.5KM, IRTYPE=
1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

              AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ------------------------------------------------------------------------------------
----------------------

              AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        2.33E+00      8.29E-02      7.73E-02      1.09E-01
8.92E-02      3.76E+01
              CHILD        TOTALS        2.33E+00      8.71E-02      7.87E-02      9.27E-02
8.40E-02      3.76E+01
              TEENAGE      TOTALS        2.33E+00      9.76E-02      7.96E-02      8.56E-02
8.19E-02      3.76E+01
              ADULT        TOTALS        2.33E+00      9.69E-02      8.08E-02      8.58E-02
8.24E-02      3.76E+01

 NUMBER 22  NAME=SF SSE                  X=  -3.5KM, Y=   0.2KM, Z=   0.0M, DIST=   3.6KM, IRTYPE=
1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

              AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

POWERTECH (USA) INC.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.38E+00	2.32E-01	2.11E-01	3.28E-01	2.55E-01	3.62E+01
CHILD	TOTALS	2.37E+00	2.47E-01	2.16E-01	2.68E-01	2.36E-01	3.62E+01
TEENAGE	TOTALS	2.38E+00	2.86E-01	2.19E-01	2.42E-01	2.28E-01	3.62E+01
ADULT	TOTALS	2.38E+00	2.83E-01	2.24E-01	2.42E-01	2.30E-01	3.62E+01

```
1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  42
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                                 DURATION IN YRS
IS...  5.0

 NUMBER 23  NAME=SF SE                X=  -2.8KM, Y=   1.3KM, Z=   0.0M, DIST=   3.1KM, IRTYPE=
1
```

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.88E+00	2.07E-01	1.94E-01	2.70E-01	2.22E-01	4.48E+01
CHILD	TOTALS	2.88E+00	2.17E-01	1.97E-01	2.31E-01	2.10E-01	4.48E+01
TEENAGE	TOTALS	2.88E+00	2.43E-01	1.99E-01	2.14E-01	2.05E-01	4.48E+01
ADULT	TOTALS	2.88E+00	2.41E-01	2.02E-01	2.14E-01	2.06E-01	4.48E+01

```
 NUMBER 24  NAME=SF S                 X=  -4.9KM, Y=  -0.3KM, Z=   0.0M, DIST=   4.9KM, IRTYPE=
1
```

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.75E+00	1.92E-01	1.72E-01	2.87E-01	2.15E-01	2.64E+01
CHILD	TOTALS	1.75E+00	2.08E-01	1.77E-01	2.28E-01	1.96E-01	2.64E+01
TEENAGE	TOTALS	1.75E+00	2.46E-01	1.80E-01	2.02E-01	1.89E-01	2.64E+01
ADULT	TOTALS	1.75E+00	2.43E-01	1.85E-01	2.03E-01	1.91E-01	2.64E+01

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  43
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                                 DURATION IN YRS
IS...  5.0

 NUMBER 25  NAME=SF SSW                 X=  -5.7KM, Y=   1.4KM, Z=   0.0M, DIST=   5.9KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ------------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.56E+00      1.28E-01      1.17E-01      1.75E-01
1.39E-01      2.41E+01
              CHILD         TOTALS        1.56E+00      1.35E-01      1.20E-01      1.45E-01
1.29E-01      2.41E+01
              TEENAGE       TOTALS        1.56E+00      1.54E-01      1.22E-01      1.32E-01
1.26E-01      2.41E+01
              ADULT         TOTALS        1.56E+00      1.53E-01      1.24E-01      1.33E-01
1.27E-01      2.41E+01

 NUMBER 26  NAME=SF SW                  X=  -6.3KM, Y=   2.1KM, Z=   0.0M, DIST=   6.6KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.10E+00	8.64E-02	7.85E-02	1.23E-01	9.53E-02	1.71E+01
CHILD	TOTALS	1.10E+00	9.22E-02	8.05E-02	1.00E-01	8.79E-02	1.71E+01
TEENAGE	TOTALS	1.10E+00	1.07E-01	8.18E-02	9.02E-02	8.50E-02	1.71E+01
ADULT	TOTALS	1.10E+00	1.06E-01	8.34E-02	9.04E-02	8.57E-02	1.71E+01

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  44
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 27  NAME=SF WSW                 X=  -6.2KM, Y=   2.9KM, Z=   0.0M, DIST=   6.9KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.03E+00      6.62E-02      5.95E-02      9.70E-02
7.37E-02      1.62E+01
              CHILD         TOTALS        1.03E+00      7.11E-02      6.11E-02      7.78E-02
6.74E-02      1.62E+01
              TEENAGE       TOTALS        1.03E+00      8.36E-02      6.22E-02      6.94E-02
6.50E-02      1.62E+01
              ADULT         TOTALS        1.03E+00      8.27E-02      6.36E-02      6.96E-02
6.55E-02      1.62E+01

 NUMBER 28  NAME=SF W                   X=  -7.0KM, Y=   3.4KM, Z=   0.0M, DIST=   7.8KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	7.11E-01	5.87E-02	5.14E-02	9.24E-02	6.69E-02	1.10E+01
CHILD	TOTALS	7.11E-01	6.41E-02	5.32E-02	7.14E-02	6.01E-02	1.10E+01
TEENAGE	TOTALS	7.11E-01	7.77E-02	5.44E-02	6.22E-02	5.74E-02	1.10E+01
ADULT	TOTALS	7.11E-01	7.68E-02	5.59E-02	6.24E-02	5.80E-02	1.10E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 45
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 29 NAME=SF WNW X= -7.0KM, Y= 4.2KM, Z= 0.0M, DIST= 8.2KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	6.11E-01	5.33E-02	4.63E-02	8.55E-02	6.11E-02	9.42E+00
CHILD	TOTALS	6.10E-01	5.84E-02	4.80E-02	6.54E-02	5.46E-02	9.42E+00
TEENAGE	TOTALS	6.11E-01	7.15E-02	4.92E-02	5.66E-02	5.20E-02	9.42E+00
ADULT	TOTALS	6.11E-01	7.05E-02	5.06E-02	5.68E-02	5.26E-02	9.42E+00

NUMBER 30 NAME=SF NW X= -6.2KM, Y= 4.7KM, Z= 0.0M, DIST= 7.8KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	7.81E-01	5.77E-02	5.10E-02	8.88E-02	6.53E-02	1.22E+01
CHILD	TOTALS	7.80E-01	6.27E-02	5.27E-02	6.94E-02	5.90E-02	1.22E+01
TEENAGE	TOTALS	7.81E-01	7.53E-02	5.38E-02	6.10E-02	5.65E-02	1.22E+01
ADULT	TOTALS	7.81E-01	7.44E-02	5.52E-02	6.12E-02	5.71E-02	1.22E+01

POWERTECH (USA) INC.

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  46
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 31  NAME=SF NNW                 X=  -5.4KM, Y=   4.7KM, Z=   0.0M, DIST=   7.1KM, IRTYPE=
1

                                40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                             TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.27E+00      6.68E-02      6.06E-02      9.53E-02
7.37E-02      2.03E+01
              CHILD         TOTALS        1.27E+00      7.13E-02      6.21E-02      7.75E-02
6.80E-02      2.03E+01
              TEENAGE       TOTALS        1.27E+00      8.29E-02      6.32E-02      6.98E-02
6.57E-02      2.03E+01
              ADULT         TOTALS        1.27E+00      8.21E-02      6.44E-02      6.99E-02
6.62E-02      2.03E+01

 NUMBER 32  NAME=SF ESE                 X=  -3.0KM, Y=   2.7KM, Z=   0.0M, DIST=   4.0KM, IRTYPE=
1

                                40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                             TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

POWERTECH (USA) INC.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.76E+00	1.33E-01	1.27E-01	1.62E-01	1.40E-01	6.06E+01
CHILD	TOTALS	3.76E+00	1.38E-01	1.28E-01	1.44E-01	1.34E-01	6.06E+01
TEENAGE	TOTALS	3.76E+00	1.50E-01	1.29E-01	1.36E-01	1.32E-01	6.06E+01
ADULT	TOTALS	3.76E+00	1.49E-01	1.31E-01	1.36E-01	1.32E-01	6.06E+01

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  47
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 33  NAME=Daniels Ranch         X=   2.1KM, Y=   0.0KM, Z=   0.0M, DIST=   2.1KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ---------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ---------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.72E+00      9.15E-02      7.96E-02      1.47E-01
1.05E-01      2.74E+01
              CHILD         TOTALS        1.72E+00      1.00E-01      8.25E-02      1.12E-01
9.38E-02      2.74E+01
              TEENAGE       TOTALS        1.72E+00      1.23E-01      8.45E-02      9.73E-02
8.94E-02      2.74E+01
              ADULT         TOTALS        1.72E+00      1.21E-01      8.70E-02      9.76E-02
9.04E-02      2.74E+01

 NUMBER 34  NAME=Spencer Ranch         X=  -2.0KM, Y=   1.2KM, Z=   0.0M, DIST=   2.3KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ---------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ---------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

POWERTECH (USA) INC.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.06E+00	1.64E-01	1.51E-01	2.21E-01	1.78E-01	3.19E+01
CHILD	TOTALS	2.06E+00	1.73E-01	1.54E-01	1.85E-01	1.66E-01	3.19E+01
TEENAGE	TOTALS	2.06E+00	1.96E-01	1.56E-01	1.70E-01	1.61E-01	3.19E+01
ADULT	TOTALS	2.06E+00	1.95E-01	1.59E-01	1.70E-01	1.62E-01	3.19E+01

```
1REGION: Dewey Burdock             CODE: MILDOS-AREA (02/97)          PAGE  48
 METSET:                           DATA: DBNOLA.MIL                   02/23/09
                           TIME STEP NUMBER 1,                                 DURATION IN YRS
IS...  5.0

 NUMBER 35  NAME=BC Ranch              X=  -6.6KM, Y=   3.8KM, Z=   0.0M, DIST=   7.7KM, IRTYPE=
1

                              40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00



                           TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        7.83E-01      5.65E-02      4.99E-02      8.70E-02
6.39E-02      1.22E+01
              CHILD         TOTALS        7.83E-01      6.14E-02      5.15E-02      6.80E-02
5.77E-02      1.22E+01
              TEENAGE       TOTALS        7.83E-01      7.37E-02      5.26E-02      5.97E-02
5.53E-02      1.22E+01
              ADULT         TOTALS        7.83E-01      7.28E-02      5.40E-02      5.99E-02
5.59E-02      1.22E+01

 NUMBER 36  NAME=Puttman Ranch         X=  -5.2KM, Y=   7.2KM, Z=   0.0M, DIST=   8.9KM, IRTYPE=
1

                              40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

                AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00



                           TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

Powertech (USA) Inc.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	6.25E-01	7.49E-02	6.35E-02	1.27E-01	8.76E-02	9.37E+00
CHILD	TOTALS	6.24E-01	8.32E-02	6.63E-02	9.46E-02	7.70E-02	9.37E+00
TEENAGE	TOTALS	6.25E-01	1.05E-01	6.82E-02	8.03E-02	7.29E-02	9.37E+00
ADULT	TOTALS	6.25E-01	1.03E-01	7.06E-02	8.07E-02	7.38E-02	9.37E+00

```
1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  49
 METSET:                              DATA: DBNOLA.MIL                   02/23/09
                              TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 37  NAME=Englebert Ranch       X=   0.3KM, Y=  -4.8KM, Z=   0.0M, DIST=   4.8KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00



                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        1.71E+00      2.34E-01      1.91E-01      4.33E-01
2.83E-01      2.53E+01
              CHILD         TOTALS        1.70E+00      2.66E-01      2.02E-01      3.09E-01
2.42E-01      2.53E+01
              TEENAGE       TOTALS        1.71E+00      3.47E-01      2.09E-01      2.55E-01
2.27E-01      2.53E+01
              ADULT         TOTALS        1.71E+00      3.41E-01      2.18E-01      2.56E-01
2.30E-01      2.53E+01

 NUMBER 38  NAME=Burdock School        X=  -2.3KM, Y=  -2.0KM, Z=   0.0M, DIST=   3.0KM, IRTYPE=
1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ----------------------------------------------------------------------------------
----------------------

               AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ----------------------------------------------------------------------------------
----------------------
              INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00



                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
```

POWERTECH (USA) INC.

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.59E+00	1.96E-01	1.67E-01	3.28E-01	2.28E-01	2.38E+01
CHILD	TOTALS	1.59E+00	2.17E-01	1.74E-01	2.45E-01	2.01E-01	2.38E+01
TEENAGE	TOTALS	1.59E+00	2.70E-01	1.79E-01	2.09E-01	1.91E-01	2.38E+01
ADULT	TOTALS	1.59E+00	2.66E-01	1.85E-01	2.10E-01	1.93E-01	2.38E+01

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 50
METSET: DATA: DBNOLA.MIL 02/23/09
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 39 NAME=Heck Ranch X= 1.7KM, Y= -6.4KM, Z= 0.0M, DIST= 6.6KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.46E+00	2.23E-01	1.73E-01	4.56E-01	2.79E-01	2.14E+01
CHILD	TOTALS	1.46E+00	2.60E-01	1.85E-01	3.10E-01	2.32E-01	2.14E+01
TEENAGE	TOTALS	1.46E+00	3.54E-01	1.93E-01	2.47E-01	2.14E-01	2.14E+01
ADULT	TOTALS	1.46E+00	3.48E-01	2.04E-01	2.49E-01	2.18E-01	2.14E+01

NUMBER 40 NAME=Edgemont X= 11.0KM, Y= -18.6KM, Z= 0.0M, DIST= 21.6KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.61E-01	9.61E-02	4.82E-02	3.19E-01	1.50E-01	5.06E+00
CHILD	TOTALS	3.57E-01	1.32E-01	5.98E-02	1.80E-01	1.05E-01	5.06E+00
TEENAGE	TOTALS	3.59E-01	2.22E-01	6.77E-02	1.19E-01	8.75E-02	5.06E+00
ADULT	TOTALS	3.61E-01	2.16E-01	7.78E-02	1.21E-01	9.16E-02	5.06E+00

```
1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  51
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
                            TIME STEP NUMBER 1,                               DURATION IN YRS
IS...  5.0

 NUMBER 41  NAME=Background           X=  -5.3KM, Y=  -3.0KM, Z=   0.0M, DIST=   6.0KM, IRTYPE=
1

                              40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION,
MREM/YR
             ------------------------------------------------------------------------------------
----------------------

              AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00      0.00E+00      0.00E+00
0.00E+00      0.00E+00


                           TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS LOCATION, MREM/YR
             ------------------------------------------------------------------------------------
----------------------

              AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG      LIVER
KIDNEY        BRONCHI
             ------------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        9.87E-01      1.47E-01      1.19E-01      2.79E-01
1.79E-01      1.45E+01
              CHILD        TOTALS        9.85E-01      1.68E-01      1.26E-01      1.97E-01
1.53E-01      1.45E+01
              TEENAGE      TOTALS        9.86E-01      2.22E-01      1.31E-01      1.61E-01
1.42E-01      1.45E+01
              ADULT        TOTALS        9.87E-01      2.18E-01      1.36E-01      1.62E-01
1.45E-01      1.45E+01
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1REGION: Dewey Burdock             CODE: MILDOS-AREA (02/97)         PAGE  52
 METSET:                           DATA: DBNOLA.MIL                  02/23/09
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TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE N DIRECTION, THETA EQUALS 0.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.015E+01	2.002E+01	1.361E+01	9.042E+00	2.174E-05	1.234E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.436E+01	1.432E+01	1.125E+01	8.437E+00	2.093E-05	1.032E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.149E+01	1.147E+01	9.714E+00	7.884E+00	2.270E-05	9.047E-05
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.391E+00	8.387E+00	7.481E+00	6.425E+00	2.245E-05	7.053E-05
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.867E+00	4.868E+00	4.674E+00	4.410E+00	2.687E-05	4.516E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.233E+00	2.234E+00	2.228E+00	2.211E+00	3.423E-05	2.185E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.265E+00	1.265E+00	1.269E+00	1.270E+00	3.703E-05	1.248E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.450E-01	8.455E-01	8.493E-01	8.516E-01	3.721E-05	8.353E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.188E-01	6.192E-01	6.222E-01	6.243E-01	3.672E-05	6.121E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.798E-01	4.801E-01	4.824E-01	4.841E-01	3.603E-05	4.746E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.865E-01	3.867E-01	3.886E-01	3.900E-01	3.530E-05	3.824E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.200E-01	3.202E-01	3.218E-01	3.229E-01	3.456E-05	3.166E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.586E+01	1.586E+01	1.586E+01	4.528E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.134E+01	1.134E+01	1.134E+01	4.361E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.082E+00	9.082E+00	9.082E+00	4.729E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.643E+00	6.643E+00	6.643E+00	4.675E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.856E+00	3.856E+00	3.856E+00	5.597E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.770E+00	1.770E+00	1.770E+00	7.130E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.002E+00	1.002E+00	1.002E+00	7.714E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.696E-01	6.696E-01	6.696E-01	7.752E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.904E-01	4.904E-01	4.904E-01	7.648E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.802E-01	3.802E-01	3.802E-01	7.505E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.063E-01	3.063E-01	3.063E-01	7.352E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.536E-01	2.536E-01	2.536E-01	7.199E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	6.521E-08
2.5	0.000E+00	0.000E+00	0.000E+00	6.280E-08
3.5	0.000E+00	0.000E+00	0.000E+00	6.811E-08
4.5	0.000E+00	0.000E+00	0.000E+00	6.734E-08
7.5	0.000E+00	0.000E+00	0.000E+00	8.061E-08
15.0	0.000E+00	0.000E+00	0.000E+00	1.027E-07
25.0	0.000E+00	0.000E+00	0.000E+00	1.111E-07
35.0	0.000E+00	0.000E+00	0.000E+00	1.116E-07
45.0	0.000E+00	0.000E+00	0.000E+00	1.101E-07
55.0	0.000E+00	0.000E+00	0.000E+00	1.081E-07
65.0	0.000E+00	0.000E+00	0.000E+00	1.059E-07
75.0	0.000E+00	0.000E+00	0.000E+00	1.037E-07

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 53
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE E DIRECTION, THETA EQUALS 90.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.813E+01	2.707E+01	1.255E+01	6.714E+00	2.404E-05	1.166E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.110E+01	2.069E+01	1.098E+01	6.450E+00	2.509E-05	1.010E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.374E+01	1.359E+01	9.573E+00	6.680E+00	2.817E-05	8.744E-05
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.006E+01	1.002E+01	8.097E+00	6.398E+00	3.107E-05	7.523E-05
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.991E+00	4.991E+00	4.610E+00	4.237E+00	3.401E-05	4.432E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.277E+00	2.279E+00	2.222E+00	2.149E+00	3.731E-05	2.163E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.261E+00	1.262E+00	1.254E+00	1.237E+00	3.694E-05	1.227E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.466E-01	8.471E-01	8.469E-01	8.430E-01	3.602E-05	8.311E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.242E-01	6.245E-01	6.260E-01	6.254E-01	3.504E-05	6.150E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.870E-01	4.872E-01	4.889E-01	4.894E-01	3.412E-05	4.806E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.945E-01	3.947E-01	3.964E-01	3.972E-01	3.327E-05	3.898E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.284E-01	3.286E-01	3.300E-01	3.309E-01	3.248E-05	3.246E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.144E+01	2.144E+01	2.144E+01	5.007E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.639E+01	1.639E+01	1.639E+01	5.225E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.076E+01	1.076E+01	1.076E+01	5.868E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.933E+00	7.933E+00	7.933E+00	6.472E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.953E+00	3.953E+00	3.953E+00	7.085E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.805E+00	1.805E+00	1.805E+00	7.771E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.993E-01	9.993E-01	9.993E-01	7.695E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.709E-01	6.709E-01	6.709E-01	7.503E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.947E-01	4.947E-01	4.947E-01	7.300E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.859E-01	3.859E-01	3.859E-01	7.108E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.127E-01	3.127E-01	3.127E-01	6.930E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.602E-01	2.602E-01	2.602E-01	6.765E+01

POWERTECH (USA) INC.

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	7.211E-08
2.5	0.000E+00	0.000E+00	0.000E+00	7.526E-08
3.5	0.000E+00	0.000E+00	0.000E+00	8.452E-08
4.5	0.000E+00	0.000E+00	0.000E+00	9.321E-08
7.5	0.000E+00	0.000E+00	0.000E+00	1.020E-07
15.0	0.000E+00	0.000E+00	0.000E+00	1.119E-07
25.0	0.000E+00	0.000E+00	0.000E+00	1.108E-07
35.0	0.000E+00	0.000E+00	0.000E+00	1.081E-07
45.0	0.000E+00	0.000E+00	0.000E+00	1.051E-07
55.0	0.000E+00	0.000E+00	0.000E+00	1.024E-07
65.0	0.000E+00	0.000E+00	0.000E+00	9.980E-08
75.0	0.000E+00	0.000E+00	0.000E+00	9.743E-08

POWERTECH (USA) INC.

1REGION: Dewey Burdock   CODE: MILDOS-AREA (02/97)   PAGE 54
METSET: DATA: DBNOLA.MIL   02/23/09

TIME STEP NUMBER 2,   DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE S DIRECTION, THETA EQUALS 180.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.331E+01	4.292E+01	2.648E+01	1.553E+01	4.259E-05	2.364E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.186E+01	3.182E+01	2.485E+01	1.808E+01	5.789E-05	2.262E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.482E+01	2.482E+01	2.152E+01	1.772E+01	7.203E-05	2.008E-04
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.114E+01	2.115E+01	1.937E+01	1.715E+01	8.683E-05	1.840E-04
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.305E+01	1.306E+01	1.272E+01	1.225E+01	1.084E-04	1.236E-04
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.389E+00	6.393E+00	6.370E+00	6.311E+00	1.198E-04	6.242E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E+00	3.550E+00	3.559E+00	3.558E+00	1.175E-04	3.497E-05
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.350E+00	2.352E+00	2.361E+00	2.367E+00	1.128E-04	2.322E-05
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.708E+00	1.709E+00	1.717E+00	1.722E+00	1.082E-04	1.689E-05
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.314E+00	1.315E+00	1.321E+00	1.326E+00	1.040E-04	1.300E-05
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.051E+00	1.052E+00	1.057E+00	1.060E+00	1.003E-04	1.040E-05
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.641E-01	8.646E-01	8.688E-01	8.719E-01	9.691E-05	8.548E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.400E+01	3.400E+01	3.400E+01	8.872E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.520E+01	2.520E+01	2.520E+01	1.206E+02
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.966E+01	1.966E+01	1.966E+01	1.500E+02
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.675E+01	1.675E+01	1.675E+01	1.809E+02
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.034E+01	1.034E+01	1.034E+01	2.257E+02
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.063E+00	5.063E+00	5.063E+00	2.495E+02
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.812E+00	2.812E+00	2.812E+00	2.448E+02
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.863E+00	1.863E+00	1.863E+00	2.350E+02
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.354E+00	1.354E+00	1.354E+00	2.254E+02
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.042E+00	1.042E+00	1.042E+00	2.167E+02
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.329E-01	8.329E-01	8.329E-01	2.089E+02
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.848E-01	6.848E-01	6.848E-01	2.019E+02

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	1.278E-07
2.5	0.000E+00	0.000E+00	0.000E+00	1.737E-07
3.5	0.000E+00	0.000E+00	0.000E+00	2.161E-07
4.5	0.000E+00	0.000E+00	0.000E+00	2.605E-07
7.5	0.000E+00	0.000E+00	0.000E+00	3.251E-07
15.0	0.000E+00	0.000E+00	0.000E+00	3.593E-07
25.0	0.000E+00	0.000E+00	0.000E+00	3.526E-07
35.0	0.000E+00	0.000E+00	0.000E+00	3.385E-07
45.0	0.000E+00	0.000E+00	0.000E+00	3.246E-07
55.0	0.000E+00	0.000E+00	0.000E+00	3.121E-07
65.0	0.000E+00	0.000E+00	0.000E+00	3.009E-07
75.0	0.000E+00	0.000E+00	0.000E+00	2.907E-07

POWERTECH (USA) INC.

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

CONCENTRATION DATA FOR THE W DIRECTION, THETA EQUALS 270.0 DEGREES

TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210	WL
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.161E+01	2.118E+01	1.524E+01	1.140E+01	3.217E-05	1.416E-04
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.592E+01	2.577E+01	2.064E+01	1.607E+01	4.130E-05	1.911E-04
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.753E+01	2.749E+01	2.274E+01	1.774E+01	4.408E-05	2.098E-04
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+01	2.419E+01	2.026E+01	1.583E+01	3.989E-05	1.867E-04
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.064E+00	8.066E+00	7.423E+00	6.549E+00	2.777E-05	7.037E-05
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.813E+00	1.814E+00	1.740E+00	1.662E+00	2.181E-05	1.689E-05
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.889E-01	8.894E-01	8.748E-01	8.517E-01	2.081E-05	8.528E-06
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.623E-01	5.626E-01	5.598E-01	5.526E-01	1.963E-05	5.479E-06
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.013E-01	4.016E-01	4.016E-01	3.994E-01	1.866E-05	3.939E-06
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.069E-01	3.071E-01	3.079E-01	3.075E-01	1.785E-05	3.024E-06
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.455E-01	2.456E-01	2.465E-01	2.467E-01	1.717E-05	2.423E-06
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.025E-01	2.027E-01	2.035E-01	2.039E-01	1.657E-05	2.001E-06

GROUND SURFACE CONCENTRATIONS, PCI/M2

XRHO, KM	U-238	Th-230	Ra-226	Pb-210	Rn-222	Po-218	Pb-214	Bi-214	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.678E+01	1.678E+01	1.678E+01	6.700E+01
2.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.041E+01	2.041E+01	2.041E+01	8.603E+01
3.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.177E+01	2.177E+01	2.177E+01	9.182E+01
4.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.916E+01	1.916E+01	1.916E+01	8.308E+01
7.5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.389E+00	6.389E+00	6.389E+00	5.785E+01
15.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.437E+00	1.437E+00	1.437E+00	4.544E+01
25.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.045E-01	7.045E-01	7.045E-01	4.334E+01
35.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.456E-01	4.456E-01	4.456E-01	4.089E+01
45.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.181E-01	3.181E-01	3.181E-01	3.887E+01
55.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.432E-01	2.432E-01	2.432E-01	3.719E+01
65.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.945E-01	1.945E-01	1.945E-01	3.576E+01
75.0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.605E-01	1.605E-01	1.605E-01	3.451E+01

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	9.650E-08
2.5	0.000E+00	0.000E+00	0.000E+00	1.239E-07
3.5	0.000E+00	0.000E+00	0.000E+00	1.322E-07
4.5	0.000E+00	0.000E+00	0.000E+00	1.197E-07
7.5	0.000E+00	0.000E+00	0.000E+00	8.332E-08
15.0	0.000E+00	0.000E+00	0.000E+00	6.544E-08
25.0	0.000E+00	0.000E+00	0.000E+00	6.242E-08
35.0	0.000E+00	0.000E+00	0.000E+00	5.889E-08
45.0	0.000E+00	0.000E+00	0.000E+00	5.598E-08
55.0	0.000E+00	0.000E+00	0.000E+00	5.356E-08
65.0	0.000E+00	0.000E+00	0.000E+00	5.150E-08
75.0	0.000E+00	0.000E+00	0.000E+00	4.970E-08

POWERTECH (USA) INC.

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1REGION: Dewey Burdock                CODE: MILDOS-AREA (02/97)          PAGE  56
 METSET:                              DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 2,                                DURATION IN YRS
IS...100.0

                                 CONCENTRATION DATA FOR THE WNW DIRECTION, THETA EQUALS 292.5
DEGREES

                                               TOTAL AIR CONCENTRATIONS, PCI/M3, AND WL
  XRHO, KM      U-238        Th-230      Ra-226       Pb-210      Rn-222       Po-218       Pb-214
Bi-214      Pb-210        WL
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    1.5     0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.244E+01   2.212E+01   1.586E+01
1.157E+01   2.895E-05   1.463E-04
    2.5     0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.754E+01   2.725E+01   2.004E+01
1.422E+01   2.894E-05   1.827E-04
    3.5     0.000E+00   0.000E+00   0.000E+00   0.000E+00   4.036E+01   3.983E+01   2.712E+01
1.708E+01   2.768E-05   2.422E-04
    4.5     0.000E+00   0.000E+00   0.000E+00   0.000E+00   5.068E+01   5.017E+01   3.070E+01
1.656E+01   2.276E-05   2.691E-04
    7.5     0.000E+00   0.000E+00   0.000E+00   0.000E+00   9.079E+00   8.976E+00   6.490E+00
4.549E+00   1.514E-05   5.912E-05
   15.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.882E+00   1.883E+00   1.791E+00
1.694E+00   2.013E-05   1.734E-05
   25.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   8.515E-01   8.520E-01   8.431E-01
8.267E-01   1.998E-05   8.236E-06
   35.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   5.255E-01   5.258E-01   5.256E-01
5.225E-01   1.909E-05   5.155E-06
   45.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   3.708E-01   3.710E-01   3.721E-01
3.719E-01   1.831E-05   3.656E-06
   55.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.814E-01   2.816E-01   2.827E-01
2.832E-01   1.762E-05   2.780E-06
   65.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.241E-01   2.242E-01   2.252E-01
2.258E-01   1.704E-05   2.215E-06
   75.0     0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.842E-01   1.843E-01   1.851E-01
1.857E-01   1.652E-05   1.821E-06

                                                GROUND SURFACE CONCENTRATIONS, PCI/M2
        XRHO, KM      U-238        Th-230      Ra-226       Pb-210      Rn-222       Po-218      Pb-
214       Bi-214      Pb-210
       ------------------------------------------------------------------------------------------
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          1.5       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.752E+01
1.752E+01   1.752E+01   6.030E+01
          2.5       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.158E+01
2.158E+01   2.158E+01   6.027E+01
          3.5       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   3.154E+01
3.154E+01   3.154E+01   5.765E+01
          4.5       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   3.974E+01
3.974E+01   3.974E+01   4.740E+01
          7.5       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   7.109E+00
7.109E+00   7.109E+00   3.154E+01
         15.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.491E+00
1.491E+00   1.491E+00   4.192E+01
         25.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   6.748E-01
6.748E-01   6.748E-01   4.161E+01
         35.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   4.165E-01
4.165E-01   4.165E-01   3.977E+01
         45.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.939E-01
2.939E-01   2.939E-01   3.815E+01
         55.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   2.230E-01
2.230E-01   2.230E-01   3.671E+01
         65.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.776E-01
1.776E-01   1.776E-01   3.550E+01
         75.0       0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   1.460E-01
1.460E-01   1.460E-01   3.441E+01
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POWERTECH (USA) INC.

TOTAL DEPOSITION RATES, PCI/M2-SEC

XRHO, KM	U-238	Th-230	Ra-226	Pb-210
1.5	0.000E+00	0.000E+00	0.000E+00	8.684E-08
2.5	0.000E+00	0.000E+00	0.000E+00	8.681E-08
3.5	0.000E+00	0.000E+00	0.000E+00	8.303E-08
4.5	0.000E+00	0.000E+00	0.000E+00	6.827E-08
7.5	0.000E+00	0.000E+00	0.000E+00	4.542E-08
15.0	0.000E+00	0.000E+00	0.000E+00	6.038E-08
25.0	0.000E+00	0.000E+00	0.000E+00	5.993E-08
35.0	0.000E+00	0.000E+00	0.000E+00	5.728E-08
45.0	0.000E+00	0.000E+00	0.000E+00	5.494E-08
55.0	0.000E+00	0.000E+00	0.000E+00	5.287E-08
65.0	0.000E+00	0.000E+00	0.000E+00	5.113E-08
75.0	0.000E+00	0.000E+00	0.000E+00	4.956E-08

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1REGION: Dewey Burdock               CODE: MILDOS-AREA (02/97)          PAGE  57
 METSET:                             DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 2,                               DURATION IN YRS
IS...100.0

                                   EXPOSURE PATHWAY IS INHAL.          EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.500E-05 4.465E-04 1.469E-04
6.713E-05 6.590E-05 1.008E-04 1.468E-04
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.482E-05 1.706E-05 1.241E-04
1.315E-04 4.589E-04 1.525E-03 7.367E-04
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.857E-05 2.870E-05 9.355E-04
7.161E-03 7.122E-04 3.256E-03 5.992E-03
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.134E-04 5.531E-04
3.978E-05 1.340E-04 4.778E-04 9.357E-04
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.540E-05 1.269E-04 1.319E-03
1.192E-02 6.941E-04 1.705E-04 2.260E-04
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 7.488E-05 8.890E-05 2.487E-04
1.037E-03 5.584E-04 4.245E-04 3.950E-04
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.460E-05 1.777E-03 9.030E-05
1.554E-04 5.656E-05 5.972E-05 1.524E-04
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.475E-05 1.488E-04 5.282E-03 4.078E-04
5.281E-05 2.181E-04 1.405E-04 2.040E-04
     S       0.000E+00 4.227E-06 0.000E+00 0.000E+00 8.705E-05 0.000E+00 6.012E-05 4.949E-05
1.425E-04 1.523E-05 1.248E-04 3.123E-04
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.953E-05 4.513E-05 0.000E+00 1.028E-05
9.458E-06 1.103E-04 8.731E-05 1.894E-04
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 8.673E-05
4.951E-05 5.388E-05 5.558E-05 1.399E-04
     WSW     0.000E+00 0.000E+00 2.345E-05 0.000E+00 0.000E+00 4.401E-05 2.859E-05 2.771E-05
6.827E-06 4.478E-05 1.210E-05 1.297E-05
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.870E-06
1.365E-05 0.000E+00 2.764E-05 2.184E-05
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 8.844E-06 8.820E-06 2.919E-06 2.791E-06
2.411E-05 7.350E-05 7.236E-05 3.992E-05
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.560E-06 3.344E-06 0.000E+00 1.529E-05
3.212E-05 4.205E-05 6.762E-05 9.474E-05
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.293E-06 0.000E+00 8.803E-05 5.683E-04
9.662E-03 2.735E-04 6.915E-04 1.635E-04

                TOTAL DOSE COMMITMENT IS 6.465E-02 PERSON-REM/YR
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1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 58
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.273E-04	3.621E-03	1.191E-03	5.438E-04	5.337E-04	8.156E-04	1.188E-03
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.014E-04	1.383E-04	1.006E-03	1.065E-03	3.716E-03	1.234E-02	5.960E-03
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.507E-04	2.327E-04	7.582E-03	5.801E-02	5.766E-03	2.635E-02	4.847E-02
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.541E-03	4.482E-03	3.222E-04	1.085E-03	3.867E-03	7.569E-03
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.305E-04	1.029E-03	1.069E-02	9.657E-02	5.620E-03	1.380E-03	1.828E-03
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.073E-04	7.207E-04	2.015E-03	8.400E-03	4.521E-03	3.436E-03	3.195E-03
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.239E-04	1.441E-02	7.318E-04	1.259E-03	4.580E-04	4.833E-04	1.233E-03
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.197E-04	1.207E-03	4.283E-02	3.304E-03	4.278E-04	1.766E-03	1.137E-03	1.650E-03
S	0.000E+00	3.430E-05	0.000E+00	0.000E+00	7.063E-04	0.000E+00	4.875E-04	4.011E-04	1.154E-03	1.233E-04	1.010E-03	2.526E-03
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.584E-04	3.660E-04	0.000E+00	8.328E-05	7.661E-05	8.932E-04	7.066E-04	1.532E-03
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.029E-04	4.011E-04	4.362E-04	4.499E-04	1.131E-03
WSW	0.000E+00	0.000E+00	1.903E-04	0.000E+00	0.000E+00	3.570E-04	2.318E-04	2.246E-04	5.531E-05	3.626E-04	9.797E-05	1.049E-04
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.326E-05	1.106E-04	0.000E+00	2.237E-04	1.767E-04
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.177E-05	7.155E-05	2.367E-05	2.263E-05	1.953E-04	5.952E-04	5.857E-04	3.230E-04
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.323E-05	2.713E-05	0.000E+00	1.240E-04	2.603E-04	3.406E-04	5.473E-04	7.665E-04
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.672E-05	0.000E+00	7.139E-04	4.607E-03	7.828E-02	2.214E-03	5.597E-03	1.323E-03

TOTAL DOSE COMMITMENT IS 5.237E-01 PERSON-REM/YR

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 59
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS AVG.LUNG

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.655E-06	5.395E-05	1.822E-05	8.547E-06	8.610E-06	1.350E-05	2.018E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.929E-06	2.066E-06	1.543E-05	1.678E-05	6.011E-05	2.049E-04	1.015E-04
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.196E-06	3.483E-06	1.166E-04	9.159E-04	9.348E-05	4.385E-04	8.275E-04
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.811E-05	6.902E-05	5.093E-06	1.760E-05	6.437E-05	1.292E-04
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.758E-06	1.544E-05	1.647E-04	1.527E-03	9.115E-05	2.295E-05	3.117E-05
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.883E-06	1.082E-05	3.102E-05	1.326E-04	7.313E-05	5.693E-05	5.421E-05
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.664E-06	2.164E-04	1.128E-05	1.989E-05	7.417E-06	8.020E-06	2.095E-05
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.717E-06	1.765E-05	6.434E-04	5.098E-05	6.774E-06	2.870E-05	1.895E-05	2.820E-05
S	0.000E+00	4.875E-07	0.000E+00	0.000E+00	1.014E-05	0.000E+00	7.322E-06	6.188E-06	1.828E-05	2.005E-06	1.686E-05	4.325E-05
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.272E-06	5.351E-06	0.000E+00	1.283E-06	1.212E-06	1.451E-05	1.178E-05	2.621E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.080E-05	6.329E-06	7.068E-06	7.481E-06	1.930E-05
WSW	0.000E+00	0.000E+00	2.699E-06	0.000E+00	0.000E+00	5.185E-06	3.457E-06	3.438E-06	8.693E-07	5.848E-06	1.621E-06	1.780E-06
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.548E-07	1.730E-06	0.000E+00	3.677E-06	2.975E-06
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.022E-06	1.035E-06	3.516E-07	3.449E-07	3.056E-06	9.551E-06	9.637E-06	5.447E-06
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.577E-07	3.922E-07	0.000E+00	1.889E-06	4.070E-06	5.463E-06	9.002E-06	1.292E-05
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.804E-07	0.000E+00	1.061E-05	7.029E-05	1.226E-03	3.561E-05	9.233E-05	2.238E-05

TOTAL DOSE COMMITMENT IS 8.346E-03 PERSON-REM/YR

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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  60
 METSET:                            DATA: DBNOLA.MIL                   02/23/09
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TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS INHAL. EXPOSED ORGAN IS BRONCHI

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.257E-02	2.609E-01	5.704E-02	1.934E-02	1.499E-02	1.884E-02	2.320E-02
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.520E-02	9.344E-03	4.575E-02	3.619E-02	1.000E-01	2.736E-01	1.118E-01
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.810E-02	1.540E-02	3.413E-01	1.961E+00	1.551E-01	5.852E-01	9.126E-01
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.705E-01	2.067E-01	1.123E-02	3.021E-02	8.924E-02	1.485E-01
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.832E-02	7.408E-02	5.302E-01	3.629E+00	1.692E-01	3.452E-02	3.900E-02
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.973E-02	6.008E-02	1.171E-01	3.738E-01	1.628E-01	1.038E-01	8.305E-02
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.634E-02	1.199E+00	4.271E-02	5.658E-02	1.673E-02	1.486E-02	3.270E-02
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.595E-02	1.479E-01	2.931E+00	1.562E-01	1.538E-02	5.103E-02	2.737E-02	3.395E-02
S	0.000E+00	3.983E-02	0.000E+00	0.000E+00	1.795E-01	0.000E+00	3.105E-02	1.763E-02	3.843E-02	3.286E-03	2.233E-02	4.753E-02
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.789E-02	3.984E-02	0.000E+00	3.575E-03	2.486E-03	2.312E-02	1.513E-02	2.783E-02
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.115E-02	1.337E-02	1.158E-02	9.870E-03	2.105E-02
WSW	0.000E+00	0.000E+00	1.444E-01	0.000E+00	0.000E+00	4.897E-02	1.718E-02	1.129E-02	2.094E-03	1.096E-02	2.458E-03	2.244E-03
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.406E-03	5.017E-03	0.000E+00	6.751E-03	4.557E-03
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.079E-02	1.412E-02	2.129E-03	1.314E-03	8.344E-03	2.005E-02	1.625E-02	7.597E-03
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.003E-01	5.514E-03	0.000E+00	7.255E-03	1.124E-02	1.163E-02	1.542E-02	1.835E-02
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.713E-02	0.000E+00	5.787E-02	2.434E-01	3.050E+00	6.804E-02	1.414E-01	2.830E-02

TOTAL DOSE COMMITMENT IS 2.090E+01 PERSON-REM/YR

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 61
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS GROUND EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.169E-05	5.339E-05	1.430E-05	5.772E-06	5.212E-06	7.505E-06	1.045E-05
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.180E-06	1.969E-06	1.181E-05	1.111E-05	3.580E-05	1.123E-04	5.191E-05
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.043E-06	3.277E-06	8.858E-05	6.041E-04	5.553E-05	2.398E-04	4.225E-04
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.605E-05	5.293E-05	3.394E-06	1.056E-05	3.557E-05	6.667E-05
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.123E-05	1.517E-05	1.305E-04	1.047E-03	5.618E-05	1.300E-05	1.645E-05
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.416E-05	1.155E-05	2.653E-05	9.766E-05	4.822E-05	3.438E-05	3.045E-05
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.210E-05	2.307E-04	9.657E-06	1.470E-05	4.911E-06	4.866E-06	1.182E-05
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.860E-06	2.470E-05	6.141E-04	3.945E-05	4.559E-06	1.741E-05	1.059E-05	1.471E-05
S	0.000E+00	4.729E-06	0.000E+00	0.000E+00	2.498E-05	0.000E+00	6.727E-06	4.638E-06	1.195E-05	1.184E-06	9.181E-06	2.202E-05
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.336E-06	6.923E-06	0.000E+00	9.533E-07	7.860E-07	8.501E-06	6.366E-06	1.324E-05
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.157E-06	4.156E-06	4.185E-06	4.080E-06	9.835E-06
WSW	0.000E+00	0.000E+00	1.760E-05	0.000E+00	0.000E+00	7.898E-06	3.472E-06	2.758E-06	6.014E-07	3.630E-06	9.235E-07	9.451E-07
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.124E-07	1.296E-06	0.000E+00	2.238E-06	1.680E-06
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.064E-05	2.070E-06	3.970E-07	2.978E-07	2.231E-06	6.191E-06	5.697E-06	2.988E-06
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.163E-05	8.033E-07	0.000E+00	1.638E-06	2.987E-06	3.560E-06	5.351E-06	7.126E-06
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.116E-06	0.000E+00	1.126E-05	5.790E-05	8.610E-04	2.229E-05	5.288E-05	1.192E-05

TOTAL DOSE COMMITMENT IS 5.815E-03 PERSON-REM/YR

Powertech (USA) Inc.

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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  62
 METSET:                            DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 2,                                DURATION IN YRS
IS...100.0

                                   EXPOSURE PATHWAY IS CLOUD           EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 6.301E-04 2.294E-03 5.034E-04
1.708E-04 1.325E-04 1.665E-04 2.050E-04
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.194E-04 8.221E-05 4.037E-04
3.196E-04 8.836E-04 2.417E-03 9.879E-04
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.567E-04 1.348E-04 3.001E-03
1.728E-02 1.368E-03 5.167E-03 8.060E-03
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.486E-03 1.814E-03
9.885E-05 2.663E-04 7.873E-04 1.311E-03
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 5.672E-04 6.380E-04 4.628E-03
3.186E-02 1.490E-03 3.044E-04 3.441E-04
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 7.011E-04 5.003E-04 1.003E-03
3.249E-03 1.425E-03 9.122E-04 7.315E-04
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 5.934E-04 9.827E-03 3.607E-04
4.861E-04 1.452E-04 1.298E-04 2.868E-04
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.821E-04 1.248E-03 2.540E-02 1.367E-03
1.352E-04 4.497E-04 2.415E-04 2.997E-04
     S       0.000E+00 2.074E-04 0.000E+00 0.000E+00 1.483E-03 0.000E+00 2.727E-04 1.555E-04
3.393E-04 2.902E-05 1.973E-04 4.199E-04
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.191E-04 3.485E-04 0.000E+00 3.156E-05
2.196E-05 2.043E-04 1.337E-04 2.459E-04
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 2.749E-04
1.181E-04 1.023E-04 8.720E-05 1.860E-04
     WSW     0.000E+00 0.000E+00 9.933E-04 0.000E+00 0.000E+00 4.195E-04 1.489E-04 9.869E-05
1.838E-05 9.650E-05 2.167E-05 1.980E-05
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.212E-05
4.377E-05 0.000E+00 5.943E-05 4.019E-05
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 4.200E-04 1.121E-04 1.815E-05 1.145E-05
7.331E-05 1.767E-04 1.434E-04 6.709E-05
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 3.931E-04 4.433E-05 0.000E+00 6.322E-05
9.871E-05 1.025E-04 1.361E-04 1.621E-04
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 1.169E-04 0.000E+00 5.039E-04 2.139E-03
2.689E-02 6.006E-04 1.249E-03 2.500E-04

                TOTAL DOSE COMMITMENT IS 1.809E-01 PERSON-REM/YR
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)          PAGE  63
 METSET:                            DATA: DBNOLA.MIL                   02/23/09

                             TIME STEP NUMBER 2,                              DURATION IN YRS
IS...100.0

                                   EXPOSURE PATHWAY IS VEG. ING          EXPOSED ORGAN IS
EFFECTIV

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     S       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00

                TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

                                         WARNING--POPULATION FOOD INGESTION DOSES SHOWN
                                          ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
                                          FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
                                          BY THE POPULATION OF THIS REGION. SEE SUMMARY
                                          TABLE FOR THIS INFORMATION.
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1REGION: Dewey Burdock              CODE: MILDOS-AREA (02/97)         PAGE  64
 METSET:                            DATA: DBNOLA.MIL                  02/23/09

                             TIME STEP NUMBER 2,                            DURATION IN YRS
IS...100.0

                                   EXPOSURE PATHWAY IS VEG. ING         EXPOSED ORGAN IS BONE

                           DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-
REM/YEAR

               XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO      XRHO
XRHO      XRHO      XRHO      XRHO
  DIRECTION     1.5       2.5       3.5       4.5       7.5      15.0      25.0      35.0
45.0      55.0      65.0      75.0
 -------------------------------------------------------------------------------------------------
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     N       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ENE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     E       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     ESE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SE      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSE     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     S       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     SW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WSW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     W       0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     WNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NW      0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00
     NNW     0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
0.000E+00 0.000E+00 0.000E+00 0.000E+00

                TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

                                         WARNING--POPULATION FOOD INGESTION DOSES SHOWN
                                          ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL
                                          FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED
                                          BY THE POPULATION OF THIS REGION. SEE SUMMARY
                                          TABLE FOR THIS INFORMATION.
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POWERTECH (USA) INC.

1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 65
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

POWERTECH (USA) INC.

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MEAT ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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1REGION: Dewey Burdock CODE: MILDOS-AREA (02/97) PAGE 67
METSET: DATA: DBNOLA.MIL 02/23/09

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MILK ING EXPOSED ORGAN IS EFFECTIV

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

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TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

EXPOSURE PATHWAY IS MILK ING EXPOSED ORGAN IS BONE

DOSES SHOWN BELOW ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DIRECTION	XRHO 1.5	XRHO 2.5	XRHO 3.5	XRHO 4.5	XRHO 7.5	XRHO 15.0	XRHO 25.0	XRHO 35.0	XRHO 45.0	XRHO 55.0	XRHO 65.0	XRHO 75.0
N	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ENE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
E	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ESE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
S	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WSW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
W	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
WNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NNW	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TOTAL DOSE COMMITMENT IS 0.000E+00 PERSON-REM/YR

WARNING--POPULATION FOOD INGESTION DOSES SHOWN ABOVE HAVE NOT BEEN CORRECTED TO REFLECT POTENTIAL FOOD EXPORT AND MAY EXCEED DOSES ACTUALLY RECEIVED BY THE POPULATION OF THIS REGION. SEE SUMMARY TABLE FOR THIS INFORMATION.

TIME STEP NUMBER 2, DURATION IN YRS IS...100.0

SUMMARY PRINT OF POPULATION DOSES COMPUTED FOR TSTEP 2--DOSES SHOWN ARE 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS, PERSON-REM/YEAR

DOSES RECEIVED BY PEOPLE WITHIN 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	6.465E-02	5.237E-01	8.346E-03	3.928E-01	1.888E-01	2.090E+01
GROUND	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03
CLOUD	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TOTALS	2.513E-01	7.104E-01	1.950E-01	5.794E-01	3.755E-01	2.108E+01

DOSES RECEIVED BY PEOPLE BEYOND 80 KILOMETERS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INHAL.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
GROUND	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CLOUD	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01
TOTALS	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01

TOTAL DOSES COMPUTED OVER ALL POPULATIONS

PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI

INHAL.	6.465E-02	5.237E-01	8.346E-03	3.928E-01	1.888E-01	2.090E+01
GROUND	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03	5.815E-03
CLOUD	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01	1.809E-01
VEG. ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEAT ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MILK ING	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RNPLUS50	7.984E+00	1.089E+02	1.815E+00	7.984E+00	7.984E+00	5.081E+01
TOTALS	8.236E+00	1.096E+02	2.010E+00	8.564E+00	8.360E+00	7.189E+01

COMPLETE SUMMARY OF COMPUTED ENVIRONMENTAL DOSE COMMITMENTS, INTEGRATED OVER ALL TIME STEPS

100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED BY PEOPLE WITHIN 80 KILOMETERS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	1.257E+00	3.552E+00	9.752E-01	2.897E+00	1.878E+00	1.054E+02
2	2013.00	2113.00	100.00	TOTALS	2.513E+01	7.104E+01	1.950E+01	5.794E+01	3.755E+01	2.108E+03
TOTALS OVER ALL 2 TIME STEPS					2.639E+01	7.459E+01	2.048E+01	6.084E+01	3.943E+01	2.214E+03

100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED BY PEOPLE BEYOND 80 KILOMETERS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	3.992E+01	5.444E+02	9.073E+00	3.992E+01	3.992E+01	2.540E+02
2	2013.00	2113.00	100.00	TOTALS	7.984E+02	1.089E+04	1.815E+02	7.984E+02	7.984E+02	5.081E+03
TOTALS OVER ALL 2 TIME STEPS					8.383E+02	1.143E+04	1.905E+02	8.383E+02	8.383E+02	5.335E+03

GRAND TOTAL 100-YEAR ENVIRONMENTAL DOSE COMMITMENTS RECEIVED OVER ALL POPULATIONS, PERSON-REM

NO.	T-START	T-END	T-LONG	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
1	2008.00	2013.00	5.00	TOTALS	4.118E+01	5.479E+02	1.005E+01	4.282E+01	4.180E+01	3.595E+02
2	2013.00	2113.00	100.00	TOTALS	8.236E+02	1.096E+04	2.010E+02	8.564E+02	8.360E+02	7.189E+03
TOTALS OVER ALL 2 TIME STEPS					8.647E+02	1.151E+04	2.110E+02	8.992E+02	8.778E+02	7.549E+03

0Program execution time = 2.14 seconds

POWERTECH (USA) INC.

APPENDIX 5.7-F

RADIUM BENCHMARK DOSE ASSESSMENT

Radium Benchmark Dose Assessment

For

Dewey-Burdock Uranium In-situ Recovery Facility

Prepared for:

Powertech USA

5575 DTC Parkway, Suite 140

Greenwood Village, CO 80111

Prepared by:

Environmental Restoration Group, Inc.

8809 Washington St. NE, Suite 150

Albuquerque, NM 87113

October 1, 2008

Radium Benchmark Dose Assessment

1.0 Introduction

On April 12, 1999, the U.S. Nuclear Regulatory Commission (NRC) issued a Final Rule (64 FR 17506) that requires the use of the existing soil radium standard to derive a dose criterion for the cleanup of byproduct material. The amendment to Criterion 6(6) of 10 CFR Part 40, Appendix A was effective on June 11, 1999. This "benchmark approach" requires that NRC licensees model the site-specific dose from the existing radium standard and then use that dose to determine the allowable quantity of other radionuclides that would result in a similar dose to the average member of the critical group. These determinations must then be submitted to NRC with the site reclamation plan or included in license applications. This report documents the modeling and assumptions made by Powertech USA (Powertech) to derive a standard for U-nat in soil for the proposed Dewey Burdock in-situ uranium recovery (DBISR) facility.

Concurrent with publication of the Final Rule, NRC published draft guidance (64 FR 17690) for performing the benchmark dose modeling required to implement the final rule. Final guidance (NRC, 2003) was published as Appendix E to the Standard Review Plan for In Situ Leach License Applications (NUREG-1569). This guidance discusses acceptable models and input parameters. This guidance, guidance from the RESRAD Users Manual (ANL, 2001), the Data Collection Handbook (ANL, 1993) and site-specific parameters were used in the modeling as discussed in the following sections.

2.0 Determination of Radium Benchmark Dose

RESRAD Version 6.4 computer code (RESRAD) was used to model the DBISR site and calculate the maximum annual dose rate from the current radium cleanup standard.

The following supporting documentation for determination of the radium benchmark dose and the natural uranium soil standard (explained in Section 3.0) is attached:

- The RESRAD Data Input Basis (Attachment 1) provides a summary of the modeling performed with RESRAD and the values that were used for the input parameters. A sensitivity analysis was performed for parameters which are important to the major component dose pathways and for which no site specific data was available.
- Selected graphs produced with RESRAD that present the results of the sensitivity analysis performed on the input parameters are attached (Attachment 2).
- A full printout of the final RESRAD modeling results for the resident farmer scenario with the chosen input values is attached (Attachments 3.0 and 3.1). The printout provides the modeled maximum annual dose for calculated times for the 1,000-year time span and provides a breakdown of the fraction of dose due to each pathway.
- Graphs produced with RESRAD that present the modeling results for the maximum dose during the 1,000 year time span for radium-226, natural uranium, and the land application. A series of graphs depicting the summed dose for all pathways and the component pathways that contributes to the total dose are attached (Attachments 4.0 and 4.1).

The maximum dose from Ra-226 contaminated soil at the 5 pCi/g above background cleanup standard, as determined by RESRAD, for the residential farmer scenario was 38.1 mrem/yr. This dose was based upon the 5 pCi/g surface (0 to 6-inch) Ra-226 standard and was noted at time, t = 0 years. The two major dose pathways were external exposure and plant ingestion (water independent). For these two pathways, a sensitivity analysis was performed for important parameters for which no site specific information was available. The 38.1 mrem/yr dose from radium is the level at which the natural uranium radiological end point soil standard will be based as described in the following section.

3.0 Determination of Natural Uranium Soil Standard

RESRAD was used to determine the concentration of natural uranium (U-nat) in soil distinguishable from background that would result in a maximum dose of 38.1mrem/yr. The method involved modeling the dose from a set concentration of U-nat in soil. This dose was then compared to the radium benchmark dose and scaled to arrive at the maximum allowable U-nat concentration in soil.

For ease of calculations, a preset concentration of 100 pCi/g U-nat was used for modeling the dose. The fractions used were 49.2 percent (or pCi/g) U-234, 48.6 percent (or pCi/g) U-238 and 2.2 percent (or pCi/g) U-235. The distribution coefficients that were selected for each radionuclide were RESRAD default values. A sensitivity analysis was performed using a range of distribution coefficients to evaluate potential effects of not using site specific data. All other input parameters were the same as those used in the Ra-226 benchmark modeling.

Using a U-nat concentration in soil of 100 pCi/g, RESRAD determined a maximum dose of 7.1 mrem/yr. at time, t = 0 years. The printout of the RESRAD data summary is provided in Attachment 3.1 and the dose figures generated with RESRAD are provided in Attachment 4.1.

To determine the uranium soil standard, the following formula was used:

$$\text{Uranium Limit} = \left(\frac{100 \text{ pCi/g U-nat}}{7.1 \text{ mrem/yr U-nat dose}} \right) \text{x } 38.1 \text{ mrem/yr radium benchmark dose}$$

$$\text{Uranium Limit} = 537 \text{ pCi/g U-nat}$$

The U-nat limit is applied to soil cleanup with the Ra-226 limit using the unity rule. To determine whether an area exceeds the cleanup standards, the standards are applied according to the following formula:

$$\left(\frac{\text{Soil Uranium Concentration}}{\text{Soil Uranium Limit}}\right)+\left(\frac{\text{Soil Radium Concentration}}{\text{Soil Radium Limit}}\right) < 1$$

This approach will be used at the DBISR site to determine the radiological impact on the environment from releases of source and byproduct materials.

3.1 Uranium Chemical Toxicity Assessment

The chemical toxicity effects from uranium exposure are evaluated by assuming the same exposure scenario as that used for the radiation dose assessment. In the benchmark dose assessment for the resident farmer scenario, it was assumed that the diet consisted of 25 percent of the meat, fruits, and vegetables grown at the site. No intake of contaminated food through the aquatic or milk pathways was considered probable since it is unlikely the Dewey-Burdock area could support this activity with local vegetation. Also, the model showed that the contamination would not affect the groundwater quality. Therefore, the same model will be used in assessing the chemical toxicity. The intake from eating meat was shown to be negligible compared to the plant pathway and therefore is not shown here. This is confirmed by the results of the RESRAD calculations shown in Attachment 3.1 and the figures generated with RESRAD shown in Attachment 4.1.

The method and parameters for estimating the human intake of uranium from ingestion are taken from NUREG/CR-5512 Vol. 1 (NRC, 1992). The uptake of uranium in food is a product of the uranium concentration in soil and the soil-to-plant conversion factor. The annual intake in humans is then calculated by multiplying the annual consumption by the uranium concentration in the food. Since the soil-plant conversion factor is based on a dry weight, the annual consumption must be adjusted to a dry-weight basis by multiplying by the dry-weight to wet-weight ratio. Parameters for these calculations are given in Section 6.5.9 of the NUREG/CR-5512 Vol. 1 (NRC, 1992). Table 3-1 provides the parameters used in these calculation and results for leafy vegetables, other vegetables, and fruit. Annual intakes of 14 kg/year and 97 kg/year were assumed for leafy vegetables and other vegetables and fruit, respectively. Consistent with Attachment 3.1 dose calculations, it was assumed that 25 percent of the food was grown on the site. It was also assumed that the uranium concentration in the garden or orchard was 537 pCi/g. This corresponds to the uranium Benchmark Concentration for surface soils. Using a conversion factor for U-nat of 1 mg = 677 pCi, then 537 pCi/g is equivalent to 793 mg/kg. The human intake shown in the first column of Table 3-1 is equal to the product of the parameters given in the subsequent columns. Table 3-1 shows that the total annual uranium intake from all food sources from the site is 46 mg/yr.

The two-compartment model of uranium toxicity in the kidney from oral ingestion was used (ICRP, 1995) to predict the burden of uranium in the kidney following chronic uranium ingestion. This model allows for the distribution of the two forms of uranium in the blood, and consists of a kidney with two compartments, as well as several other compartments for uranium distribution, storage and elimination including the skeleton, liver, red blood cells (macrophages) and other soft tissues.

Table 3-1 Annual Intake of Uranium from Ingestion

Human Intake (mg/yr)	Soil Concentration (mg/kg)	Soil to Plant Ratio (mg/kg plant to mg/kg soil)	Annual Consumption (kg)	Dry Weight Wet Weight Ratio	Food Source
9.4	793	1.7E-2	3.5	0.2	Leafy Vegetables
36.1	793	1.4E-2	13	0.25	Other Vegetables
6.9	793	4.0E-3	12	0.18	Fruit
52.4					Total

The total burden to the kidney is the sum of the two compartments. The mathematical representation for the kidney burden of uranium at steady state can be derived as follows (ICRP, 1995):

$$Q_P = \frac{IR \times f_1}{\lambda_P \left(1 - f_{ps} - f_{pr} - f_{pl} - f_{pk} - f_{pk1}\right)}$$

Where:

Q_P = uranium burden in the plasma, µg

IR = dietary consumption rate, mg U/d

f_1 = fractional transfer of uranium from GI tract to blood, unit less

f_{ps} = fractional transfer of uranium from plasma to skeleton, unit less

f_{pr} = fractional transfer of uranium from plasma to red blood cells, unit less

f_{pl} = fractional transfer of uranium from plasma to liver, unit less

f_{pt} = fractional transfer of uranium from plasma to soft tissue, unit less

f_{pk1} = fractional transfer of uranium from plasma to kidney, compartment 1, unit less

λ_p = biological retention constant in the plasma, d^{-1}

The burden in kidney compartment 1 is:

$$Q_{k1} = \lambda_P \times Q_P \times \frac{f_{pk1}}{\lambda_{k1}}$$

Where:

Q_{k1} = uranium burden in kidney compartment 1, mg

λ_{k1} = biological retention constant of uranium in kidney compartment 1, d^{-1}

Similarly, for compartment 2 in the kidney, the burden is:

$$Q_{k2} = \lambda_P \times Q_P \times \frac{f_{pk2}}{\lambda_{k2}}$$

Where:

Q_{k2} = uranium burden in kidney compartment 2, µg;

λ_{k2} = biological retention constant of uranium in kidney compartment 2, d^{-1};

f_{pk2} = fractional transfer of uranium from plasma to kidney compartment 2, unit less.

The total burden to the kidney is then the sum of the two compartments is:

$$Q_{k1} + Q_{k2} = \frac{IR \times f_1}{\left(1 - f_{ps} - f_{pr} - f_{pl} - f_{pt} - f_{pk1}\right)} \times \left(\frac{f_{pk1}}{\lambda_{k1}} + \frac{f_{pk2}}{\lambda_{k2}} \right)$$

The parameter input values for the two-compartment kidney model include the daily intake of uranium estimated for residents at this site, and the ICRP69 values recommended by the ICRP as listed below (ICRP, 1995). The daily uranium intake rate was estimated to be 0.14 mg/day (52.4 mg/year) from ingestion while residing at this site.

IR = 0.14 mg/day
f_1 = 0.02
f_{ps} = 0.105
f_{pr} = 0.007
f_{pl} = 0.0105
f_{pt} = 0.347
f_{pk1} = 0.00035
f_{pk2} = 0.084
λ_{k1} = ln(2)/(5 yrs*365 days/yr)
λ_{k2} = ln(2)/7 days
where ln(2) = 0.693…

Given a daily uranium intake of 0.14 mg/day at this site and the above equation, the calculated uranium in the kidneys is 0.0093 mg U, or a concentration of 0.032 µg U/g kidney. This is 3.2 percent of the 1.0 µg U/g value that has generally been understood to protect the kidney from the toxic effects of uranium. Some researchers have suggested that mild effects may be observable at levels as low as 0.1 µg U/g of kidney tissue.

Using 0.1 μg U/g as a criterion, then the intake is 32 percent of the level where mild effects may be observable.

The EPA evaluated the chemical toxicity data and found that mild proteinuria has been observed at drinking water levels between 20 and 100 μg/liter. Assuming water intake of 2 liters/day, this corresponds to an intake of 0.04 to 0.2 mg/day. Using animal data and a conservative factor of 100, the EPA arrived at a 30 μg/liter limit for use as a National Primary Drinking Water Standard (Federal Register/Vol.65, No.236/ December 7, 2000). This is equivalent to an intake of 0.06 mg/day for the average individual. Naturally, since large diverse populations are potentially exposed to drinking water sources regulated using these standards, the EPA is very conservative in developing limits.

This analysis indicates that a soil limit of 537 pCi/g of U-nat would result in an intake of approximately 0.14 mg/day. Using the most conservative daily limit corresponding to the National Primary Drinking Water standard, a soil limit of 230 pCi/g corresponds to the EPA intake limit from drinking water with a uranium concentration of 0.06 mg/day. Therefore exposure to soils containing 230 pCi/g of natural uranium should not result in chemical toxicity effects. Since the roots of a fruit tree would penetrate to a considerable depth, limiting subsurface uranium concentrations to 230 pCi/g will be considered appropriate as well.

4.0 References

ANL, 1993, “Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil”, Environmental Assessment Division, Argonne National Laboratory, ANL/EAIS-8, Argonne, Illinois.

ICRP, 1995, *ICRP Publication 69 - Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 3 Ingestion Dose Coefficients*, International Commission on Radiation Protection, Tarrytown, New York.

NRC, 1992, *"Residual Radioactive Contamination from Decommissioning,"* U.S. Nuclear Regulatory Commission, NUREG/CRR-5512 (PNL-7994) Vol. 1, Washington, DC.

NRC, 2003, "Standard Review Plan for In situ Leach Uranium Extraction License Applications", Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, NUREG-1569, Washington, DC.

NRCS, 2007, "2003 Annual National Resources Inventory", Natural Resources Conservation Service, U.S. Department of Agriculture, Washington, DC.

TVA, *Environmental Impact Statement – Edgemont Uranium Mine*, Tennessee Valley Authority, Knoxville, Tennessee.

USGS, 2004, *Estimated Use of Water in the United States in 2000*, U.S. Geological Survey, U.S. Department of the Interior, USGS Circular 1268, Reston, Virginia.

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Radium Benchmark Dose Assessment

Attachment 1

RESRAD Data Input Basis

Parameters

RESRAD Data Input Basis

Parameters

This document summarizes the data input and modeling scenario that was used to determine the radium benchmark dose for the DBISR Project. The modeling was performed using RESRAD for Windows Version 6.4 developed by the Environmental Assessment Division at Argonne National Laboratory.

The resident farmer scenario was used since this is the most likely land use near the site. The following sections describe the data parameters that were used to model site-specific conditions.

The data input was based upon four principal sources:

1. The Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil (Data Collection Handbook) (ANL, 1993)

2. The NUREG-1569 (NRC, 2003)

3. Site specific information to be included in the DBISR license application

4. The Natural Resources Conservation Service (NRCS) 2003 Annual Natural Resources Inventory, State Report (NRCS, 2007)

5. The Tennessee Valley Authority (TVA) Environmental Impact Statement – Edgemont Uranium Mine (EIS)

6. The US Geological Survey (USGS) Circular 1268 (USGS, 2004)

Soil Concentration

1. Lead-210: Used 5.0 pCi/g per the NUREG-1569 (NRC, 2003).

No sensitivity analysis on this parameter was performed based on the guidance.

2. Radium-226: Used 5.0 pCi/g regulatory limit as basis for determining benchmark.

No sensitivity analysis on this parameter was performed based on the regulatory limit.

Distribution Coefficient (K_d)

All values found in the Data Collection Handbook (ANL, 1993).

1. Lead-210: Used the value for sand, 270 cm^3/g, for the contaminated zone and the saturated zone. Used the value for clay, 550 cm^3/g, for the unsaturated zone. The Data Collection Handbook specifies the following values (ANL, 1993):

    - Sand = 270
    - Loam = 16,000

Sensitivity analyses were performed on the external and plant (water independent) pathways with a multiple of 100 on the value for the contaminated zone (i.e. 2.7, 270, 27,000). No appreciable impacts on maximum dose were found for both the external and plant (water independent) pathways when using the higher or lower K_d. The range of values covers the range of potential values at the site based upon sandy and loamy soil types. Graphs attached.

2. Radium 226: Used the value for sand, 500 cm^3/g, for the contaminated zone and the saturated zone. Used the value for clay, 9,100 cm^3/g, for the unsaturated zone. The Data Collection Handbook specifies the following values (ANL, 1993):

- Sand = 500
- Loam = 36,000

Sensitivity analyses were performed on the external and plant (water independent) pathways with a multiple of 100 on the value for the contaminated zone (i.e. 5, 500, 50,000). No appreciable impacts on maximum dose were found for both the external and plant (water independent) pathways when using the higher or lower K_d. The range of values covers the range of potential values at the site based upon sandy and loamy soil types. Graphs attached.

Contaminated Zone

1. Area: Used the default value of 10,000 square meters.

Sensitivity analysis was performed on the external pathway with a multiple of 2 (i.e. 5,000, 10,000, and 20,000). There was no impact on maximum dose rate for the external dose pathway when using the larger value. There was a small decrease in maximum dose rate for the external dose pathway when using the smaller value. Therefore the use of the mid-range value for the area is conservative. Graph attached.

2. Thickness: Used 0.15 m (6 inches) based on regulatory requirement.

No sensitivity analysis on this parameter was performed based on the guidance.

3. Length parallel to aquifer flow: Used the default value of 100 meters, based on the square root of a 10,000 square meter contaminated zone.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

Cover and Contaminated Zone

The topsoil of the area (the contaminated zone) is described as alluvial sand, gravel, and clay in the EIS (TVA,).

1. Cover depth: Used 0 meters in accordance with NUREG-1569 (NRC, 2003).

No sensitivity analysis on this parameter was performed based on the guidance.

2. Density of contaminated zone: Used the average density of the contaminated zone, 1.26 g/cm^3, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

3. Contaminated zone erosion rate: Used the erosion rates for South Dakota listed in the NRCS 2003 National Resources Inventory, State Report (NCRS, 2007) to calculate the erosion rate. The erosion rates listed for South Dakota are 1.8 tons/acre-year from water erosion and 2.0 tons/acre-year from wind erosion (3.8 tons/acre-year total). Using the contaminated zone soil density (1.26 g/cm^3), the total erosion rate was calculated as shown below and used in RESRAD.

$$\text{Erosion Rate (m/yr)} = \frac{3.8\text{ ton}}{\text{acre - yr}} \text{ x } \frac{9.07 \text{ x } 10^5 \text{ g}}{\text{ton}} \text{ x } \frac{\text{acre}}{4.047 \text{ x } 10^7 \text{ cm}^2} \text{ x } \frac{\text{cm}^3}{1.26 \text{ g}} \text{ x } \frac{\text{m}}{100 \text{ cm}} = 0.0007$$

Sensitivity analyses of the external and plant (water independent) pathways were performed with a multiple of 2 (i.e. 0.0014, 0.0007, and 0.00035). The maximum dose rate from the external pathway did not change when the value was changed. The maximum dose rate from the plant (water independent) pathway decreased slightly when using the smaller value. Also, the mid-range value is based on information specific to South Dakota. Therefore the mid-range value is both adequate for the model and conservative. Graph attached.

4. <u>Contaminated zone total porosity</u>: Used the average porosity of the contaminated zone, 0.5384, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

5. <u>Contaminated zone field capacity</u>: Used the minimum field capacity value for the contaminated zone, 1 x 10^{-34}, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

6. <u>Contaminated zone hydraulic conductivity</u>: Used the representative hydraulic conductivity value for sandy clay loam listed in the Data Collection Handbook, 1.99 x 10^{2} m/yr (ANL, 1993).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

7. <u>Contaminated zone b parameter</u>: Used the b parameter value for sandy clay loam listed in the Data Collection Handbook, 7.12 (ANL, 1993).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

8. <u>Evapotranspiration Coefficient</u>: Used the maximum evapotranspiration coefficient, 0.999, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

9. <u>Wind Speed</u>: Used the average wind speed, 3 m/s, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

10. Precipitation: Used the precipitation rate, 0.32 m/yr, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

11. Irrigation Rate: Used the average irrigation rate for South Dakota listed in the USGS Circular 1268, 0.360 m/yr (1.18 ft/yr) (USGS, 2004).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

12. Runoff Coefficient: From the Data Collection Handbook, the equation for runoff coefficient for an agricultural environment is shown below (ANL, 1993).

$$\text{Runoff Coefficient} = 1 - c_1 - c_2 - c_3$$

The values of c_1, c_2, and c_3 used were 0.2 (rolling land), 0.2 (intermediate combinations of clay and loam), and 0.1 (cultivated lands), respectively. The resulting runoff coefficient used is 0.5.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

13. Watershed Area for Nearby Stream or Pond: Used the watershed area, 1.3 x 10^6 m^2 (0.5 square miles), based on site specific data.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

14. Accuracy: Used the default value of 0.001.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

Saturated Zone

1. Density of saturated zone: Used the average density of the saturated zone, 2.64 g/cm^3, based on site specific data.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

2. Saturated zone total porosity: Used the value of 0.34, which is the mean total porosity for sandstone (medium) listed in the Data Collection Handbook (ANL, 1993).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

3. Saturated zone effective porosity: Used the average porosity of the saturated zone, 0.2974, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

4. Saturated zone field capacity: Used the value obtained from subtracting the effective porosity of the saturated zone from the total porosity of the saturated zone, 0.0426.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

5. Saturated zone hydraulic conductivity: Used the hydraulic conductivity of the saturated zone, 703 m/yr (2.23 x 10^{-3} cm/s), based on site specific data.

No sensitivity analysis was performed because the value is site specific.

6. Saturated zone hydraulic gradient: Used the hydraulic gradient of the saturated zone, 0.01, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

6. Saturated zone b parameter: Used the b parameter value for sand listed in the Data Collection Handbook, 4.05.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

7. Water Table Drop Rate: Used the default value of 0.001 m/yr.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

8. Well Pump Intake Depth: Used the default value of 10 m.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

10. Model for Water Transport Parameters: Used non-dispersion per NUREG-1569 (NRC, 2003).

No sensitivity analysis on this parameter was performed based on the guidance.

11. Well Pumping Rate: The UGSG Circular 1268 lists the uses of ground water in South Dakota (in million gallons per day) as public supply (54.2), domestic (9.52), irrigation (137), livestock (16.9), industrial (3.16), and thermoelectric power (1.23) (USGS, 2004). Since the aquifer containing the ore will be not used for drinking water, the public supply and domestic uses were ignored. Since the site is located in a rural area, the industrial and thermoelectric power uses were ignored as well. The Circular lists the rate of groundwater used for livestock in South Dakota as 18.9 x 10^3 acre-feet/yr (USGS, 2004). The Circular also lists the total rate of water (both groundwater and surface water) used for irrigation in South Dakota as 1.18 feet/yr and the fraction from groundwater as 153 thousand acre-feet per year (from ground water) / 418 thousand acre-feet per year (total) = 0.366. The 2003 Natural Resources Inventory by the NRCS lists the amount of land used in South Dakota for livestock is 1985 x 10^3 acres (for pasture) + 22054 x 10^3 acres (for range) = 2.40 x 10^7 acres (NRCS, 2007). Since the area of the contaminated zone is 10,000 m^2 (2.47 acres), the rate of well pumping used in RESRAD was calculated as shown below.

$$\text{Rate (m/yr)} = 2.47\text{ ac x}\left(\frac{18.9\text{ x }10^3\text{ ac - ft/yr}}{2.40\text{ x }10^7\text{ ac}} + 1.18\text{ ft/yr x }0.366\right)\text{x }\frac{1233\text{ m}^3}{\text{ac - ft}} = 1322$$

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

Unsaturated Zone

1. Unsaturated zone thickness: Used the conservative thickness of the Skull Creek shale formation, 15.2 meters (50 ft), based on site specific data.

No sensitivity analysis was performed because the value is site specific.

2. Density of unsaturated zone: Used the average density for the Skull Creek shale formation, 2.61 g/cm^3, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

3. Unsaturated zone total porosity: Used the representative total porosity value for clay, 0.42, listed in the Data Collection Handbook (ANL, 2003).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

4. Unsaturated zone effective porosity: Used the average porosity for the Skull Creek shale formation, 0.092, based on site specific data.

No sensitivity analysis was performed because the value is site specific.

5. Unsaturated zone field capacity: Used the value obtained by subtracting the effective porosity of the unsaturated zone from the total porosity of the unsaturated zone, 0.328.

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

6. Unsaturated zone hydraulic conductivity: Used the average hydraulic conductivity for the Skull Creek shale formation, 3.27 x 10^{-8} cm/s (0.0103 m/yr), based on site specific data.

No sensitivity analysis was performed because the value is site specific.

7. Unsaturated zone b parameter: Used the b parameter value for clay, 11.4, listed in the Data Collection Handbook (ANL, 1993).

No sensitivity analysis was performed since water dependent pathways were not significant contributors to dose.

Occupancy

1. Inhalation Rate: Used the default value of 8,400 m^3/yr.

No sensitivity analysis was performed since inhalation pathways were not significant contributors to dose.

2. Mass Loading for Inhalation: Used the default value of 0.0001 g/m^3.

No sensitivity analysis was performed since inhalation pathways were not significant contributors to dose.

3. Exposure Duration: Used the default value of 30 years.

4. Indoor dust filtration factor: Used the default value of 0.4.

No sensitivity analysis was performed since inhalation pathways were not significant contributors to dose.

5. External gamma shielding factor: Used the value of 0.55. The NUREG-1569 requires that a value between 0.33 and 0.55 be used.

Sensitivity analysis of the external pathway was performed using a multiple of 1.5 (i.e., 0.367, 0.55 and 0.825). Using the lower value resulted in a decrease in the maximum dose rate for the external exposure pathway. Using the higher value resulted in an *increase in the maximum dose rate for the external exposure pathway. The value 0.55 is the most conservative value in the range specified by the NUREG-1569. Graph attached.*

6. Indoor/Outdoor Fractions: Used the defaults of 0.5 indoors and 0.25 outdoors for farmer scenario in the NUREG-1569 (NRC, 2003).

No sensitivity analyses on these parameters were performed based on the guidance.

7. Shape of contaminated zone: A circular shape was used.

Ingestion: Dietary

1. Consumption Rates:

A. Fruit, vegetable and grain: Used the default value of 160 kg/yr. This value was used based upon EPA estimated consumption. NRC Reg. Guide 1.109 has an estimated consumption for an adult of 190 kg/yr. RESRAD adjusts for contaminated and uncontaminated fractions based upon the size of the contaminated area (ANL, 1993).

B. Leafy vegetable: Used the default value of 14 kg/yr. NRC Reg. Guide 1.109 has an estimated consumption for an adult of 64 kg/yr, while NRC estimates for dose from nuclear power plants uses a consumption rate of 30 kg/yr. RESRAD adjusts for contaminated and uncontaminated fractions based upon the size of the contaminated area (ANL, 1993).

C. Milk: Used the default value of 92 L/yr.

D. Meat and poultry: Used the default value of 63 kg/yr.

E. Fish/Seafood: Used the default values of 5.4 kg/yr for fish and 0.9 kg/yr for other seafood.

F. Soil ingestion: Used the default value of 36.5 g/yr.

G. Drinking water intake: Used the default value of 510 L/yr (1.4 L/d).

2. Contaminated Fractions:

NUREG-1569 states that for sites with over 25 acres (approximately 10,000 square meters) of contamination, the fraction of diet from contaminated area should be assumed to be 25% (0.25) (NRC, 2003).

No sensitivity analyses on these parameters were not performed based on the guidance.

A. Water: Used the default value of 1 (i.e., 100% of consumption is from contaminated well water). All current water use in rural areas around the site is from private wells and will likely continue to be in the foreseeable future.

B. Livestock Water: Used default value of 1 (i.e., 100% is from contaminated water). All current water use in rural areas around the site is from private wells and will likely continue to be in the foreseeable future.

C. Irrigation Water: Used the default value of 1 (i.e., 100% is from contaminated water). All current water use in rural areas around the site is from private wells and will likely continue to be in the foreseeable future.

D. Plant food: Used 0.25 as percentage of plant food that is contaminated.

E. Meat: Used 0.25 as percentage of meat that is contaminated.

F. Aquatic food: Used the value of 0 due to the semiarid environment of the site.

G. Milk: Used the value of 0 due to no consumption of locally produced and consumed milk per NUREG-1569 (NRC, 2003).

Ingestion: Nondietary

1. Consumption Rates:

A. Livestock fodder intake for meat: Used the default value of 68 kg/day.

B. Livestock water intake for meat: Used the default value of 50 L/day. According to NRC Regulatory Guide 1.109 (NRC, 1977), the water ingestion rate for beef cattle is 50 L/d.

C. Livestock intake of soil for meat: Used the default value of 0.5 g/day.

D. Mass loading for foliar deposition: Used the default value of 0.0001 g/m^3.

Sensitivity analysis on the plant (water independent) pathway was run with a multiple of 100 (i.e., 0.000001, 0.0001, and 0.01 g/m^3). Using the higher value resulted in a small increase in the maximum dose rate. Using the lower value did not result in a change in the maximum dose rate. According to the Data Collection Handbook, the mid-range value has been used by the EPA for screening calculations. Therefore the mid-range value is justified for use in the model. Graph attached.

E. Depth of soil mixing layer: Used the default value of 0.15 meters.

F. Depth of roots: Used 0.3 meters as a screening level based upon NUREG-1569. The root depth varies for different plants. For some plants, such as beets, carrots, lettuce, and so forth, it does not extend below about 0.3 m, which is the basis of the NRC guidance. For others, such as fruit trees, the roots may extend 2 or 3 m below the surface. Tap roots for some crops (e.g., alfalfa) can extend to 5 m. Most of the plant roots from which nutrients are obtained, however, usually extend to less than 1 m below the surface.

Sensitivity analysis on the plant (water independent) pathway was run with a multiple of 2 (i.e., 0.15, 0.3, and 0.6). There was a significant impact on the maximum dose. Assumption of a shallow root system increased the dose significantly. The NRC guidance is based on the shallow-rooted plants used for consumption. Therefore, the use of the root depth recommended in the NUREG-1569 in the model is conservative. Graph attached.

G. <u>Groundwater fractional usage:</u>

- <u>Drinking water</u>: Used the value of 0 due to the aquifer being exempt from being used for drinking water.
- <u>Livestock water</u>: Used the value of 0.401. In the USGS Circular 1268, the fraction of irrigation water used in South Dakota is 18.9 thousand acre-feet/yr (from ground water) / 47.1 thousand acre-feet/yr (total) = 0.401.
- <u>Irrigation water</u>: Used the value of 0.366 described previously in the well pumping rate parameter.

Storage Times

Used the default values for all storage times (vegetables, meats, fodder, etc.).

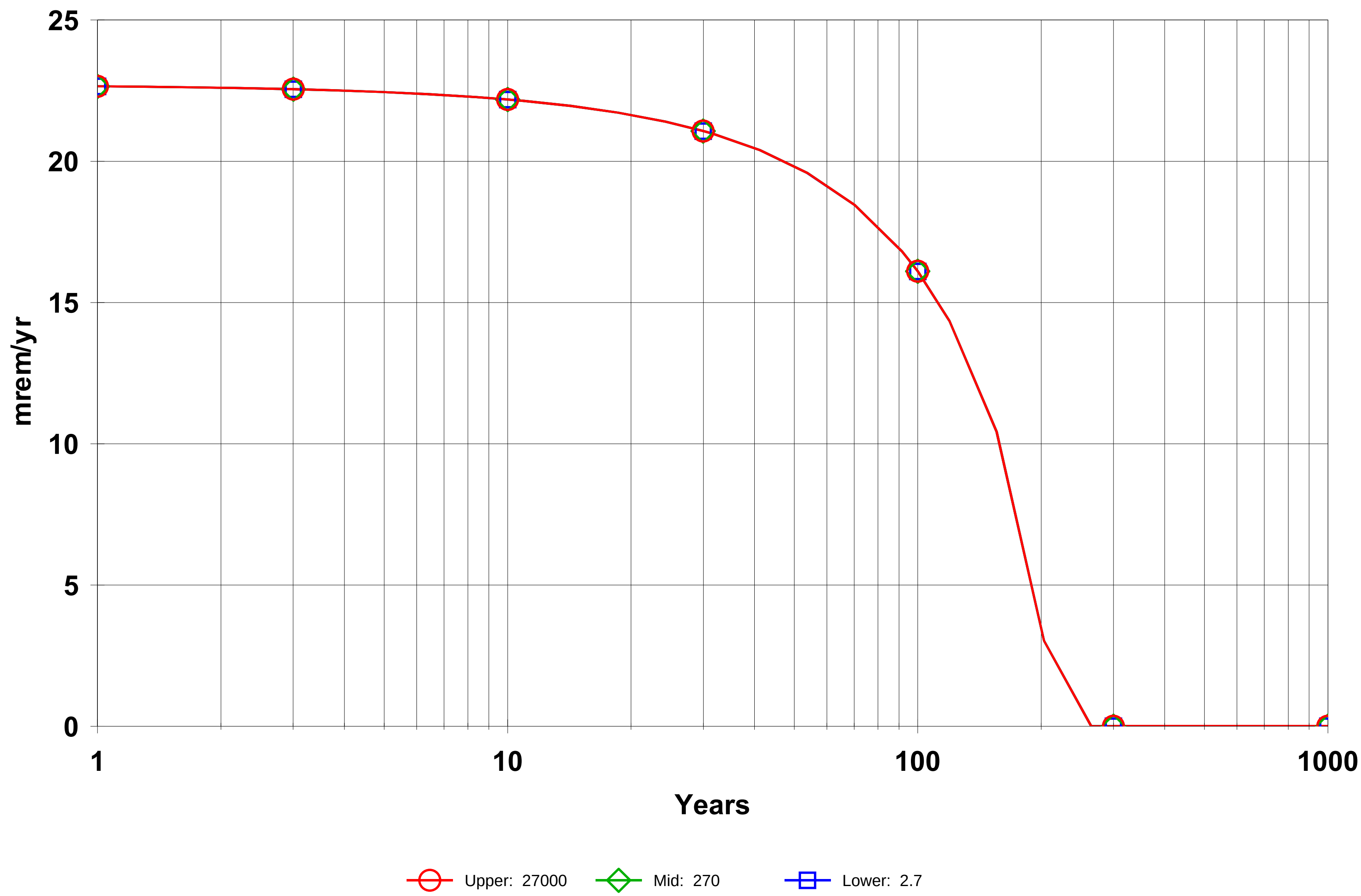
Radium Benchmark Dose Assessment

Attachment 2

RESRAD Input Parameter

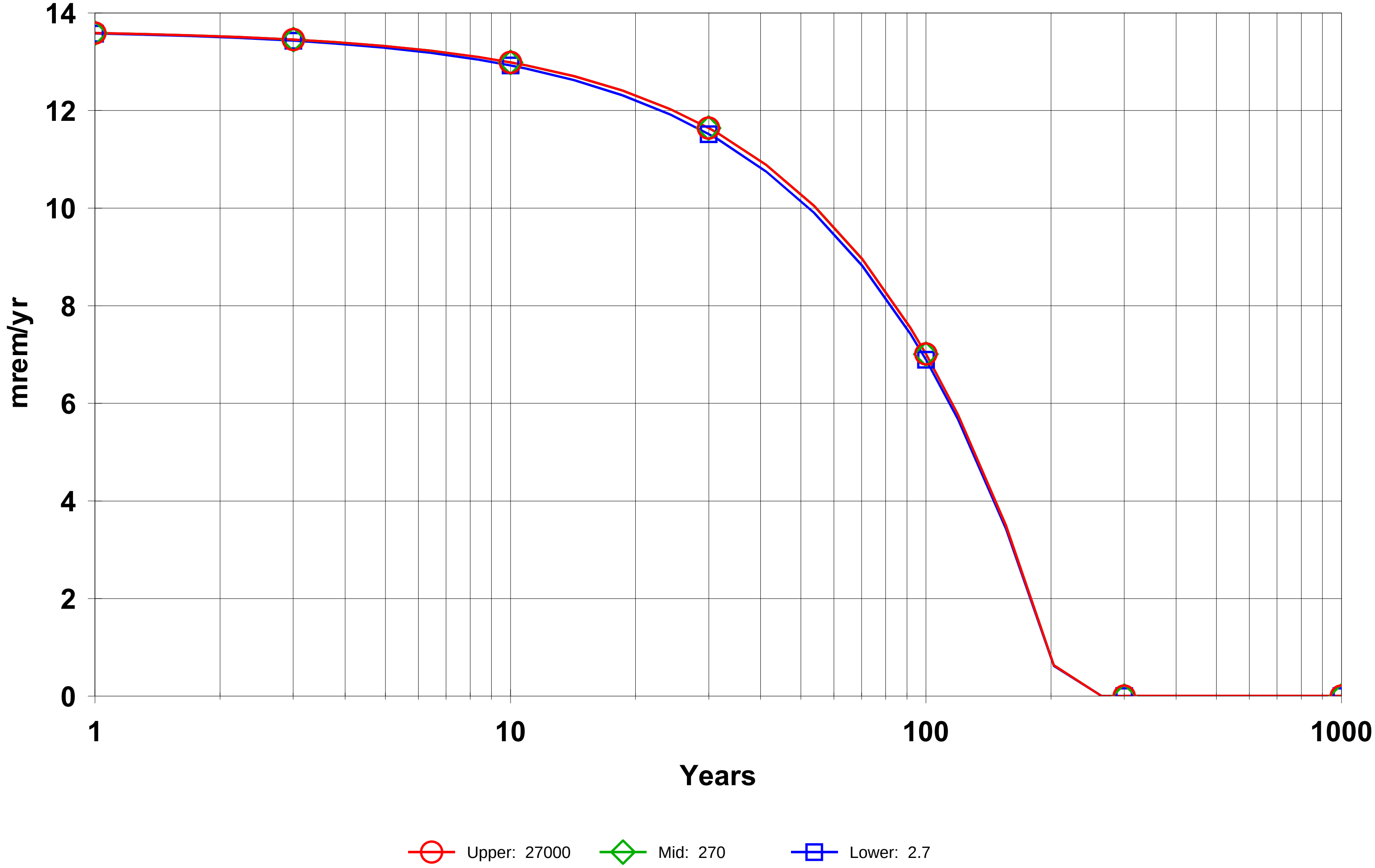
Sensitivity Analysis

DOSE: All Nuclides Summed, External With SA on Pb-210 Contaminated Zone Distribution Coefficient

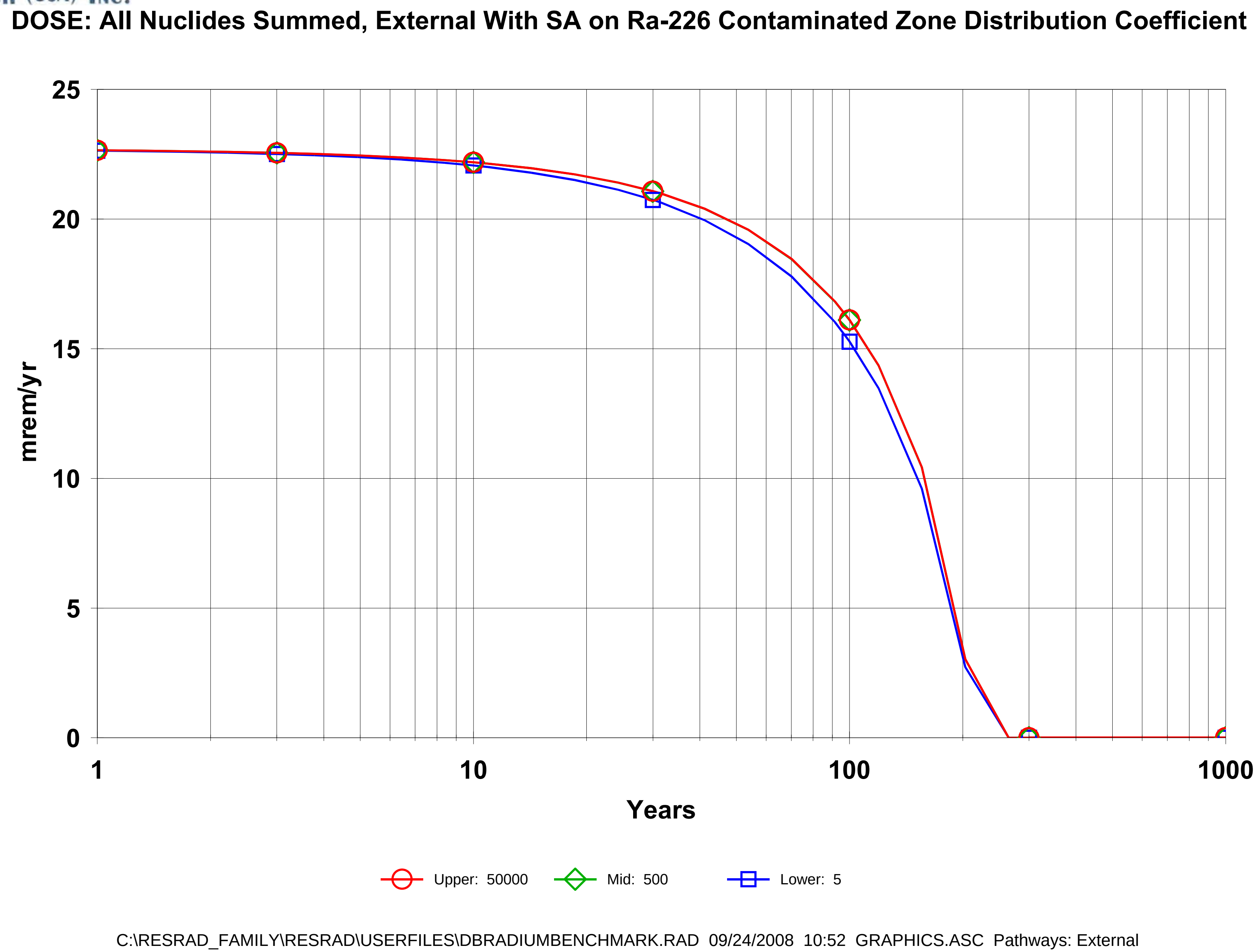


C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:52 GRAPHICS.ASC Pathways: External

DOSE: All Nuclides Summed, Plant (Water Independent) With SA on Pb-210 Contaminated Zone Distribution Coefficient



C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:52 GRAPHICS.ASC Pathways: Plant (Water Independent)


DOSE: All Nuclides Summed, External With SA on Ra-226 Contaminated Zone Distribution Coefficient
25
20
15
10
5
0
mrem/yr
1
10
100
1000
Years
Upper: 50000
Mid: 500
Lower: 5
C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:52 GRAPHICS.ASC Pathways: External

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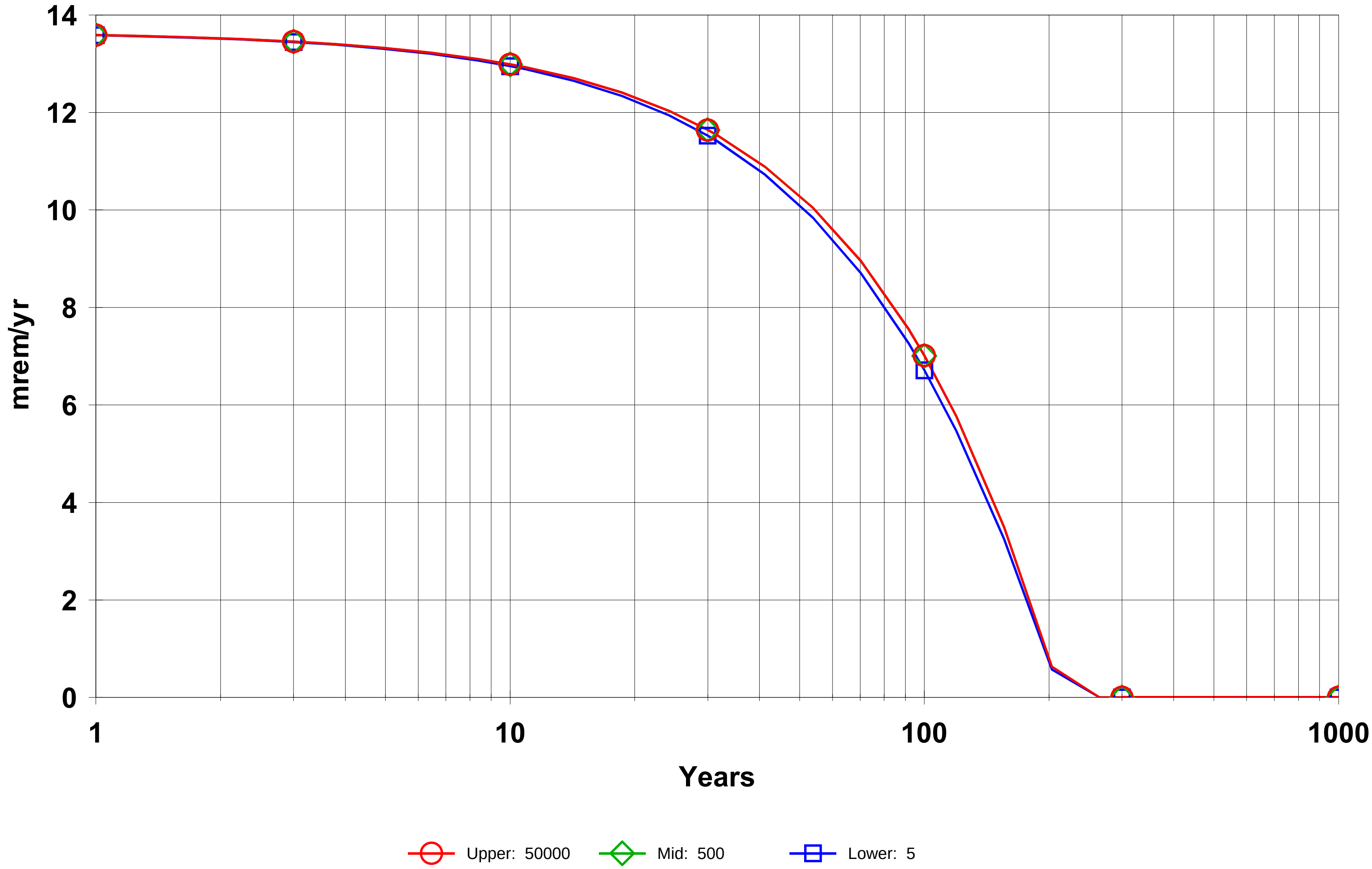
DOSE: All Nuclides Summed, Plant (Water Independent) With SA on Ra-226 Contaminated Zone Distribution Coefficient



C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:52 GRAPHICS.ASC Pathways: Plant (Water Independent)

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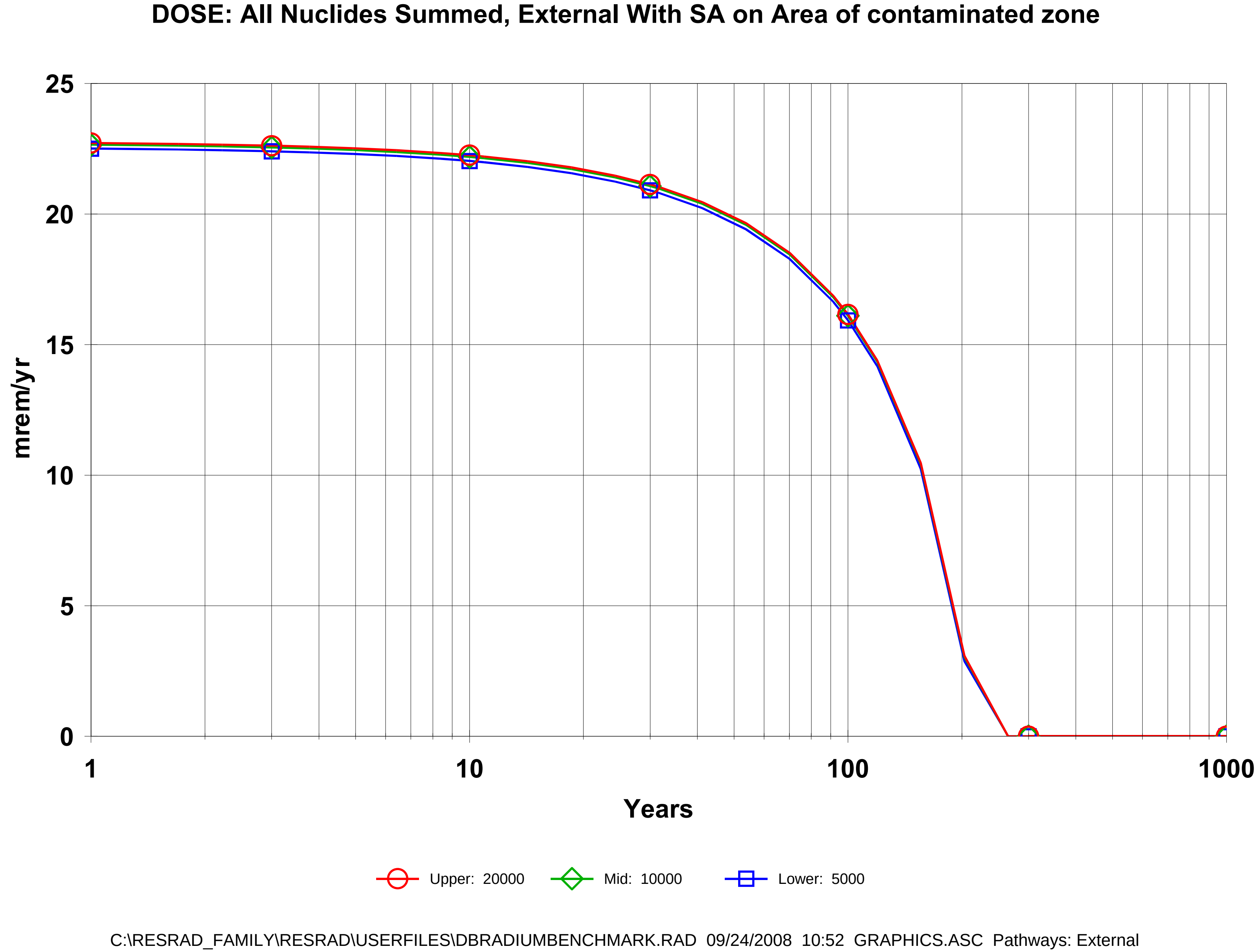
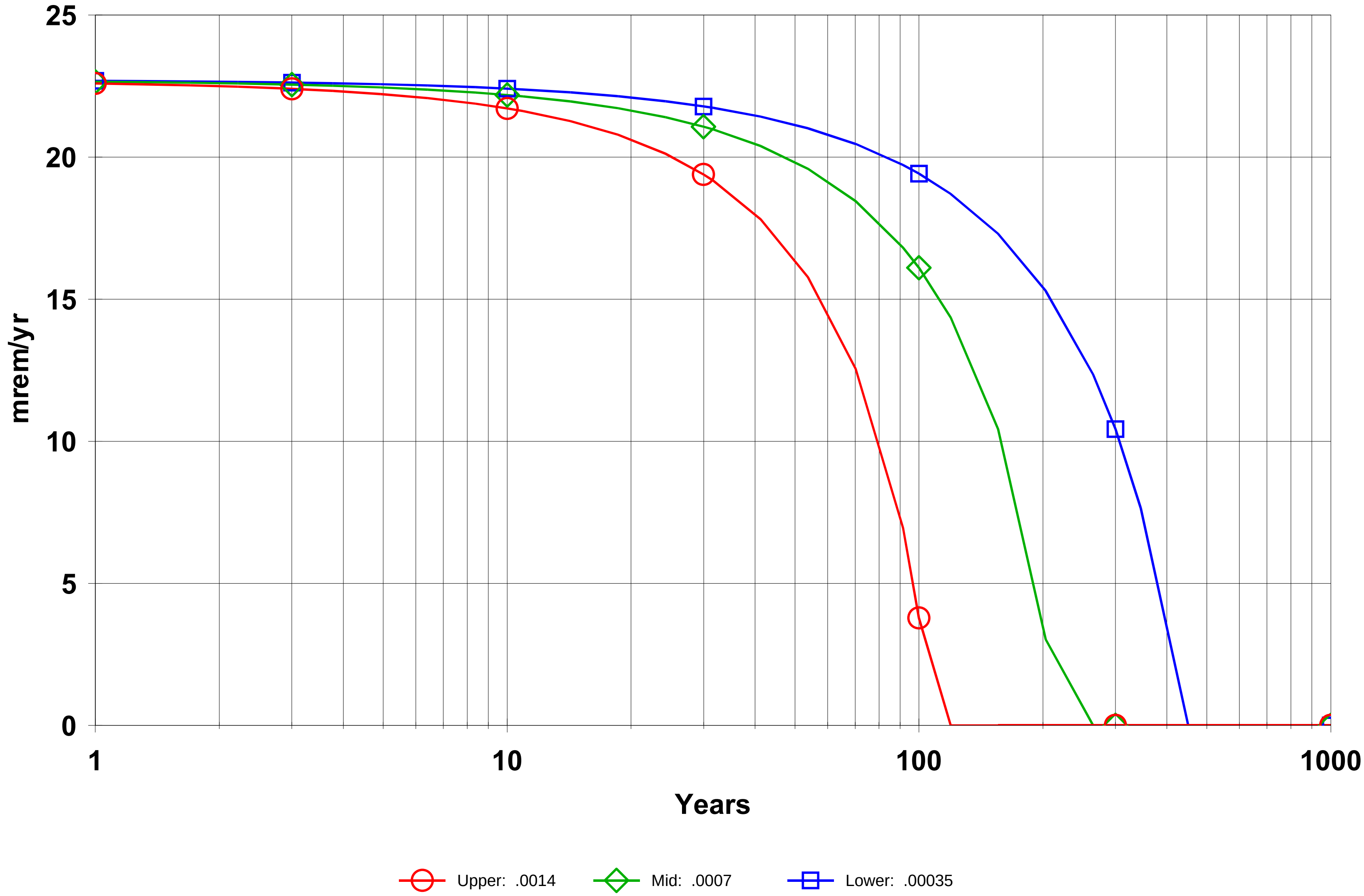


POWERTECH (USA) INC.

DOSE: All Nuclides Summed, External With SA on Contaminated zone erosion rate



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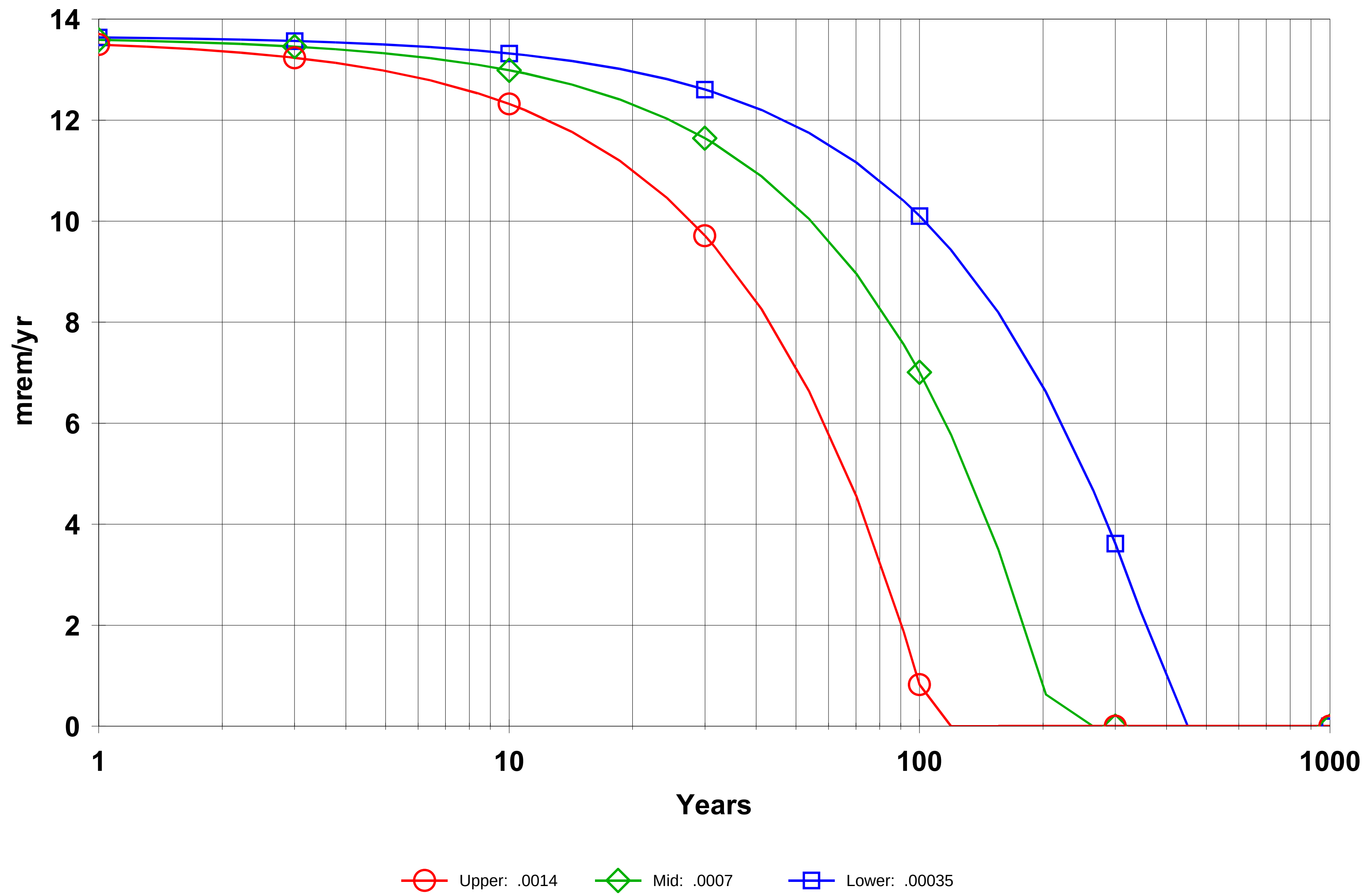
DOSE: All Nuclides Summed, Plant (Water Independent) With SA on Contaminated zone erosion rate



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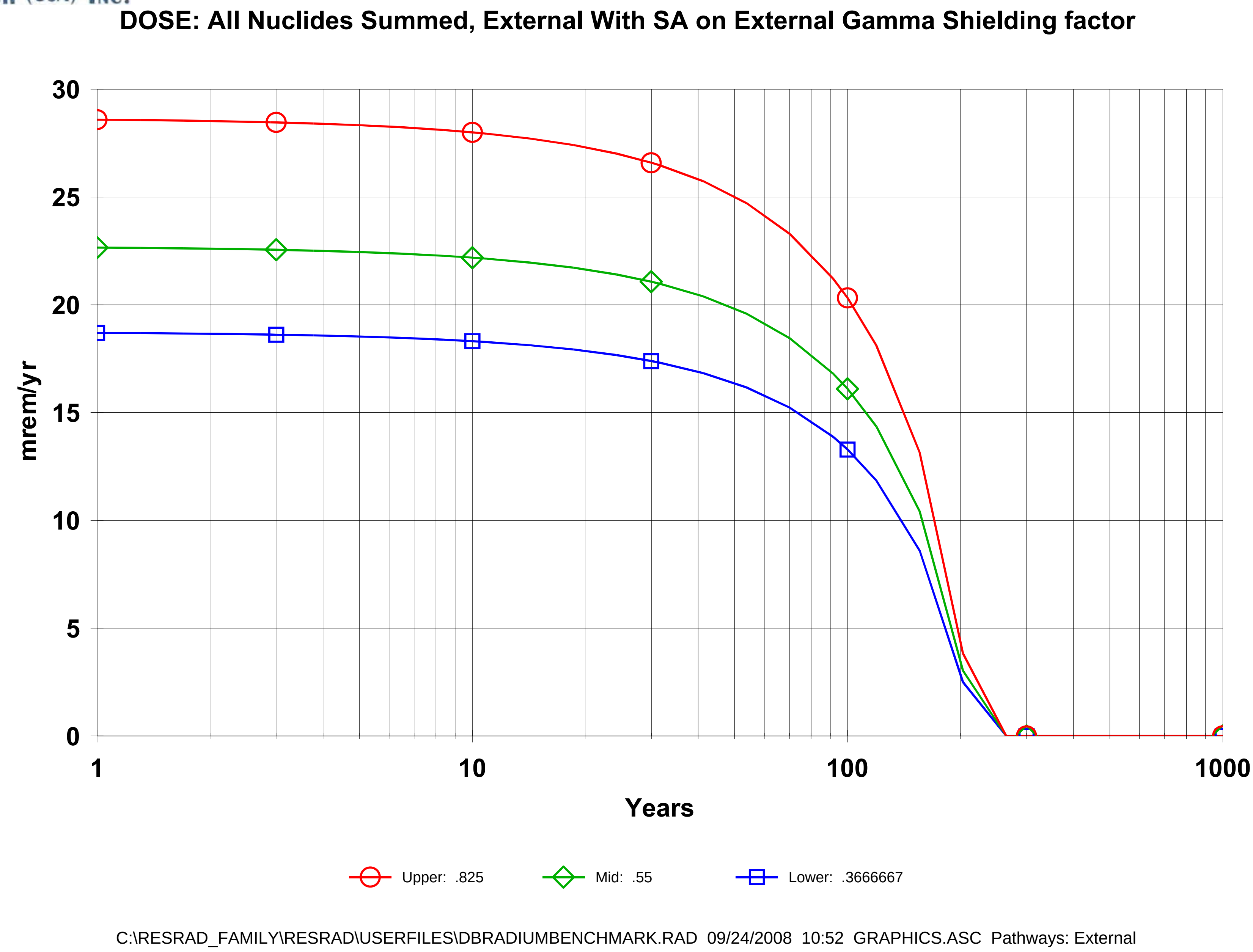
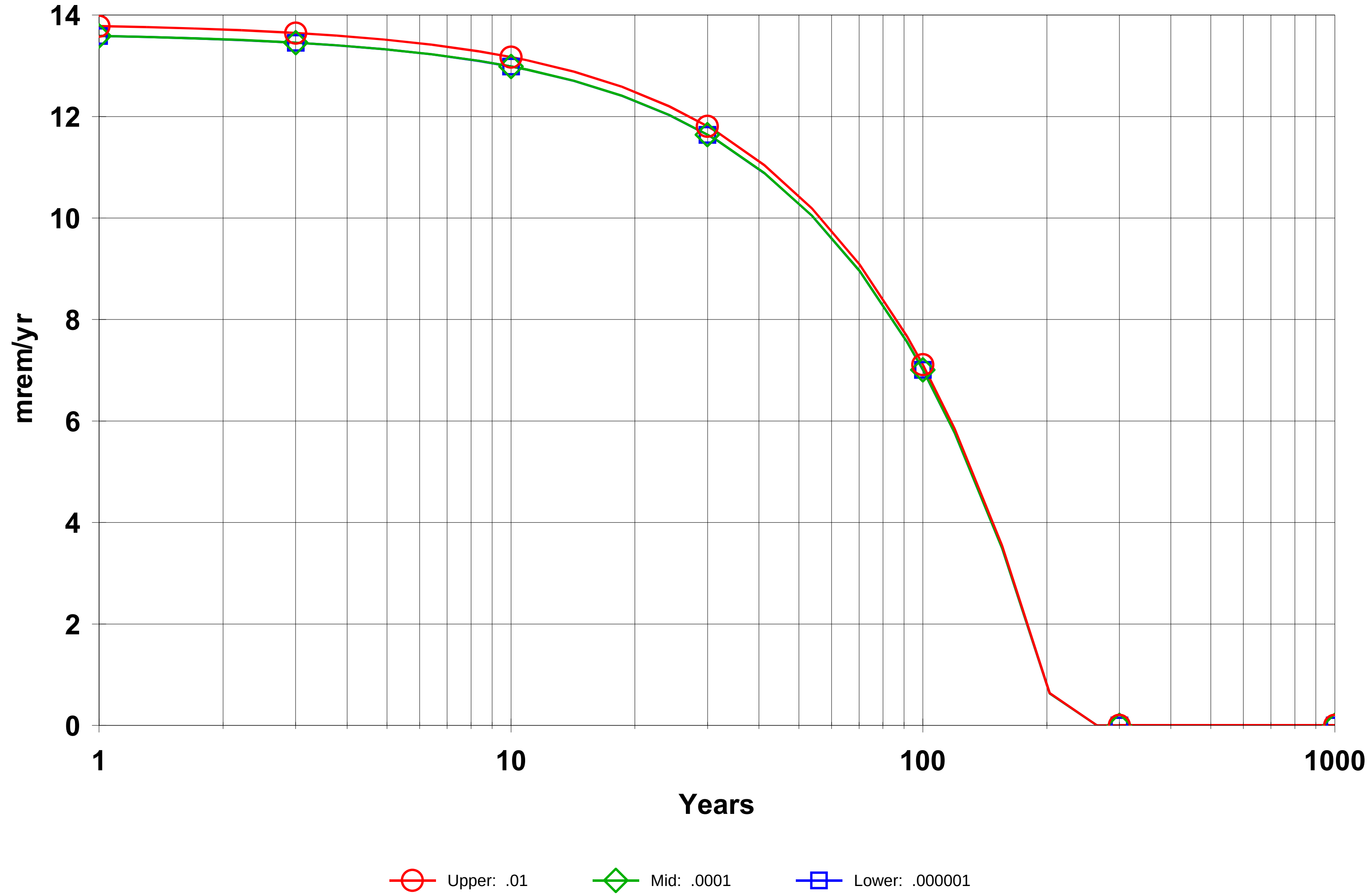
POWERTECH (USA) INC.



POWERTECH (USA) INC.

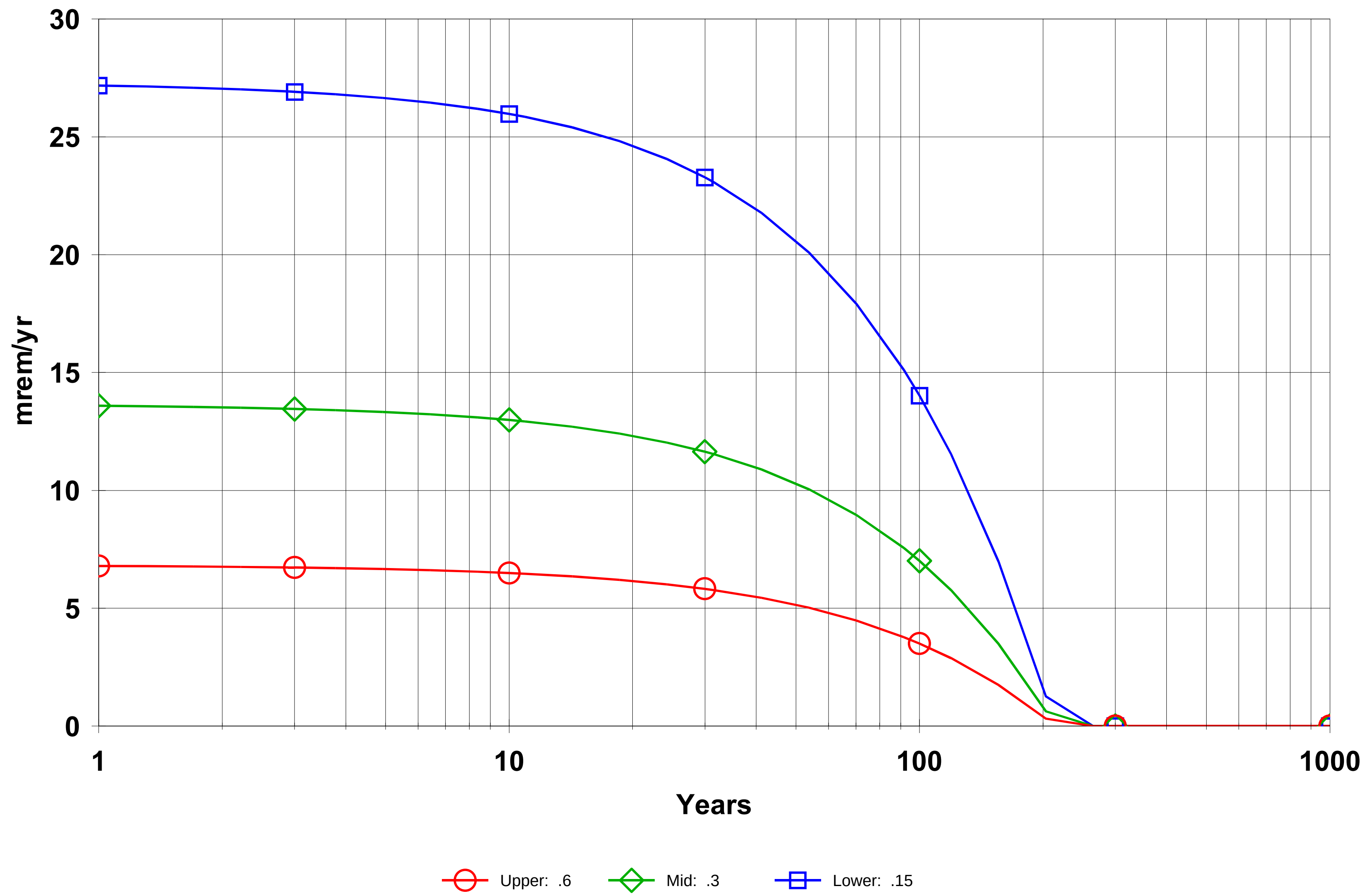
DOSE: All Nuclides Summed, Plant (Water Independent) With SA on Mass loading for foliar deposition



C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 12:04 GRAPHICS.ASC Pathways: Plant (Water Independent)

Powertech (USA) Inc.

DOSE: All Nuclides Summed, Plant (Water Independent) With SA on Depth of roots



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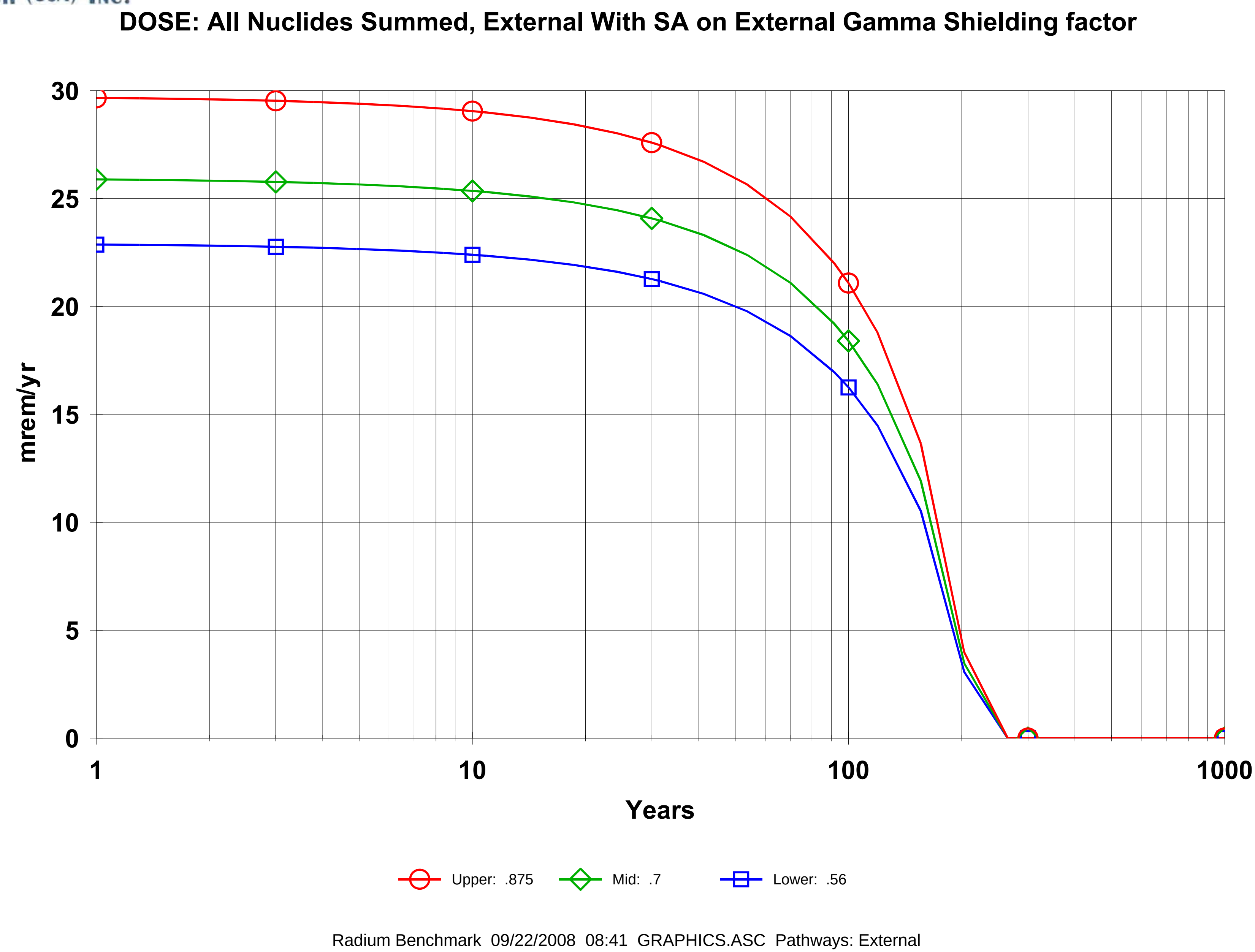
POWERTECH (USA) INC.



Radium Benchmark Dose Assessment

Attachment 3.0

RESRAD Model Output

Radium

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 11

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(1)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(2)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(3)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(4)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(5)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(6)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(7)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(8)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(9)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(10)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(11)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(1)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(1)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(2)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.260E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	7.000E-04	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	5.384E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	1.000E-34	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.990E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	7.120E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	3.200E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	3.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.300E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	2.640E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.400E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.974E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	4.260E-02	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	7.030E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.322E+03	2.500E+02	---	UW

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	1.520E+01	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	2.610E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.200E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	9.200E-02	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	3.280E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	1.140E+01	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.030E-02	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	5.500E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.018E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	9.100E+03	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.500E-06	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	5.500E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	0.000E+00	5.000E-01	---	FR9
R018	Contamination fraction of plant food	2.500E-01	-1	---	FPLANT
R018	Contamination fraction of meat	2.500E-01	-1	---	FMEAT
R018	Contamination fraction of milk	0.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	3.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	0.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	4.020E-01	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	3.660E-01	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	5.000E+00
Thickness:	0.15 meters	Ra-226	5.000E+00
Cover Depth:	0.00 meters		

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	3.812E+01	3.800E+01	3.775E+01	3.685E+01	3.422E+01	2.402E+01	0.000E+00	0.000E+00
M(t):	1.525E+00	1.520E+00	1.510E+00	1.474E+00	1.369E+00	9.609E-01	0.000E+00	0.000E+00

0Maximum TDOSE(t): 3.812E+01 mrem/yr   at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	1.478E-02	0.0004	6.341E-03	0.0002	0.000E+00	0.0000	7.776E+00	0.2040	3.785E-01	0.0099	0.000E+00	0.0000	9.784E-01	0.0257
Ra-226	2.269E+01	0.5952	2.485E-03	0.0001	0.000E+00	0.0000	5.876E+00	0.1541	2.015E-01	0.0053	0.000E+00	0.0000	1.956E-01	0.0051
Total	2.270E+01	0.5956	8.826E-03	0.0002	0.000E+00	0.0000	1.365E+01	0.3581	5.801E-01	0.0152	0.000E+00	0.0000	1.174E+00	0.0308

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.154E+00	0.2401
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.897E+01	0.7599
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.812E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	1.432E-02	0.0004	6.118E-03	0.0002	0.000E+00	0.0000	7.503E+00	0.1974	3.653E-01	0.0096	0.000E+00	0.0000	9.440E-01	0.0248
Ra-226	2.264E+01	0.5958	2.665E-03	0.0001	0.000E+00	0.0000	6.087E+00	0.1602	2.125E-01	0.0056	0.000E+00	0.0000	2.244E-01	0.0059
Total	2.265E+01	0.5962	8.783E-03	0.0002	0.000E+00	0.0000	1.359E+01	0.3576	5.778E-01	0.0152	0.000E+00	0.0000	1.168E+00	0.0307

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.833E+00	0.2324
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E+01	0.7676
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.800E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	1.344E-02	0.0004	5.695E-03	0.0002	0.000E+00	0.0000	6.984E+00	0.1850	3.400E-01	0.0090	0.000E+00	0.0000	8.787E-01	0.0233
Ra-226	2.254E+01	0.5971	3.003E-03	0.0001	0.000E+00	0.0000	6.472E+00	0.1715	2.321E-01	0.0061	0.000E+00	0.0000	2.784E-01	0.0074
Total	2.255E+01	0.5975	8.698E-03	0.0002	0.000E+00	0.0000	1.346E+01	0.3565	5.721E-01	0.0152	0.000E+00	0.0000	1.157E+00	0.0307

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.222E+00	0.2178
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.952E+01	0.7822
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.775E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	1.077E-02	0.0003	4.429E-03	0.0001	0.000E+00	0.0000	5.432E+00	0.1474	2.644E-01	0.0072	0.000E+00	0.0000	6.834E-01	0.0185
Ra-226	2.218E+01	0.6017	3.969E-03	0.0001	0.000E+00	0.0000	7.556E+00	0.2050	2.879E-01	0.0078	0.000E+00	0.0000	4.342E-01	0.0118
Total	2.219E+01	0.6020	8.398E-03	0.0002	0.000E+00	0.0000	1.299E+01	0.3524	5.523E-01	0.0150	0.000E+00	0.0000	1.118E+00	0.0303

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

0 Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.395E+00	0.1735
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.046E+01	0.8265
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.685E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	5.712E-03	0.0002	2.145E-03	0.0001	0.000E+00	0.0000	2.630E+00	0.0769	1.281E-01	0.0037	0.000E+00	0.0000	3.309E-01	0.0097
Ra-226	2.107E+01	0.6156	5.388E-03	0.0002	0.000E+00	0.0000	9.012E+00	0.2634	3.673E-01	0.0107	0.000E+00	0.0000	6.721E-01	0.0196
Total	2.107E+01	0.6158	7.533E-03	0.0002	0.000E+00	0.0000	1.164E+01	0.3402	4.953E-01	0.0145	0.000E+00	0.0000	1.003E+00	0.0293

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

Radio- Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.097E+00	0.0905
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.112E+01	0.9095
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.422E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	5.952E-04	0.0000	1.506E-04	0.0000	0.000E+00	0.0000	1.848E-01	0.0077	8.997E-03	0.0004	0.000E+00	0.0000	2.324E-02	0.0010
Ra-226	1.610E+01	0.6704	4.388E-03	0.0002	0.000E+00	0.0000	6.825E+00	0.2841	2.895E-01	0.0120	0.000E+00	0.0000	5.814E-01	0.0242
Total	1.610E+01	0.6704	4.539E-03	0.0002	0.000E+00	0.0000	7.010E+00	0.2918	2.985E-01	0.0124	0.000E+00	0.0000	6.047E-01	0.0252

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.177E-01	0.0091
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.380E+01	0.9909
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.402E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210+D	Pb-210+D	1.000E+00	1.831E+00	1.767E+00	1.644E+00	1.279E+00	6.194E-01	4.355E-02	0.000E+00	0.000E+00
0Ra-226+D	Ra-226+D	1.000E+00	5.760E+00	5.743E+00	5.710E+00	5.594E+00	5.248E+00	3.841E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	3.353E-02	8.996E-02	1.945E-01	4.978E-01	9.766E-01	9.202E-01	0.000E+00	0.000E+00
Ra-226+D	ΣDSR(j)		5.793E+00	5.833E+00	5.905E+00	6.092E+00	6.224E+00	4.761E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	1.366E+01	1.415E+01	1.520E+01	1.955E+01	4.036E+01	5.741E+02	*7.634E+13	*7.634E+13
Ra-226	4.315E+00	4.286E+00	4.234E+00	4.104E+00	4.016E+00	5.251E+00	*9.885E+11	*9.885E+11

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	5.000E+00	0.000E+00	1.831E+00	1.366E+01	1.831E+00	1.366E+01
Ra-226	5.000E+00	25.40 ± 0.05	6.235E+00	4.010E+00	5.793E+00	4.315E+00

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

DOSE(j,t), mrem/yr

0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	9.154E+00	8.833E+00	8.222E+00	6.395E+00	3.097E+00	2.177E-01	0.000E+00	0.000E+00
Pb-210	Ra-226	1.000E+00	1.677E-01	4.498E-01	9.723E-01	2.489E+00	4.883E+00	4.601E+00	0.000E+00	0.000E+00
Pb-210	ΣDOSE(j)		9.322E+00	9.282E+00	9.194E+00	8.884E+00	7.980E+00	4.819E+00	0.000E+00	0.000E+00
0Ra-226	Ra-226	1.000E+00	2.880E+01	2.872E+01	2.855E+01	2.797E+01	2.624E+01	1.920E+01	0.000E+00	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

S(j,t), pCi/g

0Nuclide (j)	Parent (i)	THF(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Pb-210	Pb-210	1.000E+00	5.000E+00	4.847E+00	4.555E+00	3.664E+00	1.967E+00	2.232E-01	4.445E-04	1.568E-13
Pb-210	Ra-226	1.000E+00	0.000E+00	1.530E-01	4.449E-01	1.333E+00	3.009E+00	4.626E+00	4.444E+00	3.269E+00
Pb-210	ΣS(j):		5.000E+00	5.000E+00	5.000E+00	4.996E+00	4.976E+00	4.849E+00	4.445E+00	3.269E+00
0Ra-226	Ra-226	1.000E+00	5.000E+00	4.998E+00	4.993E+00	4.978E+00	4.935E+00	4.785E+00	4.383E+00	3.224E+00

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 1.35 seconds

Radium Benchmark Dose Assessment

Attachment 3.1

RESRAD Model Output

Uranium

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 11

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ac-227 (Source: FGR 12)	4.951E-04	4.951E-04	DCF1(1)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(4)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(5)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(6)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(7)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(8)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(9)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(10)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(11)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(12)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(13)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(14)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(15)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(16)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(17)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(18)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(19)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(20)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(21)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(22)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(23)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(24)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(25)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(26)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(27)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(28)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(29)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(30)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	U-234	1.320E-01	1.320E-01	DCF2(6)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(7)
B-1	U-238	1.180E-01	1.180E-01	DCF2(8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	U-234	2.830E-04	2.830E-04	DCF3(6)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 11

0 Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(7)
D-1	U-238	2.550E-04	2.550E-04	DCF3(8)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(9)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(6,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(6,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(7,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(7,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(8,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(8,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 11

0

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(6,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(6,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(7,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(8,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(8,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): U-234	4.920E+01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): U-235	2.200E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-238	4.860E+01	0.000E+00	---	S1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(8)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.260E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	7.000E-04	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	5.384E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	1.000E-34	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.990E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	7.120E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	3.200E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	3.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.300E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	2.640E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.400E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.974E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	4.260E-02	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	7.030E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.322E+03	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	1.520E+01	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	2.610E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.200E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	9.200E-02	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	3.280E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	1.140E+01	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.030E-02	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.480E-05	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.480E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.480E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.362E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.480E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.746E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.919E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.585E-08	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	5.500E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	0.000E+00	5.000E-01	---	FR9
R018	Contamination fraction of plant food	2.500E-01	-1	---	FPLANT
R018	Contamination fraction of meat	2.500E-01	-1	---	FMEAT
R018	Contamination fraction of milk	0.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	3.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	0.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	4.020E-01	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	3.660E-01	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

```
      Contaminated Zone Dimensions           Initial Soil Concentrations, pCi/g
      ____________________________           __________________________________

        Area:  10000.00 square meters               U-234      4.920E+01
   Thickness:      0.15 meters                      U-235      2.200E+00
 Cover Depth:      0.00 meters                      U-238      4.860E+01
0
                                     Total Dose TDOSE(t), mrem/yr
                               Basic Radiation Dose Limit = 2.500E+01 mrem/yr
              Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
              ___________________________________________________________________________

    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  1.000E+02  3.000E+02  1.000E+03
     TDOSE(t):  7.073E+00  7.054E+00  7.015E+00  6.878E+00  6.472E+00  4.824E+00  0.000E+00  0.000E+00
         M(t):  2.829E-01  2.821E-01  2.806E-01  2.751E-01  2.589E-01  1.930E-01  0.000E+00  0.000E+00
0Maximum TDOSE(t):  7.073E+00 mrem/yr   at t = 0.000E+00 years
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	9.939E-03	0.0014	3.606E-01	0.0510	0.000E+00	0.0000	7.561E-01	0.1069	4.355E-02	0.0062	0.000E+00	0.0000	3.803E-01	0.0538
U-235	7.959E-01	0.1125	1.503E-02	0.0021	0.000E+00	0.0000	3.199E-02	0.0045	1.853E-03	0.0003	0.000E+00	0.0000	1.607E-02	0.0023
U-238	3.236E+00	0.4576	3.185E-01	0.0450	0.000E+00	0.0000	7.091E-01	0.1003	4.085E-02	0.0058	0.000E+00	0.0000	3.567E-01	0.0504
Total	4.042E+00	0.5715	6.942E-01	0.0981	0.000E+00	0.0000	1.497E+00	0.2117	8.625E-02	0.0122	0.000E+00	0.0000	7.530E-01	0.1065

0
Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.550E+00	0.2192
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.609E-01	0.1217
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.661E+00	0.6591
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.073E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
U-234	9.937E-03	0.0014	3.589E-01	0.0509	0.000E+00	0.0000	7.525E-01	0.1067	4.335E-02	0.0061	0.000E+00	0.0000	3.785E-01	0.0537
U-235	7.953E-01	0.1127	1.496E-02	0.0021	0.000E+00	0.0000	3.195E-02	0.0045	1.877E-03	0.0003	0.000E+00	0.0000	1.601E-02	0.0023
U-238	3.232E+00	0.4582	3.170E-01	0.0449	0.000E+00	0.0000	7.058E-01	0.1001	4.065E-02	0.0058	0.000E+00	0.0000	3.550E-01	0.0503
Total	4.037E+00	0.5723	6.909E-01	0.0980	0.000E+00	0.0000	1.490E+00	0.2113	8.588E-02	0.0122	0.000E+00	0.0000	7.494E-01	0.1063

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

0 Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.543E+00	0.2188
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.601E-01	0.1219
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.650E+00	0.6593
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.054E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	9.936E-03	0.0014	3.555E-01	0.0507	0.000E+00	0.0000	7.454E-01	0.1063	4.293E-02	0.0061	0.000E+00	0.0000	3.749E-01	0.0534
U-235	7.939E-01	0.1132	1.483E-02	0.0021	0.000E+00	0.0000	3.186E-02	0.0045	1.923E-03	0.0003	0.000E+00	0.0000	1.589E-02	0.0023
U-238	3.223E+00	0.4594	3.140E-01	0.0448	0.000E+00	0.0000	6.991E-01	0.0997	4.027E-02	0.0057	0.000E+00	0.0000	3.516E-01	0.0501
Total	4.027E+00	0.5740	6.844E-01	0.0976	0.000E+00	0.0000	1.476E+00	0.2105	8.513E-02	0.0121	0.000E+00	0.0000	7.424E-01	0.1058

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0 Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.529E+00	0.2179
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.584E-01	0.1224
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.628E+00	0.6597
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.015E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
U-234	9.956E-03	0.0014	3.436E-01	0.0500	0.000E+00	0.0000	7.204E-01	0.1047	4.149E-02	0.0060	0.000E+00	0.0000	3.623E-01	0.0527
U-235	7.888E-01	0.1147	1.437E-02	0.0021	0.000E+00	0.0000	3.155E-02	0.0046	2.077E-03	0.0003	0.000E+00	0.0000	1.547E-02	0.0022
U-238	3.190E+00	0.4638	3.035E-01	0.0441	0.000E+00	0.0000	6.756E-01	0.0982	3.892E-02	0.0057	0.000E+00	0.0000	3.398E-01	0.0494
Total	3.989E+00	0.5799	6.615E-01	0.0962	0.000E+00	0.0000	1.428E+00	0.2076	8.249E-02	0.0120	0.000E+00	0.0000	7.176E-01	0.1043

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E+00	0.2149
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.523E-01	0.1239
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.548E+00	0.6612
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.878E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
U-234	1.021E-02	0.0016	3.097E-01	0.0478	0.000E+00	0.0000	6.491E-01	0.1003	3.739E-02	0.0058	0.000E+00	0.0000	3.265E-01	0.0504
U-235	7.717E-01	0.1192	1.315E-02	0.0020	0.000E+00	0.0000	3.057E-02	0.0047	2.433E-03	0.0004	0.000E+00	0.0000	1.432E-02	0.0022
U-238	3.084E+00	0.4765	2.734E-01	0.0422	0.000E+00	0.0000	6.087E-01	0.0940	3.506E-02	0.0054	0.000E+00	0.0000	3.061E-01	0.0473
Total	3.866E+00	0.5973	5.962E-01	0.0921	0.000E+00	0.0000	1.288E+00	0.1991	7.488E-02	0.0116	0.000E+00	0.0000	6.470E-01	0.1000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.333E+00	0.2059
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.322E-01	0.1286
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.307E+00	0.6655
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.472E+00	1.0000

0*Sum of all water independent and dependent pathways.

Summary : Dewey Burdock
File   : C:\RESRAD_FAMILY\RESRAD\USERFILES\DBURANIUMBENCHMARK.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	1.234E-02	0.0026	1.913E-01	0.0396	0.000E+00	0.0000	4.015E-01	0.0832	2.311E-02	0.0048	0.000E+00	0.0000	2.017E-01	0.0418
U-235	6.627E-01	0.1374	8.775E-03	0.0018	0.000E+00	0.0000	2.400E-02	0.0050	2.714E-03	0.0006	0.000E+00	0.0000	9.918E-03	0.0021
U-238	2.532E+00	0.5248	1.687E-01	0.0350	0.000E+00	0.0000	3.755E-01	0.0778	2.163E-02	0.0045	0.000E+00	0.0000	1.888E-01	0.0391
Total	3.207E+00	0.6647	3.687E-01	0.0764	0.000E+00	0.0000	8.010E-01	0.1660	4.745E-02	0.0098	0.000E+00	0.0000	4.004E-01	0.0830

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years
0 Water Dependent Pathways

0 Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.298E-01	0.1720
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.081E-01	0.1468
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.287E+00	0.6812
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.824E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-234	U-234	1.000E+00	3.151E-02	3.136E-02	3.107E-02	3.003E-02	2.707E-02	1.676E-02	0.000E+00	0.000E+00
U-234	Th-230	1.000E+00	2.125E-07	6.250E-07	1.437E-06	4.156E-06	1.088E-05	2.230E-05	0.000E+00	0.000E+00
U-234	Ra-226+D	1.000E+00	3.660E-09	2.588E-08	1.368E-07	1.205E-06	9.591E-06	7.763E-05	0.000E+00	0.000E+00
U-234	Pb-210+D	1.000E+00	1.248E-11	1.627E-10	1.708E-09	3.948E-08	7.406E-07	1.074E-05	0.000E+00	0.000E+00
U-234	ΣDSR(j)		3.151E-02	3.137E-02	3.107E-02	3.004E-02	2.709E-02	1.687E-02	0.000E+00	0.000E+00
0U-235+D	U-235+D	1.000E+00	3.913E-01	3.908E-01	3.899E-01	3.866E-01	3.758E-01	3.156E-01	0.000E+00	0.000E+00
U-235+D	Pa-231	1.000E+00	3.422E-05	1.063E-04	2.492E-04	7.281E-04	1.913E-03	3.926E-03	0.000E+00	0.000E+00
U-235+D	Ac-227+D	1.000E+00	3.202E-07	2.065E-06	1.025E-05	8.164E-05	5.240E-04	2.345E-03	0.000E+00	0.000E+00
U-235+D	ΣDSR(j)		3.913E-01	3.909E-01	3.902E-01	3.874E-01	3.783E-01	3.219E-01	0.000E+00	0.000E+00
0U-238	U-238	5.400E-05	1.524E-06	1.516E-06	1.502E-06	1.452E-06	1.308E-06	8.079E-07	0.000E+00	0.000E+00
0U-238+D	U-238+D	9.999E-01	9.591E-02	9.568E-02	9.522E-02	9.357E-02	8.862E-02	6.762E-02	0.000E+00	0.000E+00
U-238+D	U-234	9.999E-01	4.463E-08	1.333E-07	3.082E-07	8.939E-07	2.341E-06	4.774E-06	0.000E+00	0.000E+00
U-238+D	Th-230	9.999E-01	2.042E-13	1.390E-12	7.205E-12	6.198E-11	4.707E-10	3.175E-09	0.000E+00	0.000E+00
U-238+D	Ra-226+D	9.999E-01	2.576E-15	3.913E-14	4.577E-13	1.197E-11	2.767E-10	7.395E-09	0.000E+00	0.000E+00
U-238+D	Pb-210+D	9.999E-01	7.414E-18	1.982E-16	4.446E-15	3.018E-13	1.678E-11	8.586E-10	0.000E+00	0.000E+00
U-238+D	ΣDSR(j)		9.591E-02	9.568E-02	9.522E-02	9.357E-02	8.863E-02	6.762E-02	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.
0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-234	7.933E+02	7.971E+02	8.046E+02	8.323E+02	9.228E+02	1.482E+03	*6.247E+09	*6.247E+09
U-235	6.389E+01	6.395E+01	6.407E+01	6.453E+01	6.609E+01	7.767E+01	*2.161E+06	*2.161E+06
U-238	2.606E+02	2.613E+02	2.625E+02	2.672E+02	2.821E+02	3.697E+02	*3.361E+05	*3.361E+05

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
U-234	4.920E+01	0.000E+00	3.151E-02	7.933E+02	3.151E-02	7.933E+02
U-235	2.200E+00	0.000E+00	3.913E-01	6.389E+01	3.913E-01	6.389E+01
U-238	4.860E+01	0.000E+00	9.592E-02	2.606E+02	9.592E-02	2.606E+02

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-234	U-234	1.000E+00	1.550E+00	1.543E+00	1.529E+00	1.478E+00	1.332E+00	8.244E-01	0.000E+00	0.000E+00
U-234	U-238	9.999E-01	2.169E-06	6.480E-06	1.498E-05	4.344E-05	1.138E-04	2.320E-04	0.000E+00	0.000E+00
U-234	ΣDOSE(j)		1.550E+00	1.543E+00	1.529E+00	1.478E+00	1.332E+00	8.246E-01	0.000E+00	0.000E+00
0Th-230	U-234	1.000E+00	1.046E-05	3.075E-05	7.068E-05	2.045E-04	5.355E-04	1.097E-03	0.000E+00	0.000E+00
Th-230	U-238	9.999E-01	9.922E-12	6.757E-11	3.502E-10	3.012E-09	2.288E-08	1.543E-07	0.000E+00	0.000E+00
Th-230	ΣDOSE(j)		1.046E-05	3.075E-05	7.068E-05	2.045E-04	5.355E-04	1.097E-03	0.000E+00	0.000E+00
0Ra-226	U-234	1.000E+00	1.801E-07	1.273E-06	6.732E-06	5.928E-05	4.719E-04	3.819E-03	0.000E+00	0.000E+00
Ra-226	U-238	9.999E-01	1.252E-13	1.902E-12	2.225E-11	5.817E-10	1.345E-08	3.594E-07	0.000E+00	0.000E+00
Ra-226	ΣDOSE(j)		1.801E-07	1.273E-06	6.732E-06	5.928E-05	4.719E-04	3.820E-03	0.000E+00	0.000E+00
0Pb-210	U-234	1.000E+00	6.141E-10	8.003E-09	8.404E-08	1.942E-06	3.644E-05	5.283E-04	0.000E+00	0.000E+00
Pb-210	U-238	9.999E-01	3.603E-16	9.632E-15	2.161E-13	1.467E-11	8.154E-10	4.173E-08	0.000E+00	0.000E+00
Pb-210	ΣDOSE(j)		6.141E-10	8.003E-09	8.404E-08	1.942E-06	3.644E-05	5.283E-04	0.000E+00	0.000E+00
0U-235	U-235	1.000E+00	8.608E-01	8.598E-01	8.578E-01	8.505E-01	8.268E-01	6.943E-01	0.000E+00	0.000E+00
0Pa-231	U-235	1.000E+00	7.529E-05	2.339E-04	5.483E-04	1.602E-03	4.209E-03	8.638E-03	0.000E+00	0.000E+00
0Ac-227	U-235	1.000E+00	7.045E-07	4.542E-06	2.255E-05	1.796E-04	1.153E-03	5.160E-03	0.000E+00	0.000E+00
0U-238	U-238	5.400E-05	7.404E-05	7.370E-05	7.300E-05	7.055E-05	6.357E-05	3.926E-05	0.000E+00	0.000E+00
U-238	U-238	9.999E-01	4.661E+00	4.650E+00	4.628E+00	4.547E+00	4.307E+00	3.286E+00	0.000E+00	0.000E+00
U-238	ΣDOSE(j)		4.661E+00	4.650E+00	4.628E+00	4.548E+00	4.307E+00	3.286E+00	0.000E+00	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-234	U-234	1.000E+00	4.920E+01	4.920E+01	4.919E+01	4.917E+01	4.912E+01	4.892E+01	4.836E+01	4.644E+01
U-234	U-238	9.999E-01	0.000E+00	1.378E-04	4.132E-04	1.377E-03	4.126E-03	1.370E-02	4.064E-02	1.302E-01
U-234	ΣS(j):		4.920E+01	4.920E+01	4.919E+01	4.917E+01	4.912E+01	4.893E+01	4.840E+01	4.657E+01
0Th-230	U-234	1.000E+00	0.000E+00	4.429E-04	1.329E-03	4.427E-03	1.327E-02	4.414E-02	1.315E-01	4.284E-01
Th-230	U-238	9.999E-01	0.000E+00	6.201E-10	5.580E-09	6.199E-08	5.574E-07	6.176E-06	5.514E-05	5.955E-04
Th-230	ΣS(j):		0.000E+00	4.429E-04	1.329E-03	4.428E-03	1.327E-02	4.415E-02	1.316E-01	4.290E-01
0Ra-226	U-234	1.000E+00	0.000E+00	9.592E-08	8.629E-07	9.576E-06	8.588E-05	9.423E-04	8.185E-03	8.058E-02
Ra-226	U-238	9.999E-01	0.000E+00	8.953E-14	2.417E-12	8.941E-11	2.407E-09	8.823E-08	2.313E-06	7.746E-05
Ra-226	ΣS(j):		0.000E+00	9.592E-08	8.629E-07	9.576E-06	8.588E-05	9.424E-04	8.187E-03	8.066E-02
0Pb-210	U-234	1.000E+00	0.000E+00	9.862E-10	2.621E-08	9.200E-07	2.149E-05	5.236E-04	6.643E-03	7.589E-02
Pb-210	U-238	9.999E-01	0.000E+00	6.914E-16	5.531E-14	6.539E-12	4.711E-10	4.109E-08	1.716E-06	7.068E-05
Pb-210	ΣS(j):		0.000E+00	9.862E-10	2.621E-08	9.200E-07	2.149E-05	5.237E-04	6.645E-03	7.596E-02
0U-235	U-235	1.000E+00	2.200E+00	2.200E+00	2.200E+00	2.199E+00	2.196E+00	2.188E+00	2.164E+00	2.083E+00
0Pa-231	U-235	1.000E+00	0.000E+00	4.655E-05	1.396E-04	4.652E-04	1.394E-03	4.624E-03	1.369E-02	4.360E-02
0Ac-227	U-235	1.000E+00	0.000E+00	7.331E-07	6.459E-06	6.676E-05	4.956E-04	3.228E-03	1.224E-02	4.214E-02
0U-238	U-238	5.400E-05	2.624E-03	2.624E-03	2.624E-03	2.623E-03	2.620E-03	2.610E-03	2.582E-03	2.484E-03
U-238	U-238	9.999E-01	4.860E+01	4.859E+01	4.859E+01	4.857E+01	4.852E+01	4.833E+01	4.780E+01	4.601E+01
U-238	ΣS(j):		4.860E+01	4.860E+01	4.859E+01	4.857E+01	4.852E+01	4.833E+01	4.781E+01	4.601E+01

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time =   1.27 seconds

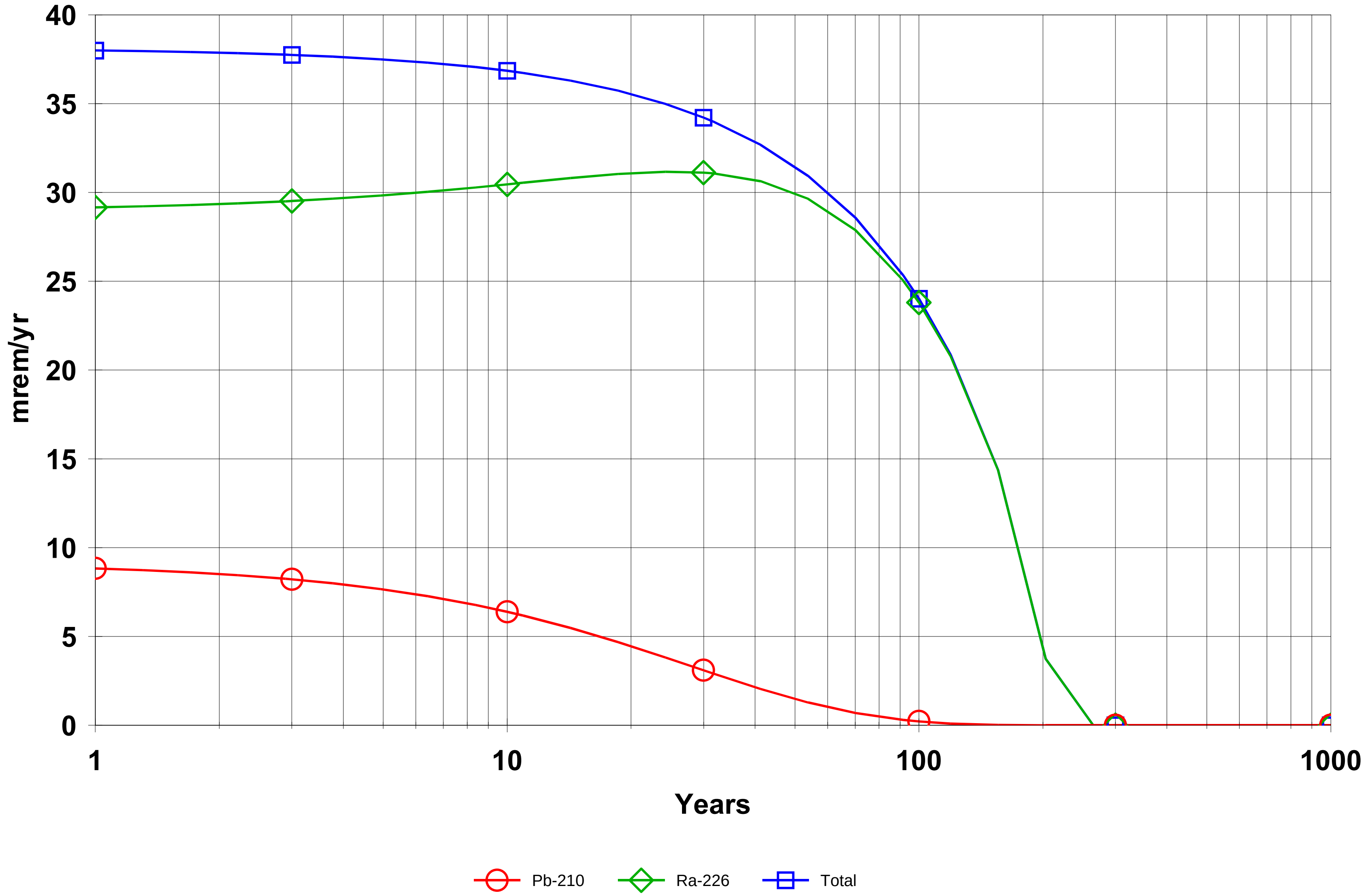
Radium Benchmark Dose Assessment

Attachment 4.0

RESRAD Radium Dose Figures

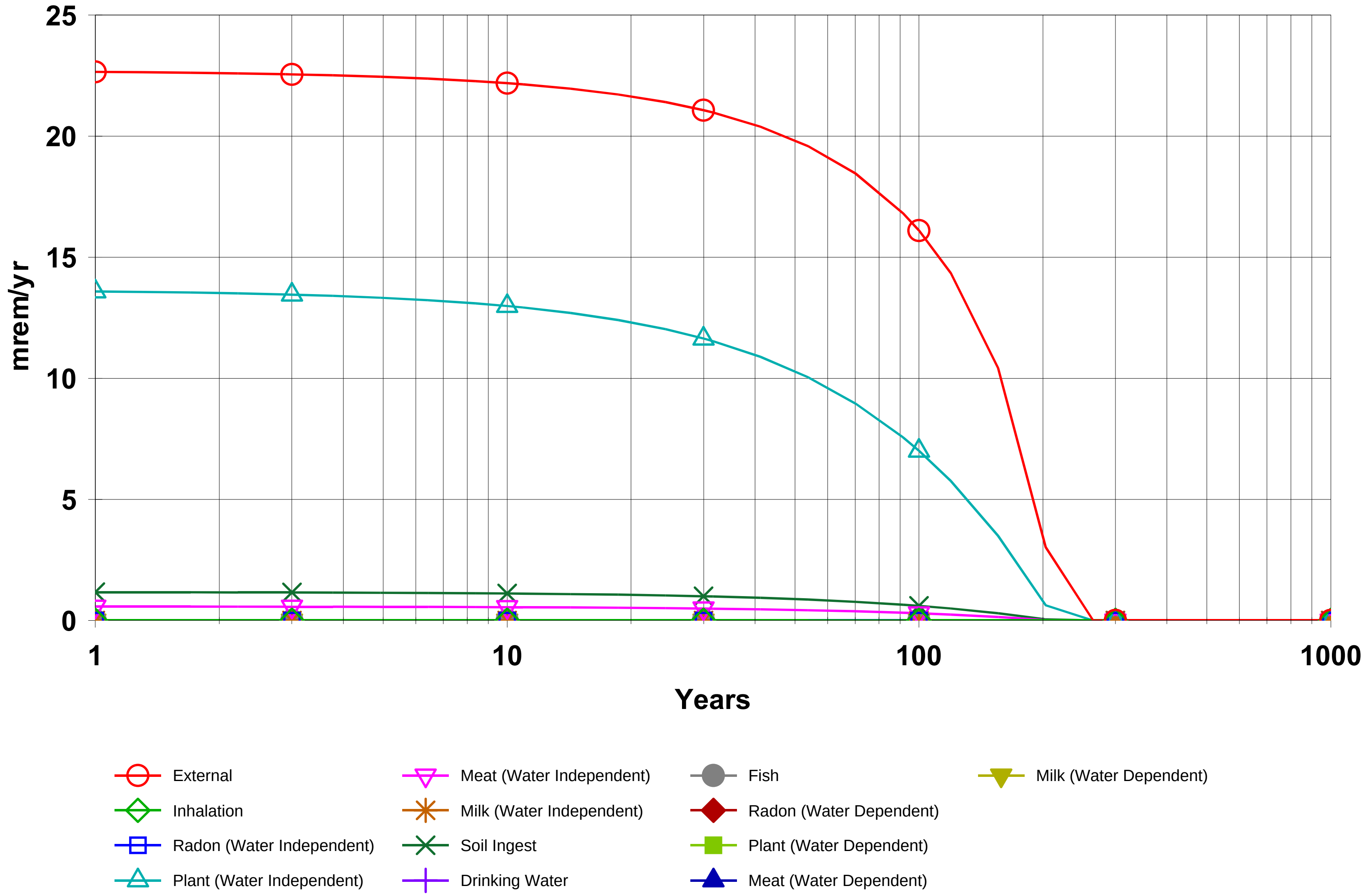
Powertech (USA) Inc.

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:16 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways

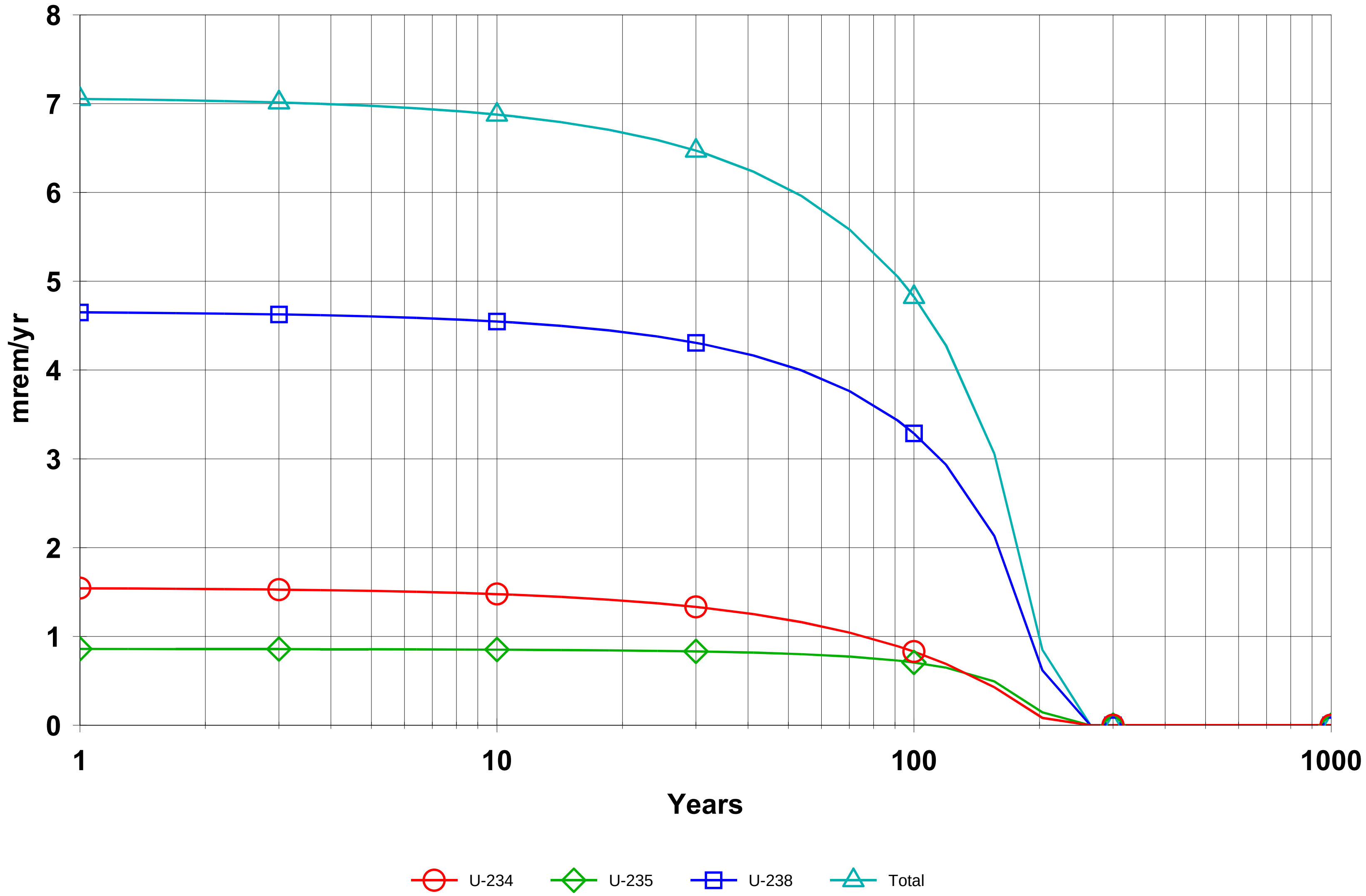


C:\RESRAD_FAMILY\RESRAD\USERFILES\DBRADIUMBENCHMARK.RAD 09/24/2008 10:16 GRAPHICS.ASC

Attachment 4.1

RESRAD Uranium Dose Graphics

DOSE: All Nuclides Summed, All Pathways Summed



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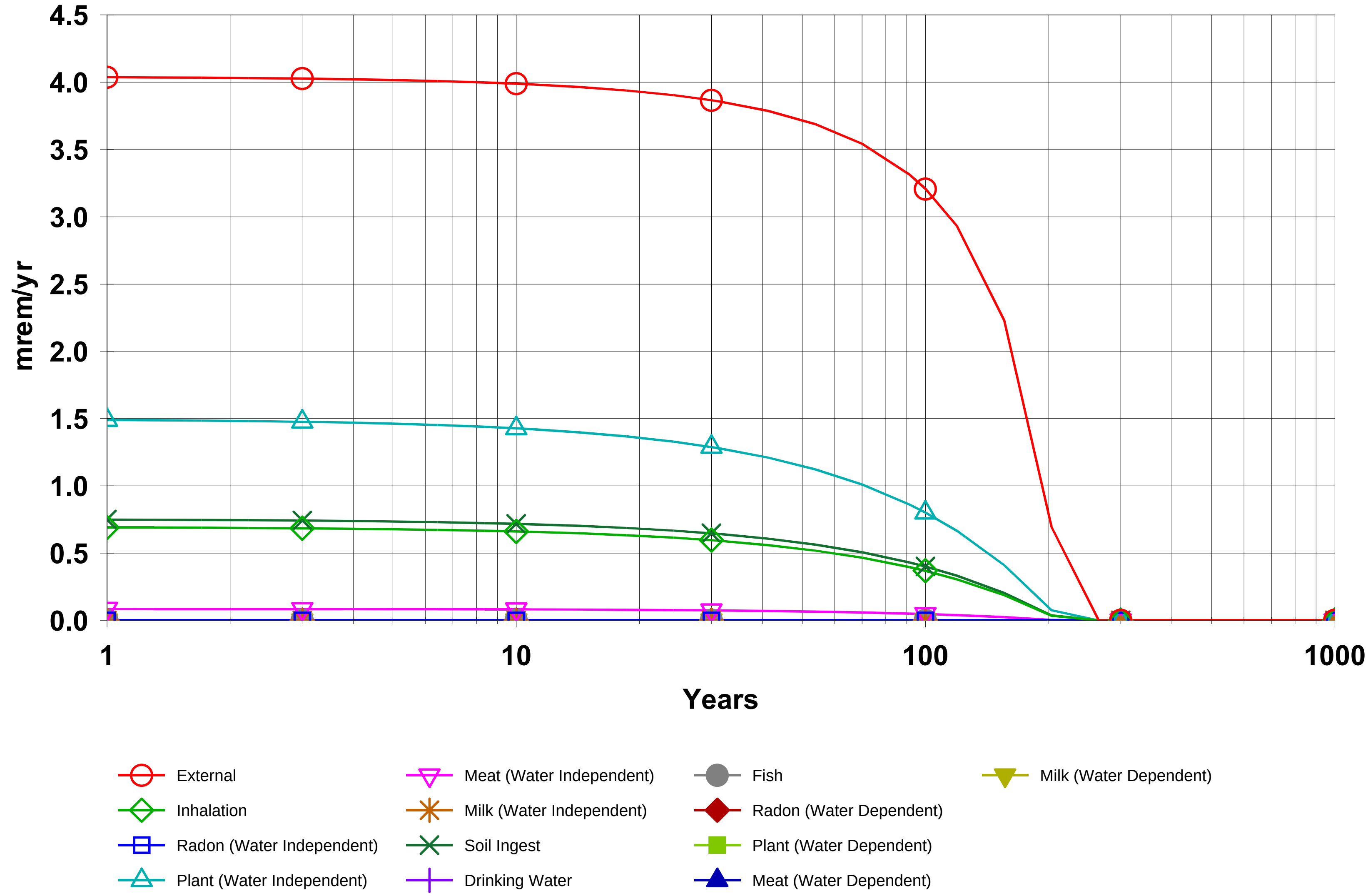
DOSE: All Nuclides Summed, Component Pathways



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POWERTECH (USA) INC.

APPENDIX 7.4-A

EXPLORATION DRILL HOLES WITHIN ONE-MILE PERIMETER

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	26	AXJ13	1005051.893	443831.866	3875
6	1	26	AXJ14	1005010.678	443807.8553	3867
6	1	26	AXJ3	1005045.069	443721.3286	3874
6	1	35	DA1	1007235.038	438498.8522	3832
6	1	35	DK1	1005363.906	438676.1739	3742
6	1	35	DK36	1005934.038	438660.1913	3763
6	1	35	DK37	1005191.662	439246.9997	3754
6	1	35	DK38	1006130.535	439179.5671	3794
6	1	35	DK39	1005398.572	439369.2244	3757
6	1	35	DK40	1005052.025	439571.7032	3755
6	1	35	DK54	1004864.522	438750.1431	3742
6	1	35	DK55	1005189.816	438552.5900	3735
6	1	35	DP252	1006772.535	438554.2677	3812
6	1	35	DP253	1006422.78	438812.5176	3802
6	1	35	DP254	1005994.921	438806.2612	3771
6	1	35	DP255	1006236.284	438972.1618	3795
6	1	35	DP256	1006194.437	439068.6234	3795
6	1	35	DP257	1006164.833	439120.9117	3794
6	1	35	DP258	1006148.12	439149.6275	3794
6	1	35	DP261	1006119.259	438670.9787	3774
6	1	35	DP263	1006160.199	439421.1526	3778
6	1	35	DR262	1006126.551	438882.5993	3779
6	1	35	DR753	1006193.947	439244.2152	3780
6	1	35	DR755	1006179.886	439219.3092	3780
6	1	35	DR756	1006162.79	439191.195	3794
6	1	35	DR757	1006161.531	439252.7673	3794
6	1	35	DR759	1006146.941	439222.378	3794
6	1	35	DR762	1006174.528	439162.6805	3782
6	1	35	DR764	1006129.562	439249.7914	3794
6	1	35	DR766	1006218.434	439112.3001	3782
6	1	35	DR767	1006240.554	439132.8922	3782
6	1	35	DR768	1006190.476	439083.1397	3795
6	1	35	DR769	1006228.482	439175.5574	3782
6	1	35	DR77	1006413.892	438950.4167	3801
6	1	35	DR770	1006130.466	439101.8628	3794
6	1	35	DR771	1006114.743	439064.357	3785
6	1	35	DR772	1006098.686	439021.8603	3785
6	1	35	DR773	1006080.611	438973.5653	3785
6	1	35	DR774	1006091.347	438935.2548	3779
6	1	35	DR775	1006009.05	438948.3116	3772
6	1	35	DR776	1005930.683	438889.304	3772
6	1	35	DR778	1005948.169	438876.7427	3772
6	1	35	DR779	1005924.107	438870.2254	3772

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	DR780	1005902.555	438891.1301	3763
6	1	35	DR781	1005914.971	438836.566	3763
6	1	35	DR782	1005900.027	438778.4641	3763
6	1	35	DR783	1005916.938	438715.9458	3763
6	1	35	DR784	1006018.703	438836.8104	3772
6	1	35	DR785	1006070.342	438881.4017	3779
6	1	35	DR786	1005944.515	438721.3826	3771
6	1	35	DR787	1005980.097	438880.2675	3772
6	1	35	DRJ101	1005588.607	439101.0006	3761
6	1	35	DRJ103	1006564.681	438478.5584	3806
6	1	35	DRJ104	1005812.339	439213.3025	3781
6	1	35	DRJ116	1004028.952	439370.1221	3731
6	1	35	DRJ118	1006605.346	438736.0722	3802
6	1	35	DRJ119	1005207.894	439558.8601	3758
6	1	35	DRJ120	1003799.844	439651.7024	3729
6	1	35	DRJ121	1004084.179	439555.9234	3735
6	1	35	DRJ122	1003931.056	439209.5672	3732
6	1	35	DRJ123	1003634.333	439505.7526	3732
6	1	35	DRJ124	1003386.22	439422.3517	3730
6	1	35	DRJ125	1003192.676	439453.6867	3727
6	1	35	DRJ126	1005041.618	439412.5191	3755
6	1	35	DRJ127	1003091.504	439647.4421	3726
6	1	35	DRJ128	1004874.374	439376.9368	3748
6	1	35	DRJ129	1003177.003	439696.7468	3731
6	1	35	DRJ130	1004672.409	439377.7737	3746
6	1	35	DRJ131	1003245.563	439724.9682	3728
6	1	35	DRJ132	1004509.074	439446.7948	3742
6	1	35	DRJ133	1004436.642	439434.3058	3742
6	1	35	DRJ134	1007244.37	439203.2647	3850
6	1	35	DRJ135	1004554.381	439451.9051	3744
6	1	35	DRJ136	1004512.277	439376.9962	3742
6	1	35	DRJ137	1004501.534	439512.562	3744
6	1	35	DRJ138	1004573.363	439374.4778	3744
6	1	35	DRJ139	1004436.298	439496.4666	3744
6	1	35	DRJ140	1004573.603	439304.7367	3743
6	1	35	DRJ141	1004368.309	439581.178	3741
6	1	35	DRJ142	1004509.566	439253.641	3740
6	1	35	DRJ143	1004563.204	439218.5521	3743
6	1	35	DRJ144	1004291.364	439577.5823	3741
6	1	35	DRJ145	1004447.146	439183.5106	3740
6	1	35	DRJ146	1004670.099	439254.543	3746
6	1	35	DRJ147	1004524.635	439121.4344	3740
6	1	35	DRJ148	1004564.789	439159.5626	3743

Powertech (USA) Inc.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	DRJ149	1004629.36	439217.283	3743
6	1	35	DRJ150	1004222.837	439579.5103	3739
6	1	35	DRJ151	1004420.034	439613.7869	3744
6	1	35	DRJ152	1004562.39	439093.2905	3743
6	1	35	DRJ153	1004628.989	439063.7605	3742
6	1	35	DRJ154	1004147.324	439651.0772	3736
6	1	35	DRJ155	1004647.82	439141.1592	3743
6	1	35	DRJ156	1004682.788	439077.0346	3741
6	1	35	DRJ157	1004195.188	439469.534	3739
6	1	35	DRJ158	1004173.138	439390.5141	3738
6	1	35	DRJ159	1004733.626	439007.4669	3741
6	1	35	DRJ160	1004093.893	439403.025	3734
6	1	35	DRJ162	1004775.395	438976.8929	3741
6	1	35	DRJ163	1004834.429	438991.3157	3742
6	1	35	DRJ164	1004863.444	439029.66	3742
6	1	35	DRJ165	1003967.947	439308.5199	3732
6	1	35	DRJ166	1004902.315	438986.5361	3742
6	1	35	DRJ167	1004969.561	439000.7831	3745
6	1	35	DRJ168	1004011.666	439259.8047	3732
6	1	35	DRJ169	1004064.843	439218.745	3734
6	1	35	DRJ170	1005001.579	438962.0494	3745
6	1	35	DRJ171	1004122.507	439221.901	3734
6	1	35	DRJ172	1004074.948	439168.2308	3733
6	1	35	DRJ173	1005043.264	438916.4504	3742
6	1	35	DRJ174	1005115.2	438833.8781	3742
6	1	35	DRJ175	1004161.306	439102.2303	3733
6	1	35	DRJ176	1005218.184	438779.2465	3738
6	1	35	DRJ-177	1005313.719	438804.1089	3741
6	1	35	DRJ-178	1004201.265	438999.449	3734
6	1	35	DRJ179	1005404.267	438875.5722	3740
6	1	35	DRJ180	1005479.204	438816.6801	3745
6	1	35	DRJ181	1005398.511	438945.7242	3740
6	1	35	DRJ55	1007008.027	438994.0304	3851
6	1	35	DRJ56	1007057.059	438864.719	3864
6	1	35	DRJ57	1007349.44	438747.0961	3868
6	1	35	DRJ58	1007312.997	439175.5762	3870
6	1	35	DRJ60	1006965.01	439466.8141	3854
6	1	35	DRJ61	1006891.743	439567.7841	3839
6	1	35	DRJ62	1006651.34	438578.8598	3806
6	1	35	DRJ63	1006943.018	439104.9563	3843
6	1	35	DRJ65	1006883.616	439650.7304	3850
6	1	35	DRJ66	1006837.037	439550.4338	3839
6	1	35	DRJ67	1006936.327	439532.999	3854

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	DRJ68	1007022.769	439448.5887	3839
6	1	35	DRJ69	1005320.229	439230.4446	3752
6	1	35	DRJ70	1005467.158	439218.8233	3751
6	1	35	DRJ71	1005637.999	438883.8809	3753
6	1	35	DRJ89	1006133.126	438551.7068	3770
6	1	35	DRJ90	1006015.967	438706.716	3763
6	1	35	DRJ91	1005420.9	439051.128	3745
6	1	35	DRJ92	1005386.011	439415.4749	3757
6	1	35	DRJ93	1005385.542	439717.8461	3773
6	1	35	DRJ98	1006125.148	438648.3776	3774
6	1	35	DRM1	1005008.637	439236.358	3750
6	1	35	DRM10	1006040.047	438588.8293	3763
6	1	35	DRM11	1006022.573	438810.4752	3771
6	1	35	DRM12	1005965.742	439034.6986	3780
6	1	35	DRM13	1005335.737	439546.4003	3763
6	1	35	DRM14	1005449.027	439647.5478	3765
6	1	35	DRM6	1006846.784	438670.5688	3804
6	1	35	DRM8	1006248.982	438485.7483	3771
6	1	35	DRM9	1005622.702	439306.1102	3760
6	1	35	DRR1	1003954.14	439593.9314	3732
6	1	35	DRR10	1005536.093	439359.5789	3750
6	1	35	DRR11	1003909.427	439397.5866	3732
6	1	35	DRR12	1005351.911	439073.9989	3741
6	1	35	DRR13	1005281.965	439053.3869	3742
6	1	35	DRR14	1005214.841	439038.9317	3742
6	1	35	DRR15	1005302.397	439110.2814	3749
6	1	35	DRR16	1003821.41	439490.7399	3730
6	1	35	DRR17	1003668.24	439452.0236	3732
6	1	35	DRR18	1003577.769	439422.2022	3733
6	1	35	DRR19	1003520.076	439435.3894	3733
6	1	35	DRR2	1005354	438972.5308	3741
6	1	35	DRR20	1005180.432	439072.148	3742
6	1	35	DRR21	1005115.026	439146.5274	3748
6	1	35	DRR22	1003436.28	439492.0283	3733
6	1	35	DRR23	1002944.224	439720.9273	3723
6	1	35	DRR23	1003337.721	439472.9023	3732
6	1	35	DRR24	1003246.91	439511.5126	3730
6	1	35	DRR25	1003142.383	439545.6421	3725
6	1	35	DRR26	1005023.457	439184.7616	3747
6	1	35	DRR27	1005102.629	439228.9896	3753
6	1	35	DRR28	1003012.05	439587.2588	3723
6	1	35	DRR29	1002890.228	439552.8102	3720
6	1	35	DRR3	1005513.947	438910.7779	3743

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	DRR30	1002812.982	439621.2412	3720
6	1	35	DRR31	1005080.664	439342.6935	3755
6	1	35	DRR32	1004934.542	439511.1819	3751
6	1	35	DRR34	1005048.484	439550.8911	3755
6	1	35	DRR35	1004989.334	439556.8654	3751
6	1	35	DRR36	1005025.704	439665.535	3753
6	1	35	DRR37	1005152.452	439644.5652	3754
6	1	35	DRR38	1005010.558	439494.2664	3751
6	1	35	DRR39	1005097.469	438593.7333	3731
6	1	35	DRR4	1004016.725	439566.2997	3731
6	1	35	DRR41	1005176.021	438498.3826	3735
6	1	35	DRR43	1004980.614	438597.8043	3734
6	1	35	DRR44	1006759.885	438754.9976	3801
6	1	35	DRR47	1004872.836	438618.5226	3734
6	1	35	DRR49	1006692.552	438845.1715	3813
6	1	35	DRR5	1005574.857	438988.2882	3750
6	1	35	DRR54	1004994.981	438720.469	3743
6	1	35	DRR57	1006603.14	438915.127	3797
6	1	35	DRR58	1004815.297	438725.7683	3742
6	1	35	DRR61	1006520.573	438998.1294	3791
6	1	35	DRR62	1004896.646	438723.3215	3742
6	1	35	DRR64	1006618.434	438996.6722	3798
6	1	35	DRR67	1006546.304	439078.9083	3791
6	1	35	DRR68	1006569.919	438787.736	3802
6	1	35	DRR69	1006640.697	438686.945	3803
6	1	35	DRR7	1005643.297	439062.5695	3750
6	1	35	DRR70	1006529.795	438831.4422	3802
6	1	35	DRR71	1006523.472	438751.4419	3802
6	1	35	DRR72	1006495.199	438872.7354	3791
6	1	35	DRR73	1006589.426	438680.168	3803
6	1	35	DRR74	1006676.529	438655.1255	3800
6	1	35	DRR76	1006565.323	438565.1534	3806
6	1	35	DRR78	1006404.663	439078.7432	3788
6	1	35	DRR79	1006347.054	439162.9878	3787
6	1	35	DRR8	1005542.28	439163.4423	3751
6	1	35	DRR81	1006233.187	439161.3707	3782
6	1	35	DRR82	1006154.426	439262.5785	3794
6	1	35	DRR84	1006220.529	439221.6839	3780
6	1	35	DRR85	1006170.675	439196.5215	3782
6	1	35	DRR86	1006240.377	439102.2795	3782
6	1	35	DRR87	1006294.495	439189.7604	3782
6	1	35	DRR88	1006121.532	439379.2736	3778
6	1	35	DRR9	1005586.585	439249.0058	3760

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	DRR90	1005999.394	439398.4304	3790
6	1	35	DRR91	1006081.798	439304.1907	3794
6	1	35	DRR92	1005962.862	439507.047	3763
6	1	35	DRR94	1006054.542	439495.7375	3768
6	1	35	DRR95	1005988.105	439625.19	3763
6	1	35	DRR96	1006113.8	439590.0633	3782
6	1	35	DRT33	1007210.734	438611.0556	3833
6	1	35	DRT35	1007116.085	438673.2004	3830
6	1	35	DRT37	1006986.653	438812.411	3839
6	1	35	DRT38	1007153.388	438607.9492	3830
6	1	35	DRT39	1006938.034	438964.8505	3851
6	1	35	DRT40	1006994.184	439081.1488	3851
6	1	35	DRT41	1007056.02	439053.1096	3867
6	1	35	DRT42	1006913.587	439487.2697	3839
6	1	35	DRT43	1007002.23	439542.0145	3854
6	1	35	DRT44	1006863.897	439476.3472	3839
6	1	35	DRT45	1007084.747	438917.5512	3864
6	1	35	DRT46	1007130.992	439072.3923	3867
6	1	35	DRT47	1007194.501	439027.7243	3869
6	1	35	DRT48	1007285.063	438978.6464	3869
6	1	35	DRT49	1007093.303	438584.9209	3830
6	1	35	DRT50	1007267.23	438880.2832	3874
6	1	35	DRT51	1007268.236	438740.0758	3865
6	1	35	DRT58	1007043.501	439244.7639	3819
6	1	35	DRT59	1007349.578	438984.09	3873
6	1	35	DRT60	1006906.269	439245.0929	3801
6	1	35	DRT62	1007150.234	439262.2924	3851
6	1	35	DRT83	1007325.152	438507.4824	3821
6	1	35	DRT84	1007350.578	438854.9861	3877
6	1	35	DRT85	1007235.321	438690.2231	3833
6	1	35	DS560	1006198.74	439524.9959	3781
6	1	35	DS588	1006188.477	439365.6026	3781
6	1	35	DS589	1006194.092	439400.7182	3781
6	1	35	DS590	1006204.239	439447.3635	3781
6	1	35	DS591	1006173.046	439462.528	3781
6	1	35	DS592	1006059.571	439497.7234	3768
6	1	35	DS594	1006204.34	439559.9557	3781
6	1	35	DS595	1006108.971	439295.3659	3794
6	1	35	DS596	1006182.831	439280.6958	3780
6	1	35	DW31	1006645.059	438670.5828	3803
6	1	35	DW32	1006582.283	438751.9712	3802
6	1	35	DW33	1006521.07	438835.6735	3791
6	1	35	DW36	1006913.659	438416.2887	3817

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	EN100	1005537.78	441728.2544	3822
6	1	35	EN101	1005994.201	441573.5781	3790
6	1	35	EN99	1004394.839	441767.9437	3785
6	1	35	SP-4	1005093.453	440802.096	3782
6	1	35	SRA1	1005242.418	441846.5452	3794
6	1	35	SRA2	1005367.958	441147.0286	3798
6	1	35	SRA3	1005185.554	441094.8575	3793
6	1	35	SRA4	1004034.212	440450.0357	3737
6	1	35	SRA5	1004263.403	439755.5522	3740
6	1	35	SRA6	1003932.893	440268.7577	3736
6	1	35	SRA7	1003792.594	440095.7657	3734
6	1	35	SRA8	1003754.449	439848.1585	3729
6	1	35	SRJ1	1005451.522	441100.1887	3793
6	1	35	SRM1	1005244.436	441121.5001	3793
6	1	35	SRM10	1006438.741	440936.5321	3831
6	1	35	SRM101	1006166.672	441505.5949	3791
6	1	35	SRM102	1006188.615	441608.3582	3807
6	1	35	SRM103	1006110.521	441490.1484	3791
6	1	35	SRM104	1006186.489	441475.7214	3800
6	1	35	SRM105	1006248.068	441456.5907	3790
6	1	35	SRM106	1005976.772	441617.5233	3818
6	1	35	SRM107	1005762.238	441673.5091	3781
6	1	35	SRM108	1005892.707	441730.2836	3801
6	1	35	SRM109	1005827.883	441465.8029	3779
6	1	35	SRM110	1005696.344	441523.5446	3773
6	1	35	SRM111	1005663.276	441520.3786	3771
6	1	35	SRM112	1005498.462	441414.7633	3770
6	1	35	SRM113	1005633.991	441513.4159	3771
6	1	35	SRM114	1005670.125	441481.5373	3773
6	1	35	SRM115	1005376.16	441483.9069	3786
6	1	35	SRM115	1006399.299	440868.5684	3817
6	1	35	SRM116	1005259.187	441613.9967	3774
6	1	35	SRM117	1005083.683	441784.878	3763
6	1	35	SRM118	1005176.762	441937.3394	3794
6	1	35	SRM119	1005246.834	441778.7306	3771
6	1	35	SRM12	1006469.796	440808.0106	3826
6	1	35	SRM120	1005070.905	442087.5126	3776
6	1	35	SRM121	1004918.317	442031.5079	3759
6	1	35	SRM122	1005149.798	442263.5364	3783
6	1	35	SRM123	1004867.807	441825.0451	3756
6	1	35	SRM124	1004815.934	442155.4088	3783
6	1	35	SRM125	1004805.559	442356.719	3782
6	1	35	SRM126	1004645.179	442121.7201	3754

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRM127	1004602.401	442295.9733	3759
6	1	35	SRM128	1004388.401	442357.3327	3752
6	1	35	SRM129	1004700.091	442018.7404	3764
6	1	35	SRM13	1006469.316	440839.385	3826
6	1	35	SRM130	1004657.528	441829.8933	3752
6	1	35	SRM131	1004329.203	441910.4844	3770
6	1	35	SRM132	1002420.334	441932.9959	3714
6	1	35	SRM135	1004166.918	442532.6702	3751
6	1	35	SRM136	1004073.586	442418.6112	3740
6	1	35	SRM137	1004044.444	442513.0262	3744
6	1	35	SRM138	1003948.188	442497.7479	3733
6	1	35	SRM139	1003891.287	442595.4285	3731
6	1	35	SRM14	1006482.213	440853.704	3831
6	1	35	SRM140	1003963.314	442673.5836	3759
6	1	35	SRM141	1003873.306	442738.0116	3750
6	1	35	SRM142	1004143.639	442419.8742	3740
6	1	35	SRM143	1004230.485	442513.8814	3751
6	1	35	SRM144	1004214.525	442622.7915	3751
6	1	35	SRM145	1004290.405	442659.0989	3755
6	1	35	SRM146	1004275.779	442619.3906	3751
6	1	35	SRM147	1004280.276	442736.9969	3749
6	1	35	SRM148	1004389.08	442573.7403	3762
6	1	35	SRM150	1004345.179	442480.2319	3762
6	1	35	SRM151	1004431.32	442596.0362	3780
6	1	35	SRM152	1004342.752	442417.2136	3752
6	1	35	SRM153	1004396.642	442764.0191	3750
6	1	35	SRM154	1004466.288	442500.2126	3780
6	1	35	SRM155	1004523.433	442379.4087	3757
6	1	35	SRM157	1002444.647	442194.8306	3712
6	1	35	SRM158	1002421.859	442350.7287	3711
6	1	35	SRM159	1004793.405	441626.7895	3766
6	1	35	SRM16	1006395.495	440830.3614	3802
6	1	35	SRM160	1004824.455	441573.4106	3773
6	1	35	SRM161	1004590.354	441785.4614	3752
6	1	35	SRM162	1004946.984	441908.7598	3757
6	1	35	SRM163	1005005.138	441837.864	3759
6	1	35	SRM164	1004938.702	441857.2224	3757
6	1	35	SRM165	1005044.91	441764.0056	3763
6	1	35	SRM166	1005213.302	441604.9219	3774
6	1	35	SRM167	1004968.54	441650.4958	3770
6	1	35	SRM168	1005250.939	441448.0164	3774
6	1	35	SRM169	1005284.743	441360.6533	3774
6	1	35	SRM2	1005127.935	441192.8486	3784

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRM3	1005100.762	441050.3565	3781
6	1	35	SRM36	1006196.407	440232.9611	3825
6	1	35	SRM37	1006212.251	440353.1421	3833
6	1	35	SRM40	1006211.791	440318.1151	3825
6	1	35	SRM41	1006245.353	440345.9228	3833
6	1	35	SRM42	1006177.024	440353.4414	3833
6	1	35	SRM43	1006209.426	440385.6435	3833
6	1	35	SRM44	1006142.429	440354.0435	3830
6	1	35	SRM45	1006177.432	440383.6382	3833
6	1	35	SRM46	1006138.046	440382.2604	3830
6	1	35	SRM47	1006115.586	440358.3354	3830
6	1	35	SRM48	1006140.491	440313.728	3820
6	1	35	SRM49	1006184.177	440322.9387	3825
6	1	35	SRM49	1004029.746	442384.5574	3737
6	1	35	SRM50	1006245.386	440317.7255	3825
6	1	35	SRM56	1006110.206	440313.4833	3820
6	1	35	SRM56	1002984.849	443074.5892	3744
6	1	35	SRM62	1006416.676	440916.7509	3817
6	1	35	SRM63	1006375.874	440845.3393	3817
6	1	35	SRM64	1006361.37	440877.7814	3817
6	1	35	SRM65	1006355.217	440829.9893	3802
6	1	35	SRM9	1006477.244	440876.9247	3831
6	1	35	SRM94	1006513.442	441060.2901	3839
6	1	35	SRM95	1006444.484	440975.1768	3839
6	1	35	SRM96	1006476.363	441071.7988	3839
6	1	35	SRP106	1006473.106	441106.5852	3816
6	1	35	SRP107	1006452.996	441020.5277	3839
6	1	35	SRP108	1006450.486	441041.9913	3839
6	1	35	SRP12	1006687.511	440860.0198	3842
6	1	35	SRP13	1006774.601	441186.3251	3808
6	1	35	SRP139	1006136.044	439786.4414	3770
6	1	35	SRP14	1006613.557	441314.0224	3800
6	1	35	SRP15	1006872.888	441123.7829	3822
6	1	35	SRP16	1006379.84	441461.1585	3790
6	1	35	SRP17	1006193.015	441553.9932	3800
6	1	35	SRP17	1006292.254	441160.3169	3838
6	1	35	SRP18	1006847.241	441338.4094	3851
6	1	35	SRP19	1006779.806	441553.1471	3874
6	1	35	SRP196	1006438.164	440825.1321	3826
6	1	35	SRP197	1006435.324	440851.0972	3831
6	1	35	SRP198	1006410.074	440852.6192	3817
6	1	35	SRP199	1006435.233	440896.1394	3831
6	1	35	SRP21	1006592.665	441699.0086	3856

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRP22	1006245.09	440909.8218	3797
6	1	35	SRP24	1006451.336	440874.1415	3831
6	1	35	SRP25	1006535.837	440815.5036	3826
6	1	35	SRP26	1006248.319	441739.9635	3798
6	1	35	SRP27	1006441.185	441928.8285	3800
6	1	35	SRP28	1006647.802	441965.8204	3810
6	1	35	SRP29	1006644.343	442194.4682	3800
6	1	35	SRP30	1006568.583	441224.8423	3800
6	1	35	SRP31	1006457.433	441321.7621	3793
6	1	35	SRP33	1006716.489	441215.3084	3808
6	1	35	SRP34	1006660.127	441589.5161	3865
6	1	35	SRP35	1006784.609	441411.3004	3857
6	1	35	SRP36	1006634.337	441635.1758	3856
6	1	35	SRP37	1006809.718	441452.2266	3867
6	1	35	SRP38	1006778.091	441432.3788	3857
6	1	35	SRP39	1006814.799	441403.245	3867
6	1	35	SRP40	1006840.254	441387.8278	3867
6	1	35	SRP41	1006836.534	441433.8144	3867
6	1	35	SRP42	1006875.319	441499.4589	3899
6	1	35	SRP43	1006762.803	441375.0259	3857
6	1	35	SRP44	1006782.834	441350.0072	3857
6	1	35	SRP45	1006609.325	441677.817	3856
6	1	35	SRP46	1006727.901	441260.9486	3839
6	1	35	SRP47	1006760.824	441236.0496	3839
6	1	35	SRP48	1006777.504	441213.4966	3808
6	1	35	SRP49	1006796.971	441190.1741	3808
6	1	35	SRP50	1006670.108	441146.2023	3798
6	1	35	SRP51	1006644.016	441169.1517	3798
6	1	35	SRP52	1006694.315	441125.1589	3808
6	1	35	SRP53	1006616.308	441190.1647	3798
6	1	35	SRP54	1006709.771	441111.8353	3808
6	1	35	SRP55	1006741.698	441094.7957	3808
6	1	35	SRP63	1006417.993	440814.2663	3802
6	1	35	SRP64	1006420.875	440879.0489	3817
6	1	35	SRP65	1006399.195	440890.4351	3817
6	1	35	SRP66	1006416.67	440949.9358	3817
6	1	35	SRP75	1006496.778	441006.0893	3839
6	1	35	SRP76	1006520.713	440989.1072	3839
6	1	35	SRP77	1006434.729	441046.1317	3839
6	1	35	SRR1	1006714.859	441282.1815	3839
6	1	35	SRR10	1005968.42	440307.5379	3823
6	1	35	SRR100	1006179.05	440596.7863	3836
6	1	35	SRR101	1006010.579	440594.626	3830

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRR102	1006032.011	440790.2706	3834
6	1	35	SRR103	1006022.747	440880.8945	3837
6	1	35	SRR104	1006093.208	440937.7197	3829
6	1	35	SRR105	1006165.011	440886.7892	3829
6	1	35	SRR106	1006018.911	440691.8723	3830
6	1	35	SRR107	1005899.437	440629.8364	3821
6	1	35	SRR108	1005902.109	440735.3185	3829
6	1	35	SRR111	1005895.593	440865.0522	3832
6	1	35	SRR112	1005810.332	440712.8843	3821
6	1	35	SRR113	1006050.66	440206.8617	3820
6	1	35	SRR113	1005942.804	440152.8161	3802
6	1	35	SRR114	1006500.506	440915.0169	3831
6	1	35	SRR115	1006491.689	440942.0683	3831
6	1	35	SRR116	1006464.12	440935.3489	3831
6	1	35	SRR117	1006475.36	440916.0343	3831
6	1	35	SRR118	1006490.456	440892.4039	3831
6	1	35	SRR12	1005997.261	440018.4217	3788
6	1	35	SRR13	1005969.858	439859.9878	3795
6	1	35	SRR14	1006207.116	440660.9097	3836
6	1	21	DWA 166	991985.7346	449500.7804	3783
6	1	21	DWA 169	992161.0403	449569.7992	3792
6	1	21	DWA 176	992730.9925	451847.2806	3847
6	1	21	DWA 177	992631.0621	452193.8693	3825
6	1	21	DWA 178	992680.7323	452418.3045	3808
6	1	21	DWA 179	992848.4519	452658.9498	3809
6	1	21	DWA 180	992719.0144	452969.638	3798
6	1	21	DWA 181	992832.2075	452082.0471	3829
6	1	21	DWA 182	992712.3592	452569.6406	3803
6	1	21	DWA 183	992872.2156	453421.2238	3800
6	1	21	DWA 184	992400.9133	450509.958	3822
6	1	21	DWA 185	992406.4514	450721.1504	3833
6	1	21	DWA 186	992577.458	452420.5599	3808
6	1	21	DWA 187	992613.6819	452976.3867	3798
6	1	21	DWA 188	992624.5168	451911.3594	3842
6	1	21	DWA 199	992736.8218	454111.0106	3789
6	1	21	DWA 201	993076.7192	453729.6277	3809
6	1	21	DWA 202	992634.1741	451734.8481	3851
6	1	21	DWA 203	992564.8583	452213.8913	3823
6	1	21	DWA168	992981.884	450322.7927	3824
6	1	21	DWA171	992785.304	450059.1539	3825
6	1	21	DWA172	993166.2495	450397.841	3822
6	1	21	DWA175	992292.844	449692.1696	3799
6	1	21	DWM 36	992700.0184	454392.9758	3782

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	21	DWM 37	992954.4054	453750.2624	3801
6	1	21	DWM 39	992988.975	453653.7973	3809
6	1	21	DWM 40	992756.1468	454379.1322	3787
6	1	21	DWM 41	992787.8078	454211.5515	3789
6	1	21	DWM 42	992971.4252	453409.8436	3800
6	1	21	DWM 43	992832.8094	454171.0723	3789
6	1	21	DWM 44	992925.7363	453572.6123	3799
6	1	21	DWM 59	992698.4132	453033.4946	3800
6	1	21	DWM 60	992667.2166	451947.8363	3842
6	1	21	DWT 98	992781.3318	454162.9277	3789
6	1	21	DWT11	997034.098	449992.1694	3786
6	1	21	DY 134	992689.8617	453517.8357	3797
6	1	21	DY 2	992896.179	453512.6149	3800
6	1	21	DY33	996573.7765	449774.7149	3808
6	1	21	DY344	997146.3242	450032.6365	3783
6	1	21	DY37	996690.976	449667.7758	3805
6	1	21	DY41	996657.1936	449741.5487	3805
6	1	21	DY42	996767.0827	449595.903	3804
6	1	21	DY50	996758.3968	449967.8088	3797
6	1	21	DY58	996865.1727	450017.5823	3792
6	1	21	DY75	996950.7703	450059.3926	3783
6	1	21	DY85	996851.1513	449733.9204	3804
6	1	21	DY87	996863.3844	449591.1311	3804
6	1	21	EN841A	996813.8755	449762.7646	3800
6	1	21	LK19	996980.7718	449235.8768	3788
6	1	36	DK157	1007642.664	438498.0298	3848
6	1	36	FK1	1009675.751	438375.8177	3900
6	1	36	FK2	1009506.253	438327.769	3900
6	1	36	FK22	1007430.2	438764.7059	3866
6	1	36	FK23	1007447.593	439158.5582	3892
6	1	36	FK3	1009230.128	438385.934	3910
6	1	36	FK4	1008684.713	438381.5719	3912
6	1	36	FK5	1008749.889	438708.1227	3919
6	1	36	FO128	1008480.562	438751.5784	3923
6	1	36	FO129	1008462.21	438794.0128	3923
6	1	36	FO131	1008511.585	438594.8466	3922
6	1	36	FO155	1008651.482	438988.4811	3937
6	1	36	FO156	1008643.301	438971.2502	3937
6	1	36	FO157	1008703.909	438987.2513	3939
6	1	36	FO159	1008756.427	438997.731	3939
6	1	36	FO160	1008850.033	439111.7321	3945
6	1	36	FO161	1008841.02	439083.3378	3940
6	1	36	FO162	1008882.341	439074.8633	3940

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	36	FO163	1008879.691	439047.3844	3940
6	1	36	FO164	1009049.536	439066.9572	3947
6	1	36	FO165	1009047.656	439097.5125	3951
6	1	36	FO166	1009042.555	439129.7149	3951
6	1	36	FO167	1009030.663	439153.2314	3951
6	1	36	FO168	1009022.328	439171.0367	3951
6	1	36	FO169	1009010.95	439188.3239	3951
6	1	36	FO173	1009078.572	439018.6953	3945
6	1	36	FO174	1009089.477	438994.2336	3945
6	1	36	FO175	1009075.325	438974.8516	3945
6	1	36	FO176	1009347.875	438959.4927	3925
6	1	36	FO177	1009336.526	438977.2949	3925
6	1	36	FO178	1009325.913	438987.8892	3925
6	1	36	FO180	1009289.787	438972.4144	3930
6	1	36	FO181	1009271.776	438964.7453	3930
6	1	36	FO182	1009292.994	438953.7532	3931
6	1	36	FO183	1009241.019	438960.2504	3930
6	1	36	FO184	1009251.792	438943.1441	3931
6	1	36	FO185	1009261.665	438927.7318	3931
6	1	36	FO186	1009276.086	439004.3237	3930
6	1	36	FO187	1009299.623	438936.6269	3931
6	1	36	FO188	1009234.581	438974.8513	3930
6	1	36	FO189	1009301.553	439176.3476	3930
6	1	36	FO190	1009328.077	439144.2635	3925
6	1	36	FO191	1009339.705	439122.9472	3925
6	1	36	FO192	1009342.583	439102.97	3925
6	1	36	FO193	1009353.411	439083.1872	3925
6	1	36	FO194	1009326.382	439088.3937	3925
6	1	36	FO195	1009318.56	439111.2294	3925
6	1	36	FO196	1009308.91	439128.9784	3930
6	1	36	FO197	1009366.109	439100.7358	3925
6	1	36	FO198	1009360.906	439122.3083	3925
6	1	36	FO199	1009353.212	439057.3138	3925
6	1	36	FO200	1009322.27	439009.2422	3925
6	1	36	FO201	1009307.522	438995.4359	3930
6	1	36	FO202	1009282.177	438986.5623	3930
6	1	36	FO213	1008284.343	438958.6249	3913
6	1	36	FO214	1008282.074	439010.1201	3913
6	1	36	FO215	1008282.485	438996.0445	3913
6	1	36	FO216	1008282.962	438985.8134	3913
6	1	36	FO217	1008282.805	438973.9346	3913
6	1	36	FO252	1008571.334	438760.8701	3922
6	1	36	FO299	1008619.153	438911.4408	3926

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	36	FO300	1008640.625	438913.3557	3926
6	1	36	FO303	1008606.906	438896.4856	3926
6	1	36	FO87	1009379.527	438993.1796	3925
6	1	36	FOA1	1009689.497	438379.609	3906
6	1	36	FOA11	1009647.945	438341.772	3900
6	1	36	FOA12	1009652.574	438324.101	3897
6	1	36	FOA13	1009653.564	438295.7555	3897
6	1	36	FOA14	1009690.449	438303.4898	3906
6	1	36	FOA15	1009706.807	438283.7022	3906
6	1	36	FOA19	1009315.036	438385.079	3904
6	1	36	FOA2	1009660.819	438362.4098	3900
6	1	36	FOA20	1009356.411	438467.7741	3918
6	1	36	FOA21	1009181.745	438487.9927	3912
6	1	36	FOA23	1009015.267	438419.664	3902
6	1	36	FOA25	1009087.31	438605.1447	3912
6	1	36	FOA26	1009135.678	438654.9508	3912
6	1	36	FOA27	1009083.383	438569.4761	3912
6	1	36	FOA28	1009075.706	438641.7858	3912
6	1	36	FOA29	1009029.329	438572.8985	3907
6	1	36	FOA3	1009621.061	438421.7396	3900
6	1	36	FOA30	1008948.736	438423.9196	3902
6	1	36	FOA31	1008945.861	438450.0113	3902
6	1	36	FOA32	1008886.963	438430.3128	3904
6	1	36	FOA33	1008913.017	438408.6317	3904
6	1	36	FOA34	1008991.326	438527.3958	3907
6	1	36	FOA35	1009062.025	438573.6399	3912
6	1	36	FOA36	1009163.889	438642.7062	3912
6	1	36	FOA37	1009126.581	438585.9627	3912
6	1	36	FOA38	1009235.848	438684.9584	3918
6	1	36	FOA39	1009266.648	438720.6345	3923
6	1	36	FOA4	1009706.578	438325.9976	3906
6	1	36	FOA40	1009273.972	438750.4734	3923
6	1	36	FOA41	1009302.929	438829.6987	3923
6	1	36	FOA42	1009291.953	438688.4278	3918
6	1	36	FOA43	1009324.919	438708.8626	3921
6	1	36	FOA44	1009361.786	438726.9503	3921
6	1	36	FOA45	1009355.768	438703.5642	3923
6	1	36	FOA46	1009399.981	438743.827	3921
6	1	36	FOA47	1009381.119	438759.947	3921
6	1	36	FOA48	1009338.664	438742.2575	3921
6	1	36	FOA49	1009397.49	438782.2418	3921
6	1	36	FOA5	1009716.441	438383.5701	3906
6	1	36	FOA50	1009429.318	438765.9099	3921

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	36	FOA51	1009457.839	438783.5377	3924
6	1	36	FOA52	1009488.251	438821.2156	3924
6	1	36	FOA53	1009545.309	438852.4983	3925
6	1	36	FOA54	1009590.313	438871.4922	3930
6	1	36	FOA55	1009632.36	438889.2764	3930
6	1	36	FOA57	1009594.464	438884.6481	3930
6	1	36	FOA58	1009588.244	438849.4163	3930
6	1	36	FOA58	1009676.187	438936.1699	3930
6	1	36	FOA59	1009621.145	438903.3981	3930
6	1	36	FOA6	1009728.095	438413.4214	3906
6	1	36	FOA60	1009601.402	438910.4835	3930
6	1	36	FOA61	1009564.054	438870.3339	3930
6	1	36	FOA62	1009565.124	438842.6107	3930
6	1	36	FOA64	1009526.63	438832.8147	3925
6	1	36	FOA65	1009582.123	438825.0335	3923
6	1	36	FOA83	1009519.377	438860.1468	3925
6	1	36	FOM10	1008605.204	438658.1944	3922
6	1	36	FOM11	1008662.885	438655.4072	3922
6	1	36	FOM12	1008700.497	438615.1805	3915
6	1	36	FOM13	1008692.499	438659.964	3915
6	1	36	FOM14	1008658.101	438625.4813	3922
6	1	36	FOM15	1008685.827	438685.8808	3915
6	1	36	FOM16	1008709.062	438710.6972	3919
6	1	36	FOM17	1009149.239	438559.4147	3912
6	1	36	FOM18	1009498.594	438788.0659	3924
6	1	36	FOM2	1008565.706	438709.5225	3922
6	1	36	FOM20	1009580.984	438332.0486	3900
6	1	36	FOM3	1008571.72	438658.6578	3922
6	1	36	FOM30	1008489.731	438655.1253	3922
6	1	36	FOM4	1008522.119	438674.1605	3922
6	1	36	FOM5	1008584.328	438779.7829	3922
6	1	36	FOM6	1008559.496	438746.5864	3922
6	1	36	FOM7	1008544.055	438726.459	3923
6	1	36	FOM8	1008620.024	438729.3124	3922
6	1	36	FOM9	1008625.218	438688.1453	3922
6	1	36	FOT1	1007495.907	438806.2728	3866
6	1	36	FOT2	1007510.31	438985.7189	3886
6	1	36	FOT3	1007425.628	438974.4606	3873
6	1	36	FOT4	1007403.979	439074.5463	3873
6	1	36	FOT5	1007436.831	438782.7814	3866
6	1	36	FP2	1007575.213	441198.8782	3891
6	1	36	FP3	1007589.56	441511.6594	3928
6	1	36	FP4	1007436.489	438961.4167	3886

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	36	FP5	1007416.681	438514.5384	3821
6	1	36	FP6	1008116.491	438510.8555	3891
6	1	36	FP7	1008430.751	438637.1191	3922
6	1	36	FP8	1007720.923	438452.9371	3853
6	1	36	FP9	1008890.568	438628.0393	3911
6	1	27	DOT1	998349.4478	445342.2362	3720
6	1	27	DOT3	999080.9282	446215.976	3712
6	1	27	EM63	997313.4051	444706.5582	3733
6	1	27	HDJ18	997556.7337	446774.318	3769
6	1	27	HDJ22	997659.539	446758.9146	3769
6	1	27	HDJ27	997171.8184	447368.577	3757
6	1	27	HDJ28	997357.9411	448756.5456	3780
6	1	27	HDJ30	997238.6778	447517.2836	3759
6	1	27	HDR12	997144.4078	446769.2782	3772
6	1	27	HDR13	997239.1336	446703.8145	3782
6	1	27	HDR15	997271.0859	446847.1464	3770
6	1	27	HDR16	997339.7435	446741.9522	3780
6	1	27	HDR17	997426.6152	446808.1695	3768
6	1	27	HDR18	997513.0125	446864.8821	3769
6	1	27	HDR19	997623.7128	446883.2668	3767
6	1	27	HDR20	997718.5948	446826.0852	3769
6	1	27	HDR21	997844.8976	446822.9144	3767
6	1	27	HDR22	997950.028	446828.4663	3765
6	1	27	HDR23	998247.0868	446930.8276	3742
6	1	27	HDR24	998339.6768	447169.1182	3733
6	1	27	HDR25	998501.5677	447127.7415	3737
6	1	27	HDR26	999022.3472	447396.2961	3738
6	1	27	HDR27	999381.7818	447067.3582	3728
6	1	27	HDR29	997343.4141	447515.3137	3756
6	1	27	HK18	997263.622	449005.5415	3784
6	1	29	DWA 104	991546.1137	444116.1059	3692
6	1	29	DWA 114	990377.2888	445697.6038	3663
6	1	29	DWA 119	987753.5402	444285.4433	3633
6	1	29	DWA 125	987566.734	444308.2966	3631
6	1	29	DWA 126	989194.0278	444286.7213	3642
6	1	29	DWA 128	987679.9359	444356.8082	3631
6	1	29	DWA 13	987298.9547	444393.1173	3631
6	1	29	DWA 131	987391.0408	444373.1741	3632
6	1	29	DWA 139	987822.4669	444337.6074	3633
6	1	29	DWA 14	986698.4505	444468.9292	3622
6	1	29	DWA 140	987220.868	444511.9853	3631
6	1	29	DWA 142	987407.1715	444475.7659	3632
6	1	29	DWA 143	988018.6135	444472.2767	3632

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
6	1	29	DWA 157	991521.3505	449303.526	3756
6	1	29	DWA 158	991624.0999	447584.1563	3735
6	1	29	DWA 161	991781.6225	447498.8549	3743
6	1	29	DWA 165	990658.8089	447668.74	3700
6	1	29	DWA 173	991877.904	447642.8832	3744
6	1	29	DWA 192	989206.671	444657.3394	3648
6	1	29	DWA 193	988977.3033	444481.478	3643
6	1	29	DWA 196	990519.1554	445666.3258	3663
6	1	29	DWA 197	986608.6003	444559.9052	3626
6	1	29	DWA 34	988977.9899	444228.5153	3639
6	1	29	DWA 35	989041.2608	444417.9473	3643
6	1	29	DWA 37	989113.7166	444583.7378	3646
6	1	29	DWA 39	989200.8582	444451.805	3644
6	1	29	DWA159	990024.1196	449479.5069	3725
6	1	29	DWA165	990131.7168	447690.1623	3687
6	1	29	DWA38	989047.9964	444785.4266	3650
6	1	29	DWM 58	986662.3939	444332.6454	3622
6	1	29	DWR 1	990770.0908	446817.4457	3689
6	1	29	DWR 10	991097.8207	447061.499	3701
6	1	29	DWR 105	991292.955	449449.8703	3742
6	1	29	DWR 108	991293.2725	449298.8055	3741
6	1	29	DWR 110	991383.0196	449194.2276	3744
6	1	29	DWR 116	990493.956	445929.7729	3665
6	1	29	DWR 12	990957.2624	446475.2577	3684
6	1	29	DWR 13	990525.5319	448137.1099	3699
6	1	29	DWR 14	991074.3081	446479.2008	3687
6	1	29	DWR 15	990584.9561	448272.5897	3701
6	1	29	DWR 16	990733.1665	446323.2661	3678
6	1	29	DWR 17	990509.7844	448550.071	3701
6	1	29	DWR 18	991002.5862	446361.281	3682
6	1	29	DWR 2	990766.2242	446186.3438	3674
6	1	29	DWR 21	990583.17	448739.314	3702
6	1	29	DWR 22	991380.1958	447025.8176	3715
6	1	29	DWR 23	991399.3503	446871.4884	3712
6	1	29	DWR 24	990737.896	448772.3369	3724
6	1	29	DWR 25	991323.9735	447168.7763	3712
6	1	29	DWR 26	991283.8564	446769.039	3707
6	1	29	DWR 27	990735.0384	448538.2664	3711
6	1	29	DWR 28	991022.5006	447188.7476	3704
6	1	29	DWR 29	991159.3465	446394.1118	3693
6	1	29	DWR 3	990921.2892	446796.5805	3694
6	1	29	DWR 30	990788.1511	448656.6117	3715
6	1	29	DWR 31	991090.1529	447340.3461	3704

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	29	DWR 32	991263.4755	446524.0442	3698
6	1	29	DWR 33	990904.0235	448765.771	3723
6	1	29	DWR 34	991219.3263	447294.9283	3709
6	1	29	DWR 35	991304.0169	446666.824	3703
6	1	29	DWR 36	991098.4608	448823.3346	3728
6	1	29	DWR 37	991452.2504	446624.3415	3704
6	1	29	DWR 38	991764.5194	446901.4693	3722
6	1	29	DWR 39	990417.0566	448741.9071	3706
6	1	29	DWR 4	990471.6693	447691.6694	3693
6	1	29	DWR 40	990477.9013	445758.6663	3663
6	1	29	DWR 42	990440.9075	445603.9047	3660
6	1	29	DWR 44	990445.6444	449192.8585	3720
6	1	29	DWR 45	990512.6685	448982.2799	3716
6	1	29	DWR 46	990433.8473	448992.6317	3715
6	1	29	DWR 47	990576.9234	449097.4844	3719
6	1	29	DWR 48	990670.6987	449255.7513	3724
6	1	29	DWR 5	990830.4612	446107.3667	3672
6	1	29	DWR 50	991627.6047	446756.1615	3712
6	1	29	DWR 51	991173.6414	446488.0204	3693
6	1	29	DWR 52	991749.4431	446751.3565	3720
6	1	29	DWR 53	991202.6664	446591.2633	3695
6	1	29	DWR 54	990908.8431	446919.517	3695
6	1	29	DWR 55	991633.6156	446658.7728	3712
6	1	29	DWR 57	990764.7179	446902.9078	3691
6	1	29	DWR 58	990861.6281	447203.3892	3700
6	1	29	DWR 59	991122.8224	446932.4083	3705
6	1	29	DWR 6	990995.5388	446986.5541	3702
6	1	29	DWR 61	990617.3734	446765.951	3686
6	1	29	DWR 62	991564.0501	447143.5327	3721
6	1	29	DWR 63	991237.0453	447404.2436	3717
6	1	29	DWR 64	990546.7964	449368.9519	3722
6	1	29	DWR 65	990910.3429	447308.2756	3702
6	1	29	DWR 67	991679.2112	447081.417	3724
6	1	29	DWR 68	990743.2766	447291.5782	3697
6	1	29	DWR 70	990597.6134	446829.4917	3682
6	1	29	DWR 71	991800.3946	447193.9896	3736
6	1	29	DWR 72	990704.6165	447167.2529	3690
6	1	29	DWR 73	991120.3358	447497.5112	3713
6	1	29	DWR 75	990599.0275	447219.6763	3687
6	1	29	DWR 76	991828.7274	447086.1731	3732
6	1	29	DWR 77	990583.4282	447121.8164	3687
6	1	29	DWR 8	990948.3154	445747.3722	3678
6	1	29	DWR 80	990490.0337	447187.7116	3687

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	29	DWR 81	991289.8123	447545.6539	3721
6	1	29	DWR 82	990672.5167	449453.7077	3724
6	1	29	DWR 85	991488.5686	447467.4884	3724
6	1	29	DWR 9	990843.8465	446333.4875	3678
6	1	29	DWR 93	990918.567	449363.7294	3726
6	1	29	DWR 99	991110.7345	449378.207	3737
6	1	29	DWR108	991295.0191	449299.1883	3741
6	1	29	DWR110	991387.4448	449194.33	3744
6	1	29	DWR13	989685.5719	448171.552	3701
6	1	29	DWR14(?)	989554.8422	447728.3149	3687
6	1	29	DWR15	989853.8751	448302.6886	3707
6	1	29	DWR17	989609.5918	448585.84	3703
6	1	29	DWR21	989810.1914	448769.9353	3720
6	1	29	DWR24	990269.7739	448790.2158	3710
6	1	29	DWR27	990285.9083	448555.7365	3702
6	1	29	DWR39	989314.9228	448784.9718	3700
6	1	29	DWR45	989583.4283	449020.1939	3710
6	1	29	DWR46	989767.6195	449130.1856	3721
6	1	29	DWR47	989370.3586	449236.4632	3712
6	1	29	DWR48	990037.1672	449281.3243	3724
6	1	29	DWR64	989656.9346	449403.5992	3722
6	1	29	DWR82	990766.1384	449369.4282	3722
6	1	29	DWT 13	986767.8082	444511.7554	3627
6	1	29	DWT 15	987116.5192	444492.0308	3633
6	1	29	DWT 30	990617.6829	447542.497	3700
6	1	29	DWT 31	991724.3333	447696.1379	3736
6	1	29	DWT 32	990600.4293	446899.3125	3683
6	1	29	DWT 34	991232.4381	447049.8433	3709
6	1	29	DWT 36	991580.0708	446999.464	3718
6	1	29	DWT 37	990857.61	447729.583	3704
6	1	29	DWT 38	990495.0242	447267.9227	3692
6	1	29	DWT 39	990801.4974	447473.8188	3698
6	1	29	DWT 40	991016.3867	445874.7446	3680
6	1	29	DWT 41	990648.9036	447387.4919	3697
6	1	29	DWT 42	990495.7564	447837.8684	3696
6	1	29	DWT 43	990526.3725	447383.974	3695
6	1	29	DWT 44	990575.5625	447915.5213	3697
6	1	29	DWT 45	990653.6158	448039.5506	3701
6	1	29	DWT 46	990793.5654	448198.2323	3707
6	1	29	DWT 47	990907.7692	446050.5519	3679
6	1	29	DWT 65	987320.8453	444529.2236	3631
6	1	29	DWT 71	987487.449	444373.0731	3632
6	1	29	DWT 8	987895.7196	444391.3949	3632

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	29	DWT42	989629.3214	447872.9127	3696
6	1	29	DWT43(?)	989856.6244	447945.8482	3697
6	1	29	DWT45	990086.5069	448062.7642	3702
6	1	29	DY 5	990650.2726	448413.3046	3705
6	1	29	DY5	990030.4874	448438.4933	3709
6	1	29	ELA 108	989821.5266	444779.1318	3644
6	1	29	ELA 109	989904.3631	445036.8312	3641
6	1	29	ELA 110	989669.6547	444331.8271	3633
6	1	29	ELA 19	989741.9727	445327.37	3648
6	1	29	ELA 20	989614.2324	444675.7838	3635
6	1	29	ELA 21	989658.2832	445090.3415	3641
6	1	29	ELA 22	989609.6034	444491.0943	3632
6	1	29	ELA 23	989529.0966	445201.1706	3642
6	1	29	ELA 24	989410.6466	444401.7961	3643
6	1	29	ELA 25	989489.2918	445013.1078	3643
6	1	29	ELA 26	989579.0517	444866.9007	3643
6	1	29	ELA 27	989420.4449	444792.9687	3644
6	1	29	ELA 28	989317.1855	444275.1384	3643
6	1	29	ELA 30	989646.4174	445246.6117	3648
6	1	29	ELA 31	989915.3349	445567.4505	3652
6	1	29	ELA 32	990328.5614	446066.5924	3663
6	1	29	ELA 34	989331.5463	444892.9296	3649
6	1	29	ELA 37	989266.1015	444590.4107	3645
6	1	29	ELA 42	989478.6019	444172.8999	3641
6	1	29	ELA 44	989668.1316	444904.9568	3640
6	1	29	ELA 66	989996.5513	445054.7287	3643
6	1	29	ELA 67	989581.2307	444338.4547	3642
6	1	29	ELA 71	990214.8141	445208.6609	3648
6	1	29	ELA 72	990098.6132	444867.3328	3641
6	1	29	ELA 73	989970.5051	444719.1199	3634
6	1	29	ELA 75	990173.3399	445047.012	3647
6	1	29	ELA 76	989593.2775	444194.235	3641
6	1	29	ELA 77	989423.8834	444237.8708	3644
6	1	29	ELA 78	989371.4815	444816.8906	3644
6	1	29	ELA 79	990098.8454	445734.596	3651
6	1	29	ELA 80	990323.6023	445385.7265	3651
6	1	29	ELA 81	990257.898	444990.7015	3650
6	1	29	ELA 82	989586.9467	445170.3367	3642
6	1	29	ELA 83	990176.4274	444713.0236	3641
6	1	29	ELA 84	990454.8336	446048.112	3662
6	1	29	ELA 85	989996.6131	445364.0218	3646
6	1	29	ELA 86	990322.8159	445270.1126	3652
6	1	29	ELA 87	989909.3347	444485.6747	3632

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Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
6	1	29	ELA 88	990326.9815	444911.5439	3647
6	1	29	ELA 89	990326.6157	445499.7333	3658
6	1	29	ELM 106	989977.0199	444668.6258	3631
6	1	29	ELM 107	989322.7373	445007.2741	3650
6	1	29	ELM 108	989495.4231	444369.5598	3635
6	1	29	ELM 4	989275.7641	444735.7536	3648
6	1	29	ELR 1	990476.7519	446138.2091	3671
6	1	29	ELR 10	990255.2717	445753.3815	3660
6	1	29	ELR 12	989893.8242	445410.3999	3650
6	1	29	ELR 13	990097.4143	445828.2808	3652
6	1	29	ELR 14	989865.3041	445204.3021	3643
6	1	29	ELR 16	989920.3993	445703.8155	3652
6	1	29	ELR 17	989860.6556	445007.3856	3641
6	1	29	ELR 18	989796.6141	445532.3767	3653
6	1	29	ELR 19	989728.1861	444848.199	3644
6	1	29	ELR 3	990429.6126	445983.9362	3662
6	1	29	ELR 5	990274.0587	445931.8682	3662
6	1	29	ELR 68	989509.6134	444726.338	3632
6	1	29	ELR 69	989801.5541	444690.5667	3641
6	1	29	ELR 7	990303.8431	445583.6007	3658
6	1	29	ELR 70	990079.4667	445616.7944	3651
6	1	29	ELR 72	990137.2837	445342.097	3649
6	1	29	ELR 73	989393.4213	444499.8263	3642
6	1	29	ELR 76	990067.444	445211.9031	3642
6	1	29	ELR 77	989901.0754	444879.4859	3637
6	1	29	ELR 85	989984.2886	444567.1358	3632
6	1	29	ELR 9	990124.8945	445499.545	3654
6	1	29	ELT 95	989788.1308	445422.2273	3653
6	1	29	ELT 96	989634.7619	444580.1376	3632
6	1	34	DWT94	996856.4635	440446.5772	3692
6	1	34	SNJ1	997832.1814	441397.2596	3680
6	1	34	SNJ11	997042.5736	441090.4009	3690
6	1	34	SNJ12	998028.7756	440378.5826	3672
6	1	34	SNJ13	998196.9987	440232.079	3672
6	1	34	SNJ14	999225.6985	439322.0452	3669
6	1	34	SNJ15	997743.5749	441248.6519	3682
6	1	34	SNJ16	997878.5208	440835.375	3676
6	1	34	SNJ17	998185.412	440776.6377	3674
6	1	34	SNJ18	998350.6625	440386.4992	3673
6	1	34	SNJ19	1000067.886	440054.9237	3684
6	1	34	SNJ2	998291.1591	441348.2577	3678
6	1	34	SNJ20	998399.5431	440862.946	3675
6	1	34	SNJ21	999545.394	439664.8835	3675

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	34	SNJ22	998132.5161	441336.7703	3678
6	1	34	SNJ3	997992.8988	441275.4242	3679
6	1	34	SNJ4	997937.1284	440996.237	3678
6	1	34	SNJ5	997292.1382	441353.4435	3691
6	1	34	SNJ6	998026.1685	440796.2324	3673
6	1	34	SNJ7	997397.61	441163.7678	3685
6	1	34	SNJ8	998123.1859	440579.86	3672
6	1	34	SNJ9	997089.4237	441307.6614	3696
6	1	34	SNT-1	999018.1311	439081.2614	3667
6	1	34	SNT10	998109.4947	440410.0809	3672
6	1	34	SNT10	998370.4966	439775.0343	3665
6	1	34	SNT10	998807.8871	441965.7722	3682
6	1	34	SNT11	998263.8502	440410.3258	3673
6	1	34	SNT12	997541.3475	441316.1031	3683
6	1	34	SNT13	998069.3004	440058.4834	3670
6	1	34	SNT14	998296.8863	440685.882	3674
6	1	34	SNT15	998150.4441	441491.3026	3678
6	1	34	SNT16	998256.8063	439889.1183	3668
6	1	34	SNT17	998458.2318	440368.7294	3672
6	1	34	SNT18	998268.5923	441665.7381	3679
6	1	34	SNT19	998148.753	439770.7288	3667
6	1	34	SNT2	997234.9217	440367.4608	3680
6	1	34	SNT20	996977.5892	440687.2458	3692
6	1	34	SNT21	997904.5956	440145.7785	3672
6	1	34	SNT22	998560.2736	440556.3116	3671
6	1	34	SNT23	997070.6197	440491.2396	3685
6	1	34	SNT24	998458.3186	441735.1279	3681
6	1	34	SNT25	998000.7696	439631.0603	3664
6	1	34	SNT26	997828.4697	439940.9152	3670
6	1	34	SNT3	997515.8723	441594.6366	3682
6	1	34	SNT5	1000423.614	440382.9647	3688
6	1	34	SNT6	997252.0622	440579.277	3681
6	1	34	SNT-7	998135.1739	441177.386	3678
6	1	34	SNT8	997740.6533	440814.0236	3677
6	1	34	SNT-9	998505.3726	441544.8444	3679
6	1	28	CAT1	996745.9274	444661.2248	3736
6	1	28	DWA 164	991930.8286	447745.4256	3744
6	1	28	DWA 167	992142.8374	447561.258	3762
6	1	28	DWA 170	992294.5797	447653.2492	3763
6	1	28	DWA 174	992461.8039	447516.2297	3768
6	1	28	DWJ10	994595.8787	447325.7858	3813
6	1	28	DWJ11	995045.7686	447530.0541	3820
6	1	28	DWJ12	995180.892	447718.1751	3838

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	28	DWJ13	995384.4315	447376.1983	3837
6	1	28	DWJ2	995279.0338	447186.9527	3816
6	1	28	DWJ3	995467.5829	447575.0391	3846
6	1	28	DWJ4	995435.4022	447114.3651	3815
6	1	28	DWJ5	995575.684	447227.6506	3836
6	1	28	DWJ6	995727.0761	447381.9597	3855
6	1	28	DWJ7	995480.6966	446673.3573	3793
6	1	28	DWJ8	994952.7719	447424.864	3827
6	1	28	DWJ9	994918.1537	447592.4705	3830
6	1	28	DWR 101	993508.2537	447276.5594	3819
6	1	28	DWR 103	992711.8645	447300.1681	3779
6	1	28	DWR 104	993361.2009	447261.5699	3800
6	1	28	DWR 106	992827.444	447239.443	3781
6	1	28	DWR 107	993223.235	447146.7364	3780
6	1	28	DWR 109	992974.2921	447256.0046	3789
6	1	28	DWR 49	991875.5865	446744.8291	3727
6	1	28	DWR 56	991909.988	446856.1114	3727
6	1	28	DWR 60	992032.2153	446823.9705	3731
6	1	28	DWR 74	992601.2864	446883.0451	3758
6	1	28	DWR 78	992679.3399	447008.951	3769
6	1	28	DWR 79	991934.7656	447187.5358	3742
6	1	28	DWR 83	992852.9986	446951.8027	3769
6	1	28	DWR 84	992017.3574	447113.1013	3735
6	1	28	DWR 86	992949.9398	447041.4919	3771
6	1	28	DWR 89	993200.4715	447017.8739	3779
6	1	28	DWR 92	993367.6015	447048.2524	3805
6	1	28	DWR 95	993539.8837	447061.2358	3814
6	1	28	DWR 97	992515.7995	447278.5607	3773
6	1	28	DWR 98	993670.0648	447196.9958	3825
6	1	28	DWR112	994675.9099	447396.4861	3837
6	1	28	DWR113	994859.4688	447483.8432	3827
6	1	28	DWR114	995350.2588	446831.5951	3800
6	1	28	DWT9	994213.177	444247.0293	3710
6	1	28	DY96	995676.2003	447104.3242	3833
6	1	28	DY97	995001.296	447244.0745	3814
6	1	28	HDA1	996954.4928	448582.2198	3781
6	1	28	HDA2	996764.2544	447609.4002	3773
6	1	28	HDA3	996723.8474	448473.606	3787
6	1	28	HDA4	996850.1485	448455.9071	3783
6	1	28	HDA5	996773.3156	448347.5759	3782
6	1	28	HDA6	996992.5592	447359.3465	3766
6	1	28	HDJ1	996569.1421	448325.1068	3786
6	1	28	HDJ10	996872.6338	446988.6719	3774

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
6	1	28	HDJ11	996713.615	447762.5635	3780
6	1	28	HDJ12	996800.5305	447063.6355	3769
6	1	28	HDJ13	996661.4357	447659.3807	3781
6	1	28	HDJ14	996760.9737	447150.8879	3768
6	1	28	HDJ15	996558.3798	447577.1477	3789
6	1	28	HDJ16	996789.2087	447256.9003	3770
6	1	28	HDJ17	996623.1535	447510.5813	3789
6	1	28	HDJ19	996707.3801	447365.1607	3781
6	1	28	HDJ2	996806.2136	447939.7229	3777
6	1	28	HDJ20	996611.3511	447316.7352	3792
6	1	28	HDJ21	996543.6675	447392.4114	3790
6	1	28	HDJ23	996948.9341	449080.2172	3783
6	1	28	HDJ24	996468.432	447320.1561	3800
6	1	28	HDJ25	997172.9057	448815.498	3781
6	1	28	HDJ26	996376.3365	447309.6198	3804
6	1	28	HDJ29	996320.8873	447396.5611	3807
6	1	28	HDJ3	996973.2719	448075.7432	3772
6	1	28	HDJ31	996199.7033	447372.8926	3814
6	1	28	HDJ32	996517.9312	447199.9109	3791
6	1	28	HDJ33	996046.2713	447504.0671	3823
6	1	28	HDJ34	996888.2943	448663.8098	3781
6	1	28	HDJ35	996573.3027	447099.5237	3788
6	1	28	HDJ37	996527.0896	446995.0518	3788
6	1	28	HDJ38	996603.4199	446937.4635	3785
6	1	28	HDJ4	996622.6483	448241.9973	3782
6	1	28	HDJ5	996641.8724	448131.1091	3782
6	1	28	HDJ6	996758.3246	448030.6433	3778
6	1	28	HDJ7	996705.3861	447945.4755	3781
6	1	28	HDJ8	996943.8033	447060.0909	3760
6	1	28	HDJ9	996643.8726	447859.6225	3780
6	1	28	HDR1	997023.9089	448723.8639	3780
6	1	28	HDR10	996998.3894	446927.8173	3769
6	1	28	HDR11	997078.7162	446844.2795	3784
6	1	28	HDR14	997132.8352	446952.7478	3761
6	1	28	HDR2	996769.805	448219.5138	3780
6	1	28	HDR28	996820.0239	446854.3704	3788
6	1	28	HDR3	996959.267	447798.8365	3770
6	1	28	HDR30	996469.9342	447099.5303	3793
6	1	28	HDR31	996394.7599	447172.116	3796
6	1	28	HDR4	996855.9275	447506.7623	3773
6	1	28	HDR5	996850.3746	447273.5984	3770
6	1	28	HDR6	996977.7023	447493.1248	3766
6	1	28	HDR7	997041.3616	447318.4323	3762

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	28	HDR8	997064.1522	447691.1602	3764
6	1	28	HDR9	997054.6377	447023.6574	3760
6	1	28	HDS1	996682.5342	448859.7336	3796
6	1	28	HDS10	996774.6856	449177.9857	3789
6	1	28	HDS11	996610.3388	448891.4605	3805
6	1	28	HDS12	996506.047	448942.4077	3805
6	1	28	HDS13	996494.9647	449045.6791	3806
6	1	28	HDS14	996371.1671	448621.9278	3809
6	1	28	HDS15	996310.7038	448800.6665	3817
6	1	28	HDS16	996995.1712	447126.5404	3763
6	1	28	HDS2	996775.7529	448808.2022	3785
6	1	28	HDS3	996968.066	448760.997	3782
6	1	28	HDS4	996897.8226	448871.7757	3782
6	1	28	HDS5	996964.9204	448971.446	3782
6	1	28	HDS6	996799.6528	448863.393	3785
6	1	28	HDS7	996864.4925	448929.0942	3785
6	1	28	HDS8	996859.1318	449014.6033	3783
6	1	28	HDS9	996848.8794	449108.2234	3783
6	1	28	HDW1	996286.4837	448691.4577	3812
6	1	28	HDW2	996243.4905	448469.8329	3805
6	1	28	HDW3	996369.2947	448367.5813	3803
6	1	28	HDW4	996446.7804	448464.861	3799
6	1	28	HDW5	996548.5468	448527.1915	3799
6	1	28	HK22	996718.138	449022.6065	3792
6	1	28	HK23	996179.33	449020.3538	3820
6	1	28	HK24	996593.7882	448896.0867	3805
6	1	28	HP1	996422.8201	449182.4788	3804
6	1	28	HP-2	996349.7858	449210.5491	3807
6	1	28	HP3	996245.177	449159.9529	3818
6	1	28	HP4	996135.7174	449204.5723	3818
6	1	28	HP5	996557.4567	449175.7806	3799
6	1	28	HSJ36	996671.7296	448376.3947	3787
6	1	28	HWT10	995524.446	446073.2631	3774
6	1	20	DWA 134	990634.4299	454304.0819	3750
6	1	20	DWA 135	989926.5756	454595.9202	3742
6	1	20	DWA 136	990340.1041	454085.3867	3737
6	1	20	DWA 159	990835.5894	449498.0905	3729
6	1	20	DWA 162	990691.932	449572.8066	3727
6	1	20	DWA 163	991630.9354	449454.4912	3766
6	1	20	DWA162	990079.2989	449598.1282	3725
6	1	20	DWJ 14	990494.4039	449569.1801	3726
6	1	20	DWJ 14	989481.7517	449610.1565	3724
6	1	20	DWM 46	990455.3378	454030.7276	3741

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	20	DWM 47	990210.5458	454138.0137	3731
6	1	20	DWM 48	989909.7989	454728.4939	3743
6	1	20	DWM 49	989875.0571	454668.2998	3743
6	1	20	DWM 50	990645.9502	454323.6329	3750
6	1	20	DWM 51	990416.1053	454096.1514	3741
6	1	20	DWM 52	990643.5975	454378.7756	3750
6	1	20	DWM 53	989406.2323	453721.204	3721
6	1	20	DWM 54	990474.5238	454091.3479	3741
6	1	20	DWM 55	990573.4594	453136.4161	3743
6	1	20	DWM 56	989460.9689	453606.7205	3723
6	1	20	DWR 102	991193.7197	449492.9195	3738
6	1	20	DWR 88	990637.6007	449709.4334	3733
6	1	20	DWR 91	990751.1488	449687.7302	3736
6	1	20	DWR 96	990918.4299	449574.7135	3736
6	1	20	DWR88	989906.1454	449738.2025	3730
6	1	20	DWR91	990242.2012	449707.5113	3725
6	1	20	DWT 97	990379.1261	454027.2902	3741
6	1	20	DWT 99	990287.6819	453968.5304	3734
6	1	16	DWA 200	992593.0001	454687.0715	3762
6	1	16	DWM 45	992760.1931	454675.3331	3770
6	1	16	DY 102	992748.7541	455698.8022	3773
6	1	16	DY 111	992534.0908	456118.8427	3766
6	1	16	DY 138	992739.5181	455692.1699	3773
6	1	16	DY 147	992644.0539	455743.0733	3769
6	1	16	DY 158	992684.838	455948.6015	3766
6	1	16	DY 177	992687.8631	455575.1575	3770
6	1	16	DY 178	992791.4441	455573.9687	3774
6	1	16	DY 178-1	992737.5668	455578.1506	3774
6	1	16	DY 183	992577.4767	455380.4526	3763
6	1	16	DY 185	992880.2613	455367.1998	3772
6	1	16	SMSM 1	992798.5687	455465.5873	3774
6	1	16	SMSM 10	992775.3342	456001.9887	3772
6	1	16	SMSM 11	992754.4291	455783.6458	3773
6	1	16	SMSM 2	992563.6361	455041.4233	3759
6	1	16	SMSM 3	992822.9204	455660.7709	3773
6	1	16	SMSM 4	992771.5371	455828.9932	3773
6	1	16	SMSM 5	992727.8279	455020.8455	3762
6	1	16	SMSM 6	992745.0453	454789.9036	3767
6	1	16	SMSM 7	992409.846	456207.9426	3763
6	1	16	SMSM 8	992683.1474	456052.7595	3767
6	1	16	SMSM 9	992541.5039	456202.6152	3766
6	1	16	SMST 1	992695.3042	455416.7202	3769
6	1	33	DWA 155	991864.1992	443496.4817	3654

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	33	DWA 156	991859.8533	443613.4292	3656
6	1	33	DWA 43	991934.9424	443738.2501	3671
6	1	33	DWA41	993964.1008	443086.8579	3665
6	1	33	DWA46	994089.1197	443069.3196	3669
6	1	33	DWA51	993777.3684	443332.9303	3683
6	1	33	DWJ1	996844.6803	441178.4602	3705
6	1	33	DWM 1	991762.6024	443619.288	3661
6	1	33	DWM10	995954.9517	442507.6404	3775
6	1	33	DWM11	995564.9946	442544.7332	3768
6	1	33	DWM12	994767.092	442716.7017	3702
6	1	33	DWM13	994765.6025	442107.8509	3715
6	1	33	DWM14	994509.3836	442151.7004	3690
6	1	33	DWM15	996178.9168	442521.4111	3752
6	1	33	DWM16	994602.23	442737.9321	3695
6	1	33	DWM17	995495.6064	442020.1214	3762
6	1	33	DWM18	994533.9871	442399.0108	3689
6	1	33	DWM19	994627.5467	441938.1312	3689
6	1	33	DWM2	993828.3956	443004.4302	3661
6	1	33	DWM20	996065.0615	442669.6089	3770
6	1	33	DWM21	995922.5126	442733.1913	3776
6	1	33	DWM22	995280.1371	442004.8979	3752
6	1	33	DWM23	995444.9883	442327.8997	3777
6	1	33	DWM24	996382.6556	442835.0056	3776
6	1	33	DWM25	995635.4438	441808.5995	3748
6	1	33	DWM26	994498.1638	442263.9531	3686
6	1	33	DWM27	995146.0789	441933.585	3729
6	1	33	DWM28	995889.0684	443156.0138	3786
6	1	33	DWM29	995859.4824	441719.6545	3759
6	1	33	DWM3	995643.7773	442240.8664	3782
6	1	33	DWM30	994947.3771	441845.4494	3701
6	1	33	DWM31	995963.1732	443023.5926	3785
6	1	33	DWM32	996264.6626	443109.2284	3785
6	1	33	DWM4	995200.9306	442333.6468	3759
6	1	33	DWM5	995789.994	441964.1568	3776
6	1	33	DWM6	995406.1864	442145.7659	3774
6	1	33	DWM7	995331.6231	442400.0134	3761
6	1	33	DWM8	994889.1054	442513.9392	3704
6	1	33	DWM9	995623.3157	442077.9294	3759
6	1	33	DWT48	994273.0084	444049.1131	3692
6	1	33	DWT51	994100.3589	443859.1966	3702
6	1	33	DWT52	994027.9488	443724.7123	3681
6	1	33	DWT53	994259.1555	443896.058	3691
6	1	33	DWT54	994063.6075	443571.8275	3672

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	33	DWT55	994227.7905	443599.4475	3678
6	1	33	DWT56	993933.1234	443218.3946	3670
6	1	33	DWT58	993995.4404	443401.4691	3673
6	1	33	DWT59	993796.0725	443081.1776	3661
6	1	33	DWT61	993886.087	443827.7233	3686
6	1	33	DWT62	993840.8186	442917.9947	3660
6	1	33	DWT66	994917.6027	442384.614	3721
6	1	33	DWT68	995092.5081	442323.8032	3741
6	1	33	DWT69	995943.3918	442352.0529	3772
6	1	33	DWT70	995547.1417	442281.4174	3780
6	1	33	DWT91	996738.3004	440995.3853	3704
6	1	33	DWT92	996782.6826	440793.184	3696
6	1	33	LK56	995627.7458	443901.9498	3777
6	1	33	LK57	996785.1924	443920.4734	3742
6	1	32	DWA 1	988459.9202	443746.5912	3628
6	1	32	DWA 10	988349.763	443705.5298	3627
6	1	32	DWA 101	991626.5241	443932.8545	3681
6	1	32	DWA 11	987658.7405	444045.2269	3628
6	1	32	DWA 115	988790.7012	443718.3457	3629
6	1	32	DWA 116	988510.8402	443942.1886	3629
6	1	32	DWA 117	987600.8974	444202.1215	3630
6	1	32	DWA 118	988590.1452	443776.4737	3628
6	1	32	DWA 12	988667.0568	443531.2089	3627
6	1	32	DWA 120	988021.6273	443845.8694	3627
6	1	32	DWA 121	988489.883	443840.4975	3628
6	1	32	DWA 122	987758.5134	444109.7639	3631
6	1	32	DWA 123	988969.5484	443806.95	3630
6	1	32	DWA 124	989126.9543	443809.8848	3631
6	1	32	DWA 127	988831.4027	443511.1822	3628
6	1	32	DWA 129	989138.0849	443999.1435	3638
6	1	32	DWA 130	989171.5872	444087.7866	3638
6	1	32	DWA 132	987500.617	444224.4293	3629
6	1	32	DWA 133	988655.6808	443850.4206	3629
6	1	32	DWA 138	987932.6616	443910.1931	3629
6	1	32	DWA 141	988049.0685	443939.0584	3629
6	1	32	DWA 145	988611.4817	443433.6537	3626
6	1	32	DWA 146	988691.9677	443346.7629	3625
6	1	32	DWA 147	988446.5275	443649.7535	3627
6	1	32	DWA 149	991088.2016	443981.8013	3640
6	1	32	DWA 15	991261.3496	443431.6432	3643
6	1	32	DWA 150	990562.6634	444006.1476	3628
6	1	32	DWA 151	991079.6505	443290.6031	3632
6	1	32	DWA 152	991420.4319	443390.7078	3647

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	DWA 16	989082.477	443525.3254	3629
6	1	32	DWA 17	988219.0159	443633.1916	3627
6	1	32	DWA 18	991379.6604	443478.1027	3650
6	1	32	DWA 189	988970.4899	443996.6359	3636
6	1	32	DWA 19	988288.5504	443598.1159	3625
6	1	32	DWA 190	989088.6024	444161.8769	3639
6	1	32	DWA 191	988824.332	443185.3372	3624
6	1	32	DWA 195	988922.1559	443322.1541	3626
6	1	32	DWA 2	988934.5018	443585.5839	3629
6	1	32	DWA 20	987852.1624	443859.373	3629
6	1	32	DWA 204	988211.2364	443702.628	3627
6	1	32	DWA 209	987810.7328	443945.0588	3627
6	1	32	DWA 21	991336.1207	443567.5019	3647
6	1	32	DWA 22	988728.652	443154.0975	3624
6	1	32	DWA 23	988942.0217	443514.6891	3629
6	1	32	DWA 24	988808.9128	443838.2004	3630
6	1	32	DWA 25	987649.4603	443986.4738	3628
6	1	32	DWA 26	987665.5608	444126.9742	3630
6	1	32	DWA 27	989044.8853	443929.5239	3632
6	1	32	DWA 28	988687.3813	444023.6206	3632
6	1	32	DWA 29	988769.8169	443072.871	3624
6	1	32	DWA 3	988664.4503	443701.642	3628
6	1	32	DWA 30	988806.2389	443346.4082	3625
6	1	32	DWA 31	988895.2735	443711.1638	3629
6	1	32	DWA 32	988899.1691	444040.338	3635
6	1	32	DWA 33	988603.0859	443044.8586	3624
6	1	32	DWA 36	988390.6246	444032.4854	3630
6	1	32	DWA 4	990851.199	443360.1488	3625
6	1	32	DWA 5	988546.8169	443611.7914	3628
6	1	32	DWA 6	990949.1383	443190.1062	3627
6	1	32	DWA 7	991065.1784	443352.2252	3632
6	1	32	DWA 8	988771.9079	443590.0928	3628
6	1	32	DWA 9	991199.462	443220.4804	3634
6	1	32	DWA 92	991587.9834	443091.8032	3648
6	1	32	DWA 93	991429.0643	443207.2801	3645
6	1	32	DWA 95	991520.0997	443177.2926	3649
6	1	32	DWM 57	989238.5896	443957.0284	3637
6	1	32	DWR 111	988891.5795	443124.6555	3625
6	1	32	DWR 115	988992.0985	443228.8247	3626
6	1	32	DWR 117	989011.7431	443086.2054	3624
6	1	32	DWT 14	987457.9544	443127.482	3621
6	1	32	DWT 16	987762.3316	443324.2662	3621
6	1	32	DWT 24	988724.4018	443450.1806	3626

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	DWT 25	990491.8659	443845.6071	3622
6	1	32	DWT 27	988566.9507	443293.4279	3625
6	1	32	DWT 32	988891.8325	443244.3761	3626
6	1	32	DWT 33	991713.3573	443770.0015	3662
6	1	32	DWT 6	990938.1479	442975.93	3626
6	1	32	DWT 64	988335.4525	443342.2353	3623
6	1	32	DWT 66 AB	990735.4883	443617.3436	3622
6	1	32	DWT 72	987336.8246	444193.7908	3632
6	1	32	DWT 73	987557.448	444117.118	3629
6	1	32	DWT 74	987739.9235	443973.5271	3627
6	1	32	DWT 75	988358.6042	443563.5041	3626
6	1	32	DWT 77	988239.1173	443737.8903	3628
6	1	32	DWT 78	987825.3266	443761.9372	3624
6	1	32	DWT 79	990813.4275	443562.2079	3625
6	1	32	DWT 80	988013.5154	443712.7711	3626
6	1	32	DWT 81	989082.2501	443672.5748	3630
6	1	32	DWT 82	988025.7106	443518.7372	3624
6	1	32	DWT 85	987428.357	442917.6868	3617
6	1	32	DWT 86	987631.3707	443035.83	3619
6	1	32	DWT 87 AB2	987560.0785	443243.0613	3621
6	1	32	DWT 90	986631.8276	444229.3867	3621
6	1	32	DWT 95	988757.6591	443768.5817	3630
6	1	32	DWT 96 Core	988695.1416	443569.6514	3627
6	1	32	ELA 1	990237.7489	443583.532	3619
6	1	32	ELA 10	989313.7974	443239.8748	3627
6	1	32	ELA 101	988109.0172	442008.9065	3613
6	1	32	ELA 102	988209.1389	442132.7927	3614
6	1	32	ELA 102 AB	988258.8948	442236.9795	3614
6	1	32	ELA 103	988269.2127	442255.2186	3614
6	1	32	ELA 104	988584.6928	441712.1088	3602
6	1	32	ELA 105	989002.4625	442666.722	3620
6	1	32	ELA 106	988450.5261	441647.9627	3602
6	1	32	ELA 107	988911.4311	442442.492	3619
6	1	32	ELA 11	988731.0779	442608.9103	3620
6	1	32	ELA 111	989893.0042	444139.7111	3621
6	1	32	ELA 12	989425.0436	443905.2896	3638
6	1	32	ELA 13	988544.5615	442716.6839	3619
6	1	32	ELA 14	988479.0622	441902.3859	3610
6	1	32	ELA 15	988370.1269	442606.3294	3619
6	1	32	ELA 16	989586.5485	444043.8159	3637
6	1	32	ELA 17	988499.939	442488.887	3618
6	1	32	ELA 18	989274.4751	444131.8677	3642
6	1	32	ELA 2	989860.9963	443534.7849	3632

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	ELA 26 AB	989414.3418	444125.864	3642
6	1	32	ELA 29	989369.2126	443730.4756	3634
6	1	32	ELA 3	989788.1517	443460.5103	3632
6	1	32	ELA 33	989508.6123	443705.9124	3632
6	1	32	ELA 35	989514.0768	443814.7376	3633
6	1	32	ELA 36	989728.2969	443374.0751	3632
6	1	32	ELA 38	989626.0019	443429.5708	3630
6	1	32	ELA 39	990133.8945	443779.8987	3618
6	1	32	ELA 4	990426.7767	443581.3566	3613
6	1	32	ELA 40	990076.8343	443510.6004	3633
6	1	32	ELA 41	988643.2934	442874.5302	3622
6	1	32	ELA 43	990062.2613	443964.1711	3622
6	1	32	ELA 45	989579.5037	443508.4243	3631
6	1	32	ELA 46	990047.957	443375.5588	3633
6	1	32	ELA 47	990166.31	443440.4386	3633
6	1	32	ELA 48	989274.3896	444019.4782	3640
6	1	32	ELA 49	989972.6463	443296.8801	3632
6	1	32	ELA 5	989740.8814	443274.7939	3632
6	1	32	ELA 50	990255.1443	443473.2345	3627
6	1	32	ELA 51	990024.0365	443802.5784	3627
6	1	32	ELA 52	990312.6559	443735.7274	3611
6	1	32	ELA 53	990172.0093	443863.3509	3615
6	1	32	ELA 54	990130.7006	443304.6528	3631
6	1	32	ELA 55	989371.0828	443623.3396	3631
6	1	32	ELA 56	989988.6737	443696.3079	3633
6	1	32	ELA 57	989876.6298	443765.1623	3629
6	1	32	ELA 58	989715.5448	443445.73	3630
6	1	32	ELA 59	989854.1492	443456.8858	3632
6	1	32	ELA 6	989852.7832	443361.5783	3632
6	1	32	ELA 60	990234.5889	443399.1272	3627
6	1	32	ELA 61	989888.2304	443914.2895	3632
6	1	32	ELA 62	989924.6791	443386.5523	3632
6	1	32	ELA 63	990328.202	443433.9346	3627
6	1	32	ELA 64	989644.3361	443725.3793	3632
6	1	32	ELA 65	989256.8575	443376.8335	3629
6	1	32	ELA 7	989150.8858	443114.2445	3625
6	1	32	ELA 70	989351.8121	443947.0361	3638
6	1	32	ELA 74	989401.145	443378.6963	3630
6	1	32	ELA 8	988651.1754	442265.5816	3615
6	1	32	ELA 9	989261.2569	443788.0769	3633
6	1	32	ELA 90	988803.2839	442820.5	3621
6	1	32	ELA 91	988782.8397	442629.2099	3620
6	1	32	ELA 92	988278.2814	442185.0888	3614

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	ELA 93	988348.7584	442296.9757	3615
6	1	32	ELM 2	989679.0435	443522.9749	3631
6	1	32	ELM 3	988405.3369	442295.0616	3615
6	1	32	ELR 22	988350.8413	442140.0542	3613
6	1	32	ELR 23	988278.1317	441907.1854	3610
6	1	32	ELR 24	988217.2413	442208.5298	3614
6	1	32	ELR 25	988393.7654	441773.5993	3607
6	1	32	ELR 26	988160.1059	442032.9866	3613
6	1	32	ELR 27	988297.6769	441553.8588	3598
6	1	32	ELR 28	987993.6836	441953.9443	3612
6	1	32	ELR 30	988104.4761	441849.016	3610
6	1	32	ELR 31	987959.593	441775.1229	3611
6	1	32	ELR 33	988067.973	441984.7797	3612
6	1	32	ELR 34	988304.3623	441796.2801	3607
6	1	32	ELR 35	988595.1135	441924.15	3612
6	1	32	ELR 36	988027.3208	441662.5228	3607
6	1	32	ELR 40	988692.1367	442181.0408	3614
6	1	32	ELR 41	988471.6706	442580.3268	3618
6	1	32	ELR 42	988683.549	443018.0175	3624
6	1	32	ELR 43	988788.9562	442310.1586	3615
6	1	32	ELR 44	988317.3604	441677.966	3604
6	1	32	ELR 45	988412.6035	442445.1618	3616
6	1	32	ELR 46	988858.5376	442442.9277	3619
6	1	32	ELR 47	988313.6891	442260.7063	3614
6	1	32	ELR 48	988484.1434	441795.4797	3606
6	1	32	ELR 49	988152.2778	442120.5811	3614
6	1	32	ELR 50	989008.4347	442491.9405	3620
6	1	32	ELR 51	988796.2306	442210.1853	3614
6	1	32	ELR 52	988232.9455	442295.2347	3614
6	1	32	ELR 54	988013.1586	441861.015	3612
6	1	32	ELR 55	989009.8774	442734.0266	3621
6	1	32	ELR 56	988876.6566	442344.3453	3616
6	1	32	ELR 57	987948.2888	441679.3731	3609
6	1	32	ELR 58	989040.5528	442902.8683	3623
6	1	32	ELR 59	988760.0618	442393.8202	3618
6	1	32	ELR 60	988394.7159	441610.3745	3602
6	1	32	ELR 61	988638.5071	442600.3487	3620
6	1	32	ELR 62	988612.7259	442174.3394	3614
6	1	32	ELR 63	988300.2853	442325.7882	3614
6	1	32	ELR 64	988537.5795	442023.0294	3613
6	1	32	ELR 65	988260.8939	442126.4761	3614
6	1	32	ELR 66	988890.6078	443029.5634	3624
6	1	32	ELR 67	988820.5707	442772.385	3621

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
6	1	32	ELR 71	988799.1322	442528.4494	3619
6	1	32	ELR 74	989306.8389	443111.9373	3626
6	1	32	ELR 75	988924.6303	442758.6974	3621
6	1	32	ELR 78	988586.9344	442364.8418	3616
6	1	32	ELR 79	988088.5453	441920.9246	3612
6	1	32	ELR 80	988211.8262	441946.7906	3610
6	1	32	ELR 81	988409.4848	441947.4093	3609
6	1	32	ELR 82	988472.6772	441679.0469	3602
6	1	32	ELR 83	989005.5498	442813.4883	3621
6	1	32	ELR 84	988540.5424	442911.6536	3621
6	1	32	ELR 86	988108.1667	441668.1965	3605
6	1	32	ELR 87	988408.196	442057.2427	3612
6	1	32	ELR 88	988716.3342	442268.997	3615
6	1	32	ELR 89	987973.3215	441721.3344	3610
6	1	32	ELR 90	988016.273	441792.5963	3610
6	1	32	ELR 91	988405.3969	442208.1881	3613
6	1	32	ELR 92	988978.6271	442588.6502	3620
6	1	32	ELR 93	988042.9408	441892.2126	3612
6	1	32	ELT 1	989147.2113	442630.7766	3622
6	1	32	ELT 10	988959.6799	443464.0535	3627
6	1	32	ELT 13	990080.1733	443657.4347	3633
6	1	32	ELT 16	990246.7664	443796.3494	3611
6	1	32	ELT 25	989476.6092	443541.0654	3631
6	1	32	ELT 26	989132.93	443423.222	3629
6	1	32	ELT 28	988956.1222	442653.8502	3620
6	1	32	ELT 29	988964.0167	442150.7103	3614
6	1	32	ELT 31	989096.9299	442834.2021	3622
6	1	32	ELT 32	988981.3882	441830.5155	3611
6	1	32	ELT 34	988969.2339	442992.2656	3624
6	1	32	ELT 36	988680.6771	441852.3794	3612
6	1	32	ELT 38	989289.3325	441838.7599	3609
6	1	32	ELT 39	989603.8687	441803.9041	3601
6	1	32	ELT 4	987593.1836	442452.1562	3614
6	1	32	ELT 40	989460.6376	442648.9329	3624
6	1	32	ELT 40 ABN 1	988861.5594	442813.0751	3621
6	1	32	ELT 40 ABN 2	988820.5573	442814.3902	3621
6	1	32	ELT 43	989171.669	442151.5031	3616
6	1	32	ELT 44	988190.4015	441672.5787	3605
6	1	32	ELT 46	989100.3486	443221.8797	3625
6	1	32	ELT 49	988546.5877	442137.6069	3614
6	1	32	ELT 5	989627.6698	443642.06	3632
6	1	32	ELT 50	988757.5434	442986.9763	3624
6	1	32	ELT 51	988764.5872	442133.0862	3614

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
6	1	32	ELT 53	988729.8469	442817.7948	3621
6	1	32	ELT 55	988636.2612	442050.188	3613
6	1	32	ELT 61 ABN 1	988757.6565	442685.6982	3620
6	1	32	ELT 7	989254.3852	443539.314	3631
6	1	32	ELT 9	989946.5152	443456.8233	3632
6	1	32	ELT 92	988326.5461	442393.1591	3615
6	1	32	ELT 93	989318.4543	443753.6882	3633
6	1	32	ELT 94	989194.8363	443486.9428	3630
6	1	32	ELT 97	988578.6793	442802.0337	3620
6	1	32	PUA 1	987731.1876	440521.2854	3590
6	1	32	PUA 2	988122.3553	441189.6826	3592
6	1	32	PUA 3	988208.0446	441377.8009	3596
6	1	32	PUA 4	988240.5863	441194.7037	3590
6	1	32	PUA 5	988159.1431	441296.8963	3594
6	1	32	PUR 1	988183.6524	441435.6803	3596
6	1	32	PUR 10	988127.8472	441526.2483	3602
6	1	32	PUR 11	987745.3685	440979.1034	3596
6	1	32	PUR 12	988116.9098	441112.2272	3592
6	1	32	PUR 13	987830.7277	440930.7673	3594
6	1	32	PUR 14	987884.9637	441452.6926	3601
6	1	32	PUR 15	987740.9863	441144.547	3600
6	1	32	PUR 16	988215.544	441518.8683	3602
6	1	32	PUR 19	988188.078	441257.5522	3594
6	1	32	PUR 2	987966.8344	441442.2018	3599
6	1	32	PUR 20	988032.1126	441080.3939	3593
6	1	32	PUR 21	987921.3352	441547.5219	3604
6	1	32	PUR 22	987798.5245	441051.1566	3596
6	1	32	PUR 24	987887.0545	441380.3431	3601
6	1	32	PUR 25	988110.1371	441254.4663	3594
6	1	32	PUR 26	988190.132	441586.3596	3602
6	1	32	PUR 27	988227.7764	441463.0604	3594
6	1	32	PUR 28	987880.0809	441304.4821	3598
6	1	32	PUR 29	987926.7475	441399.5204	3601
6	1	32	PUR 3	987903.0565	441604.7474	3609
6	1	32	PUR 30	987792.2904	440998.4417	3596
6	1	32	PUR 31	987799.7518	441203.6436	3600
6	1	32	PUR 32	987927.87	441485.6893	3604
6	1	32	PUR 33	987747.283	440784.3283	3590
6	1	32	PUR 34	987819.3615	441154.1522	3600
6	1	32	PUR 35	987949.887	441579.1759	3604
6	1	32	PUR 36	987923.2892	441334.2294	3598
6	1	32	PUR 37	987851.2136	441230.242	3598
6	1	32	PUR 38	988172.3933	441174.7249	3592

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	PUR 39	987970.1633	441520.7124	3604
6	1	32	PUR 4	988098.2929	441344.7411	3596
6	1	32	PUR 41	987806.9475	440763.3825	3590
6	1	32	PUR 42	988068.4803	441117.1894	3595
6	1	32	PUR 44	987823.937	440647.2057	3592
6	1	32	PUR 45	988371.3485	441559.6665	3597
6	1	32	PUR 46	987785.7811	440585.727	3590
6	1	32	PUR 5	987802.6072	441462.4994	3603
6	1	32	PUR 6	987969.8142	441296.3316	3597
6	1	32	PUR 7	987825.4698	441280.3725	3602
6	1	32	PUR 8	988072.1088	441185.2415	3595
6	1	32	PUR 9	987849.0295	441110.6655	3597
6	1	35	SRR15	1006214.072	440793.1165	3815
6	1	35	SRR18	1006360.308	441046.797	3844
6	1	35	SRR2	1006699.208	441244.876	3839
6	1	35	SRR20	1004135.938	442027.9911	3755
6	1	35	SRR21	1003999.512	442008.6926	3761
6	1	35	SRR22	1003738.774	442278.1818	3732
6	1	35	SRR23	1003833.695	442335.8159	3735
6	1	35	SRR24	1003879.809	441668.6158	3771
6	1	35	SRR25	1003814.416	442703.6753	3750
6	1	35	SRR26	1003745.772	442860.2246	3750
6	1	35	SRR27	1004132.292	442600.6593	3744
6	1	35	SRR28	1004258.166	442436.2429	3742
6	1	35	SRR29	1003911.584	441462.3582	3757
6	1	35	SRR3	1006689.121	441302.5987	3839
6	1	35	SRR30	1005677.77	442701.271	3801
6	1	35	SRR31	1005641.175	442543.6937	3785
6	1	35	SRR32	1006672.942	441260.1539	3839
6	1	35	SRR32	1005531.46	442417.3177	3778
6	1	35	SRR33	1005628.156	442821.2229	3797
6	1	35	SRR34	1005436.467	442357.5753	3778
6	1	35	SRR35	1003896.109	441159.037	3749
6	1	35	SRR36	1006167.887	440136.1719	3820
6	1	35	SRR37	1006136.283	440054.5828	3817
6	1	35	SRR38	1006082.801	439985.4513	3817
6	1	35	SRR39	1006075.453	439884.9593	3787
6	1	35	SRR4	1006637.364	441268.6932	3800
6	1	35	SRR42	1005927.56	442716.0299	3800
6	1	35	SRR43	1005771.517	442668.7505	3801
6	1	35	SRR44	1005628.109	442931.2094	3798
6	1	35	SRR45	1006796.896	441383.0452	3857
6	1	35	SRR46	1006874.55	441465.2107	3867

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRR47	1006848.143	441491.754	3899
6	1	35	SRR48	1006575.978	441627.9506	3856
6	1	35	SRR49	1006783.766	441506.5409	3874
6	1	35	SRR5	1006847.228	441463.5012	3867
6	1	35	SRR50	1006813.5	441484.8516	3899
6	1	35	SRR51	1006696.142	441236.6804	3839
6	1	35	SRR52	1003889.667	441134.5264	3749
6	1	35	SRR53	1005622.46	442896.7052	3798
6	1	35	SRR54	1005658.17	442924.8482	3798
6	1	35	SRR55	1005464.966	441904.1138	3817
6	1	35	SRR56	1005520.665	442076.5565	3823
6	1	35	SRR57	1005404.418	442030.7008	3808
6	1	35	SRR58	1005448.978	442034.9188	3823
6	1	35	SRR59	1005546.235	441660.8081	3785
6	1	35	SRR6	1006832.401	441410.5084	3867
6	1	35	SRR60	1005465.998	441627.398	3805
6	1	35	SRR61	1005371.989	441671.4234	3796
6	1	35	SRR62	1005297.844	441746.6099	3813
6	1	35	SRR63	1005972.822	441643.2206	3818
6	1	35	SRR64	1005900.58	441761.9924	3801
6	1	35	SRR65	1005783.552	441738.2028	3784
6	1	35	SRR7	1006608.561	441639.2368	3856
6	1	35	SRR70	1006298.905	439808.3766	3792
6	1	35	SRR71	1006307.001	439960.6483	3810
6	1	35	SRR72	1006355.222	439955.1474	3810
6	1	35	SRR73	1006284.598	439924.1477	3794
6	1	35	SRR74	1006289.432	440755.8352	3815
6	1	35	SRR75	1006281.7	440710.5778	3836
6	1	35	SRR77	1006385.626	440921.3381	3817
6	1	35	SRR78	1006084.981	440335.7407	3820
6	1	35	SRR79	1006448.698	440737.1936	3826
6	1	35	SRR8	1006186.42	440508.2877	3835
6	1	35	SRR80	1006389.809	440766.005	3802
6	1	35	SRR81	1006250.312	440752.1634	3815
6	1	35	SRR82	1006668.656	440912.4987	3859
6	1	35	SRR83	1006640.977	440930.8208	3859
6	1	35	SRR84	1006601.825	440929.762	3859
6	1	35	SRR85	1006570.237	440939.3908	3859
6	1	35	SRR86	1006537.587	440964.4039	3831
6	1	35	SRR87	1006547.739	441050.5672	3819
6	1	35	SRR88	1006726.716	441101.1098	3808
6	1	35	SRR89	1006701.731	441114.6783	3808
6	1	35	SRR9	1006109.278	440284.496	3820

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	SRR90	1006683.5	441134.6198	3808
6	1	35	SRR91	1006659.263	441157.9946	3798
6	1	35	SRR92	1006606.847	441038.9804	3819
6	1	35	SRR93	1006667.405	441028.6486	3819
6	1	35	SRR94	1006635.994	441037.4571	3819
6	1	35	SRR95	1006078.439	440441.8303	3830
6	1	35	SRR96	1006086.381	440542.0637	3831
6	1	35	SRR97	1006093.039	440644.6791	3832
6	1	35	SRR98	1006098.493	440740.8378	3836
6	1	35	SRR99	1006093.343	440829.5436	3836
6	1	35	TRA1	1005256.268	443486.0588	3863
6	1	35	TRA2	1005094.191	443650.2196	3874
6	1	35	TRA3	1005210.921	443394.0476	3830
6	1	35	TRA4	1005130.25	443630.1198	3874
6	1	35	TRA5	1005152.577	443533.5097	3843
6	1	35	TRA6	1005300.369	443233.826	3885
6	1	35	TRI-2	1004264.934	442587.0201	3751
6	1	35	TRJ1	1005742.762	442612.6461	3801
6	1	35	TRJ10	1005188.071	443306.9281	3867
6	1	35	TRJ100	1005490.766	442697.2802	3782
6	1	35	TRJ101	1005559.2	442675.4013	3784
6	1	35	TRJ102	1005507.355	442512.3264	3788
6	1	35	TRJ103	1003443.416	442495.0724	3731
6	1	35	TRJ104	1003517.292	440569.8153	3730
6	1	35	TRJ105	1003421.629	440600.0051	3735
6	1	35	TRJ106	1003530.715	440618.5488	3735
6	1	35	TRJ107	1003468.75	442533.7063	3731
6	1	35	TRJ108	1003555.053	440676.208	3735
6	1	35	TRJ109	1003590.808	440567.4665	3730
6	1	35	TRJ11	1005304.512	443324.2046	3885
6	1	35	TRJ110	1003473.001	442594.9149	3731
6	1	35	TRJ111	1003390.805	442672.5227	3727
6	1	35	TRJ112	1003581.367	440617.3908	3735
6	1	35	TRJ113	1003609.7	440668.0544	3735
6	1	35	TRJ114	1003427.443	442710.9026	3732
6	1	35	TRJ115	1003313.895	442810.7811	3735
6	1	35	TRJ116	1003584.415	440722.0759	3736
6	1	35	TRJ117	1003639.334	440800.5792	3736
6	1	35	TRJ118	1003743.135	440825.3574	3738
6	1	35	TRJ119	1003254.357	442765.5711	3727
6	1	35	TRJ12	1005357.301	443213.0537	3881
6	1	35	TRJ120	1003120.005	442817.0149	3727
6	1	35	TRJ121	1003686.438	440926.0323	3739

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRJ122	1003767.018	440945.3383	3739
6	1	35	TRJ123	1003034.964	442862.6322	3737
6	1	35	TRJ124	1003070.801	442963.0975	3737
6	1	35	TRJ125	1002984.728	442982.5623	3744
6	1	35	TRJ126	1003751.663	441046.4517	3741
6	1	35	TRJ127	1003834.136	441026.7728	3742
6	1	35	TRJ128	1003851.154	441133.5355	3749
6	1	35	TRJ129	1002921.633	442985.0837	3744
6	1	35	TRJ13	1005312.975	443555.6384	3860
6	1	35	TRJ130	1003799.14	441204.1986	3749
6	1	35	TRJ131	1005360.223	439960.7647	3773
6	1	35	TRJ132	1003864.394	441306.3355	3753
6	1	35	TRJ133	1005227.556	440099.7934	3774
6	1	35	TRJ134	1003799.056	441380.806	3755
6	1	35	TRJ135	1005246.399	439975.5661	3772
6	1	35	TRJ136	1005357.931	440118.9145	3780
6	1	35	TRJ137	1005291.796	439960.9685	3773
6	1	35	TRJ138	1003732.327	441336.2154	3751
6	1	35	TRJ139	1005342.555	440048.3663	3778
6	1	35	TRJ14	1005197.978	443620.3111	3891
6	1	35	TRJ140	1004718.355	439790.1283	3749
6	1	35	TRJ141	1004518.067	439818.8743	3745
6	1	35	TRJ142	1003674.107	441264.8829	3751
6	1	35	TRJ143	1003615.917	441192.5796	3750
6	1	35	TRJ144	1004553.416	440015.1756	3750
6	1	35	TRJ145	1004589.791	440149.5857	3749
6	1	35	TRJ146	1003654.777	441098.5064	3750
6	1	35	TRJ147	1003553.469	440982.7997	3740
6	1	35	TRJ148	1004339.13	440017.1209	3744
6	1	35	TRJ149	1003608.897	440941.3518	3738
6	1	35	TRJ15	1006357.276	440013.8958	3809
6	1	35	TRJ150	1003390.393	440784.8946	3734
6	1	35	TRJ151	1004356.581	440124.1945	3745
6	1	35	TRJ152	1003479.529	440876.479	3738
6	1	35	TRJ153	1003410.634	440960.0855	3738
6	1	35	TRJ154	1003319.369	440902.0846	3736
6	1	35	TRJ155	1003937.156	439853.5117	3734
6	1	35	TRJ157	1003507.294	440180.934	3723
6	1	35	TRJ158	1003309.132	440662.1058	3734
6	1	35	TRJ159	1003376.391	440264.8755	3721
6	1	35	TRJ16	1005619.071	441021.9426	3809
6	1	35	TRJ160	1004979.929	439776.3551	3760
6	1	35	TRJ161	1005082.046	439767.9387	3761

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRJ162	1005058.871	439872.418	3765
6	1	35	TRJ163	1004812.689	440178.6001	3755
6	1	35	TRJ164	1003330.968	439831.1221	3726
6	1	35	TRJ167 (Abn)	1005298.143	442841.1898	3819
6	1	35	TRJ168	1005406.981	442461.3404	3802
6	1	35	TRJ169	1005340.255	443403.9372	3843
6	1	35	TRJ17	1005303.377	441583.9346	3786
6	1	35	TRJ170	1005257.986	443138.364	3852
6	1	35	TRJ18	1005154.052	441813.2764	3763
6	1	35	TRJ19	1004759.357	442274.7197	3771
6	1	35	TRJ2	1005655.241	442536.8067	3785
6	1	35	TRJ20	1006774.614	439718.7261	3841
6	1	35	TRJ21	1006818.569	439701.9349	3850
6	1	35	TRJ21	1005665.751	441604.8352	3785
6	1	35	TRJ22	1005969.132	441618.1921	3818
6	1	35	TRJ23	1005883.35	441932.0061	3805
6	1	35	TRJ24	1005933.285	441422.6146	3782
6	1	35	TRJ25	1005471.029	442474.6846	3788
6	1	35	TRJ26	1005422.228	442670.0118	3782
6	1	35	TRJ27	1005781.131	442297.8103	3833
6	1	35	TRJ28	1005778.415	442370.8107	3802
6	1	35	TRJ29	1003770.778	440499.9305	3731
6	1	35	TRJ3	1005607.681	442680.9932	3784
6	1	35	TRJ30	1003902.373	440660.0916	3740
6	1	35	TRJ31	1003980.498	440767.5566	3743
6	1	35	TRJ32	1003978.681	440898.0228	3742
6	1	35	TRJ33	1004000.489	441037.1039	3746
6	1	35	TRJ34	1003960.032	440975.0144	3746
6	1	35	TRJ36	1004057.297	441262.5158	3754
6	1	35	TRJ37	1004090.954	441588.6841	3773
6	1	35	TRJ38	1003503.937	440477.8391	3730
6	1	35	TRJ39	1003660.551	440506.6265	3731
6	1	35	TRJ40	1003551.916	440530.4915	3730
6	1	35	TRJ41	1004091.945	441218.4525	3754
6	1	35	TRJ42	1004039.169	441549.8536	3773
6	1	35	TRJ43	1004127.402	441721.8088	3772
6	1	35	TRJ44	1003455.542	440569.3893	3730
6	1	35	TRJ45	1004008.367	441231.3421	3752
6	1	35	TRJ46	1003991.819	441646.5534	3767
6	1	35	TRJ47	1003388.518	440466.886	3729
6	1	35	TRJ48	1003931.924	441735.7697	3752
6	1	35	TRJ49	1004011.93	441582.076	3762
6	1	35	TRJ5	1005266.386	442614.9207	3809

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRJ50	1003324.492	440578.8512	3729
6	1	35	TRJ51	1003955.548	442047.9409	3761
6	1	35	TRJ52	1004035.483	441673.5458	3767
6	1	35	TRJ53	1003206.298	440601.07	3729
6	1	35	TRJ54	1004022.951	441788.0878	3752
6	1	35	TRJ55	1003920.719	441902.6934	3761
6	1	35	TRJ56	1003258.86	440451.4266	3725
6	1	35	TRJ56	1003909.498	440079.1195	3734
6	1	35	TRJ57	1003339.282	440366.5562	3724
6	1	35	TRJ58	1004069.335	441921.2954	3763
6	1	35	TRJ59	1004127.893	441836.2149	3772
6	1	35	TRJ6	1005301.911	442779.4221	3819
6	1	35	TRJ60	1003942.135	441987.9162	3761
6	1	35	TRJ61	1003134.159	440512.0194	3725
6	1	35	TRJ62	1003370.251	440421.4919	3724
6	1	35	TRJ63	1003477.596	440522.1918	3730
6	1	35	TRJ64	1003708.314	440464.0812	3730
6	1	35	TRJ65	1003873.108	440536.4032	3737
6	1	35	TRJ66	1003812.93	440488.6232	3737
6	1	35	TRJ67	1003939.825	440927.3217	3742
6	1	35	TRJ68	1003947.675	441019.6927	3746
6	1	35	TRJ69	1004044.488	441305.6955	3754
6	1	35	TRJ7	1005422.453	442920.8265	3799
6	1	35	TRJ70	1004051.501	441628.954	3773
6	1	35	TRJ71	1004081.828	441430.1518	3759
6	1	35	TRJ72	1003419.443	440527.1562	3730
6	1	35	TRJ73	1003424.113	440419.6881	3725
6	1	35	TRJ74	1004066.503	441149.7973	3751
6	1	35	TRJ75	1004080.505	441816.3323	3772
6	1	35	TRJ76	1003645.593	442211.4853	3749
6	1	35	TRJ77	1003535.933	440375.38	3729
6	1	35	TRJ78	1003818.083	442148.9591	3737
6	1	35	TRJ79	1003720.494	442052.9157	3754
6	1	35	TRJ8	1005244.059	442984.0294	3842
6	1	35	TRJ80	1003448.187	440285.5847	3722
6	1	35	TRJ81	1003768.906	441955.6412	3761
6	1	35	TRJ82	1003545.288	442089.3419	3756
6	1	35	TRJ83	1003666.94	442106.7047	3731
6	1	35	TRJ84	1003572.079	440252.3918	3728
6	1	35	TRJ85	1003418.171	442276.5936	3729
6	1	35	TRJ86	1003688.954	440132.1739	3731
6	1	35	TRJ87	1003722.654	440246.4718	3730
6	1	35	TRJ88	1003527.102	442247.6029	3729

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRJ89	1003547.417	442379.5195	3732
6	1	35	TRJ9	1005178.808	443188.029	3852
6	1	35	TRJ90	1003811.186	440287.6	3733
6	1	35	TRJ91	1003574.425	442250.3329	3730
6	1	35	TRJ92	1003383.95	442477.5081	3725
6	1	35	TRJ93	1003388.049	442566.1838	3725
6	1	35	TRJ94	1003477.908	442417.7682	3730
6	1	35	TRJ95	1005197.812	443671.0487	3891
6	1	35	TRJ96	1003523.789	442506.333	3731
6	1	35	TRJ97	1003841.557	440351.1766	3731
6	1	35	TRJ98	1005208.116	443661.671	3891
6	1	35	TRJ99	1005216.105	443511.5948	3863
6	1	35	TRJA4	1005454.182	442592.044	3788
6	1	35	TRK1	1003263.317	443080.134	3739
6	1	35	TRM1	1002449.568	441844.6761	3716
6	1	35	TRM10	1004112.438	440859.7081	3745
6	1	35	TRM11	1004273.174	440800.4254	3748
6	1	35	TRM12	1004438.969	440764.8961	3751
6	1	35	TRM13	1005051.408	440080.0377	3769
6	1	35	TRM14	1004661.561	440672.5065	3754
6	1	35	TRM141	1005055.971	439957.4985	3765
6	1	35	TRM15	1005296.494	439821.769	3773
6	1	35	TRM16	1003946.488	440804.2128	3743
6	1	35	TRM17	1004745.69	440221.3919	3751
6	1	35	TRM18	1005299.059	440026.5591	3778
6	1	35	TRM19	1004048.881	441388.6513	3759
6	1	35	TRM2	1003676.578	441578.8639	3760
6	1	35	TRM20	1004072.833	440667.4572	3744
6	1	35	TRM21	1004896.474	440119.913	3755
6	1	35	TRM22	1004550.199	440361.3203	3751
6	1	35	TRM-23	1004730.57	440091.6579	3753
6	1	35	TRM24	1004024.859	441195.8013	3749
6	1	35	TRM25	1003967.081	440632.202	3743
6	1	35	TRM26	1004049.335	440895.868	3745
6	1	35	TRM27	1003995.738	440744.9681	3743
6	1	35	TRM28	1003848.942	440697.2833	3740
6	1	35	TRM29	1004887.679	439971.72	3757
6	1	35	TRM3	1004349.105	441259.905	3760
6	1	35	TRM30	1005341.128	439912.5735	3773
6	1	35	TRM31	1005172.071	440054.5914	3772
6	1	35	TRM32	1003815.325	440543.0416	3737
6	1	35	TRM33	1004016.325	440986.264	3746
6	1	35	TRM34	1005183.707	439900.7865	3768

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRM35	1005466.006	440026.3884	3782
6	1	35	TRM35	1004038.765	441089.2887	3749
6	1	35	TRM36	1003773.521	440443.4589	3730
6	1	35	TRM37	1003993.769	440839.6286	3743
6	1	35	TRM38	1004018.862	441141.1376	3749
6	1	35	TRM39	1003709.37	440518.0534	3731
6	1	35	TRM4	1004078.249	441482.1065	3773
6	1	35	TRM40	1003641.506	440396.0675	3729
6	1	35	TRM42	1005438.037	439836.7162	3773
6	1	35	TRM43	1004090.833	441118.8811	3751
6	1	35	TRM44	1003931.903	440716.3679	3743
6	1	35	TRM45	1003872.764	440589.4782	3737
6	1	35	TRM46	1003604.801	440480.3264	3730
6	1	35	TRM5	1004075.296	441343.9359	3759
6	1	35	TRM6	1003968.256	441308.1073	3752
6	1	35	TRM7	1003994.349	441088.3178	3746
6	1	35	TRM8	1005866.753	442063.6959	3804
6	1	35	TRM9	1004116.111	441040.0106	3749
6	1	35	TRR1	1002927.821	439825.461	3723
6	1	35	TRR10	1005245.132	439912.7042	3768
6	1	35	TRR11	1005234.845	439855.6963	3768
6	1	35	TRR12	1005967.326	439769.1062	3786
6	1	35	TRR13	1005875.771	439736.5919	3786
6	1	35	TRR14	1005870.485	439845.1327	3775
6	1	35	TRR15	1005850.986	439967.9948	3787
6	1	35	TRR16	1005928.245	440050.8487	3788
6	1	35	TRR17	1005933.131	440166.6877	3802
6	1	35	TRR18	1006059.232	439970.0158	3817
6	1	35	TRR19	1005798.478	440129.3647	3808
6	1	35	TRR2	1002846.208	439910.6768	3717
6	1	35	TRR20	1005995.145	440009.8437	3788
6	1	35	TRR21	1005758.669	440242.8209	3810
6	1	35	TRR22	1005831.474	440332.9706	3815
6	1	35	TRR23	1005714.5	440357.5013	3808
6	1	35	TRR24	1005642.908	440271.4624	3800
6	1	35	TRR25	1005596.745	440388.3347	3797
6	1	35	TRR26	1005677.965	440467.9946	3800
6	1	35	TRR27	1005576.6	440497.7582	3792
6	1	35	TRR28	1005489.626	440430.4822	3785
6	1	35	TRR29	1005506.657	440331.8813	3788
6	1	35	TRR3	1002737.706	439920.7903	3713
6	1	35	TRR30	1005435.709	440222.046	3788
6	1	35	TRR31	1005198.05	440317.5786	3778

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRR32	1005108.477	440516.4163	3780
6	1	35	TRR33	1004998.47	440527.0286	3773
6	1	35	TRR5	1005283.63	440231.0607	3778
6	1	35	TRR6	1005140.561	440216.7382	3777
6	1	35	TRR7	1005238.769	440038.2719	3772
6	1	35	TRR8	1002747.359	439793.3536	3718
6	1	35	TRR9	1005176.993	439834.6419	3762
6	1	35	TRS1	1004112.145	442374.8745	3740
6	1	35	TRS10	1004687.959	441843.0338	3756
6	1	35	TRS11	1004646.13	441924.7946	3752
6	1	35	TRS12	1004742.122	441892.9338	3751
6	1	35	TRS13	1004824.748	442020.7968	3771
6	1	35	TRS14	1004370.158	442523.0243	3762
6	1	35	TRS15	1004851.171	441926.0383	3754
6	1	35	TRS16	1004877.689	441963.9988	3754
6	1	35	TRS17	1004801.506	441455.4875	3774
6	1	35	TRS18	1004203.853	442795.3861	3749
6	1	35	TRS19	1004183.55	442748.2603	3749
6	1	35	TRS2	1004248.638	442371.3382	3742
6	1	35	TRS20	1004204.528	442728.8332	3749
6	1	35	TRS21	1005064.572	441092.3397	3781
6	1	35	TRS22	1004908.999	441276.3328	3770
6	1	35	TRS23	1004734.649	441646.9632	3758
6	1	35	TRS25	1004715.16	441691.5704	3758
6	1	35	TRS26	1004759.857	441571.6454	3760
6	1	35	TRS27	1004735.369	441722.9208	3756
6	1	35	TRS28	1004670.523	441664.3515	3758
6	1	35	TRS29	1004700.541	441737.1378	3756
6	1	35	TRS3	1004269.143	442240.5382	3741
6	1	35	TRS4	1004136.675	442281.772	3738
6	1	35	TRS5	1004217.356	442216.8301	3741
6	1	35	TRS6	1004183.325	442014.4703	3755
6	1	35	TRS7	1004313.335	441935.3659	3770
6	1	35	TRS8	1004429.493	441956.5322	3749
6	1	35	TRS9	1004585.575	441876.5293	3752
6	1	35	TRT10	1005648.373	440536.7652	3792
6	1	35	TRT100	1005476.289	443263.5682	3886
6	1	35	TRT101	1004950.169	443289.0766	3821
6	1	35	TRT102	1004929.526	443185.0252	3808
6	1	35	TRT103	1005153.792	441686.1313	3762
6	1	35	TRT104	1004830.863	443175.0519	3787
6	1	35	TRT105	1004924.707	443385.3601	3803
6	1	35	TRT106	1004767.196	443300.1231	3795

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRT107	1004653.536	443191.4217	3777
6	1	35	TRT108	1005136.791	443152.7442	3817
6	1	35	TRT109	1005061.099	441690.0223	3762
6	1	35	TRT11	1005741.969	440506.3619	3800
6	1	35	TRT110	1005076.818	443203.9623	3817
6	1	35	TRT111	1005039.078	443277.801	3821
6	1	35	TRT112	1004964.89	442083.5447	3759
6	1	35	TRT113	1005057.969	443352.2417	3838
6	1	35	TRT114	1005163.341	443408.8273	3814
6	1	35	TRT115	1004831.769	442185.5914	3783
6	1	35	TRT116	1005630.372	442909.5838	3798
6	1	35	TRT117	1006889.635	441127.0305	3822
6	1	35	TRT118	1006739.642	441233.9665	3839
6	1	35	TRT119	1006644.196	441300.0532	3800
6	1	35	TRT12	1005483.029	440972.947	3811
6	1	35	TRT120	1006774.713	441163.3322	3808
6	1	35	TRT121	1004542.966	443260.466	3812
6	1	35	TRT122	1005378.614	443106.2415	3881
6	1	35	TRT123	1005630.814	442902.8884	3798
6	1	35	TRT124	1006381.397	440116.4616	3798
6	1	35	TRT125	1006347.85	439941.637	3810
6	1	35	TRT13	1005395.601	441061.1659	3799
6	1	35	TRT14	1005298.209	441094.0529	3798
6	1	35	TRT15	1005857.009	440199.152	3808
6	1	35	TRT16	1006070.852	440044.6568	3817
6	1	35	TRT17	1006303.762	439958.9652	3810
6	1	35	TRT18 (ABN)	1006539.527	439906.1082	3819
6	1	35	TRT19	1006562.445	439906.3539	3836
6	1	35	TRT2	1005550.84	441004.858	3809
6	1	35	TRT20	1006522.351	439676.1998	3797
6	1	35	TRT22	1005373.177	441282.5429	3772
6	1	35	TRT23	1005216.23	441280.3698	3786
6	1	35	TRT24	1005194.371	441421.6555	3774
6	1	35	TRT25	1005041.087	441742.8139	3763
6	1	35	TRT26	1005759.202	440936.0795	3817
6	1	35	TRT27	1004860.293	441716.6937	3766
6	1	35	TRT28	1004552.139	441622.4293	3761
6	1	35	TRT29	1004781.359	441834.3445	3756
6	1	35	TRT30	1005132.626	441875.8366	3778
6	1	35	TRT31	1005184.651	441784.4836	3771
6	1	35	TRT32	1005264.289	441712.1087	3774
6	1	35	TRT33	1005391.062	441597.0888	3796
6	1	35	TRT34	1005453.957	441771.4611	3822

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRT35	1005515.458	441714.4731	3805
6	1	35	TRT36	1005523.572	441797.685	3822
6	1	35	TRT37	1005723.949	441611.7854	3781
6	1	35	TRT38	1005820.042	441567.4099	3793
6	1	35	TRT39	1005700.138	441533.2276	3773
6	1	35	TRT4	1005470.631	440857.6934	3812
6	1	35	TRT40	1005651.117	441420.0969	3778
6	1	35	TRT41	1005818.925	441480.709	3793
6	1	35	TRT42	1005911.789	441643.0313	3796
6	1	35	TRT43	1006047.632	441434.4711	3787
6	1	35	TRT44	1006016.64	441313.7145	3785
6	1	35	TRT45	1006121.405	441199.9134	3812
6	1	35	TRT46	1006139.104	441497.5931	3791
6	1	35	TRT47	1006206.618	441226.6791	3816
6	1	35	TRT48	1006079.931	441524.4612	3791
6	1	35	TRT49	1005992.04	441585.1754	3790
6	1	35	TRT5	1005554.055	440792.1556	3820
6	1	35	TRT50	1005905.838	441577.5597	3793
6	1	35	TRT51	1005866.907	441715.8767	3796
6	1	35	TRT52	1005792.948	441729.5813	3784
6	1	35	TRT53	1005834.021	441844.0969	3801
6	1	35	TRT54	1005515.687	441608.8892	3805
6	1	35	TRT55	1005634.877	441536.3997	3771
6	1	35	TRT56	1005754.618	441468.1416	3779
6	1	35	TRT57	1005703.457	442241.5897	3833
6	1	35	TRT58	1005872.572	441972.6485	3804
6	1	35	TRT59	1005845.901	442205.238	3799
6	1	35	TRT6	1005518.234	440686.2318	3800
6	1	35	TRT60	1005908.829	442261.0075	3828
6	1	35	TRT61	1005403.184	442551.5397	3818
6	1	35	TRT62	1005360.013	443309.683	3885
6	1	35	TRT63	1005727.903	442524.0461	3780
6	1	35	TRT64	1005308.198	442988.6906	3858
6	1	35	TRT65	1005346.123	442538.6165	3818
6	1	35	TRT66	1005411.62	443351.0541	3885
6	1	35	TRT67	1005344.029	442682.5274	3827
6	1	35	TRT68	1005847.997	441796.4913	3801
6	1	35	TRT69	1005902.381	441666.6193	3796
6	1	35	TRT7	1005583.07	440603.6028	3814
6	1	35	TRT70	1005826.657	442123.9307	3799
6	1	35	TRT71	1005691.389	442274.1053	3833
6	1	35	TRT72	1005663.135	442375.1932	3793
6	1	35	TRT73	1005133.31	441742.0071	3763

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	35	TRT74	1005217.437	441668.3402	3774
6	1	35	TRT75	1005950.991	441520.5451	3790
6	1	35	TRT76	1005938.958	441685.5632	3818
6	1	35	TRT77	1005272.98	441651.2678	3774
6	1	35	TRT78	1005422.869	441672.9773	3805
6	1	35	TRT79	1005064.972	441829.5162	3763
6	1	35	TRT8	1005806.004	440690.6184	3821
6	1	35	TRT80	1005477.325	441590.1896	3793
6	1	35	TRT81	1005384.626	441716.2477	3796
6	1	35	TRT82	1005065.809	441932.6643	3778
6	1	35	TRT83	1005007.98	442037.7637	3759
6	1	35	TRT84	1004964.036	441776.0664	3759
6	1	35	TRT85	1005575.34	442482.4433	3785
6	1	35	TRT86	1004846.074	442072.9481	3771
6	1	35	TRT87	1004985.859	441983.0487	3759
6	1	35	TRT88	1004949.551	442206.7389	3775
6	1	35	TRT89	1005112.553	441542.8008	3771
6	1	35	TRT9	1005694.119	440616.3277	3816
6	1	35	TRT90	1005294.469	441290.0591	3772
6	1	35	TRT91	1004836.021	442246.6748	3793
6	1	35	TRT92	1004762.393	443444.988	3816
6	1	35	TRT93	1004901.872	442341.5627	3793
6	1	35	TRT94	1005429.622	442975.7243	3799
6	1	35	TRT95	1005441.048	443050.8891	3809
6	1	35	TRT96	1005458.07	443114.6305	3852
6	1	35	TRT97	1005510.982	443178.4993	3852
6	1	35	TRT98	1005560.805	443228.5593	3849
6	1	35	TRT99	1005545.773	443315.7415	3849
6	1	29	DWA104	991550.9564	444121.6094	3692
6	1	29	DWA38	989048.1429	444784.8858	3650
6	1	29	ELM 4	989276.1295	444735.2047	3648
6	1	29	DWA 192	989205.5888	444656.8506	3648
6	1	29	ELA 37	989265.8974	444589.8875	3645
6	1	29	DWA 37	989113.9729	444583.1962	3646
6	1	29	ELA 109	989903.1702	445036.3393	3641
6	1	29	ELR 77	989900.733	444878.9625	3637
6	1	29	ELM 107	989321.0278	445006.8042	3650
6	1	29	ELA 34	989331.9405	444892.3766	3649
6	1	29	ELA 78	989371.2754	444816.3633	3644
6	1	29	ELR 16	989919.5769	445703.2964	3652
6	1	29	ELA 31	989914.2195	445566.9458	3652
6	1	29	ELR 18	989795.8539	445531.8583	3653
6	1	29	ELA 83	990176.5663	444712.4836	3641

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	29	ELA 73	989970.288	444718.5943	3634
6	1	29	ELM 106	989975.5982	444668.1499	3631
6	1	29	ELR 85	989984.6041	444566.5915	3632
6	1	29	ELA 87	989909.1188	444485.1534	3632
6	1	29	ELA 66	989996.5736	445054.1873	3643
6	1	29	ELA 75	990173.0592	445046.4829	3647
6	1	29	ELA 72	990098.1539	444866.8142	3641
6	1	29	ELA 85	989996.6953	445363.4723	3646
6	1	29	ELR 72	990137.0569	445341.5603	3649
6	1	29	ELA 71	990213.3336	445208.1773	3648
6	1	29	ELR 70	990079.6606	445616.2357	3651
6	1	29	ELR 9	990125.4051	445498.9756	3654
6	1	29	ELR 13	990096.6486	445827.757	3652
6	1	29	ELA 79	990098.5061	445734.0567	3651
6	1	28	DWA113	992025.3906	444202.4641	3661
6	1	33	TP55A	995354.7034	439994.7903	3773
6	1	33	DWA96	991753.4121	442496.5647	3641
6	1	33	DWA99	991854.8702	442466.7503	3642
6	1	33	DWA79	991906.9269	442365.8112	3641
6	1	33	DWA80	991701.5049	442306.1291	3633
6	1	33	DWA88	991830.7536	442252.3898	3642
6	1	33	DWA100	991677.953	442193.878	3628
6	1	33	DWA82	991663.3213	442098.9058	3628
6	1	33	DWA83	991694.995	442639.1552	3641
6	1	33	DWA43	991934.0571	443730.1953	3671
6	1	33	DWA156	991857.2115	443605.4456	3661
6	1	33	DWM1	991760.1284	443611.2975	3661
6	1	33	DWA155	991861.5574	443488.498	3654
6	1	33	DWA111	992411.422	443886.2171	3655
6	1	33	DWA106	992446.6006	443712.8998	3660
6	1	33	DWA154	991967.4402	443556.0164	3654
6	1	33	DWA103	992376.7715	443531.9155	3660
6	1	33	DWM35	992498.2961	443526.4038	3668
6	1	33	DWA49	992048.123	443489.4486	3650
6	1	33	DWA42	992019.5527	443364.8276	3641
6	1	33	DWA52	992210.959	443360.648	3643
6	1	33	DWA55	992379.2611	443236.6929	3656
6	1	33	DWA57	992290.7943	443053.8511	3641
6	1	33	DWA58	992472.1302	443031.3288	3644
6	1	33	DWA60	992481.8174	442837.3061	3636
6	1	33	DWA74	992348.3267	442737.9014	3631
6	1	33	DWA62	992236.9956	442870.967	3638
6	1	33	DWA64	992280.614	442548.9341	3642

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	33	DWA66	992305.6653	442471.4189	3645
6	1	33	DWA59	992327.4475	442403.3563	3645
6	1	33	DWA56	992472.8018	442283.4887	3622
6	1	33	DWA68	992384.5477	442146.6768	3630
6	1	33	DWA76	993023.5461	442456.4133	3633
6	1	33	DWA53	992823.4776	442417.9231	3633
6	1	33	DWA73	992857.1851	442253.6573	3629
6	1	33	DWA50	992696.4779	442216.3267	3635
6	1	33	DWA75	992580.3315	443153.6659	3657
6	1	33	DWA205	992580.7	443045.9046	3651
6	1	33	DWA70	992753.1258	443052.0322	3656
6	1	33	DWA65	993102.7151	443049.0831	3662
6	1	33	DWA67	992925.174	442940.0763	3655
6	1	33	DWA48	992836.5197	442846.7076	3648
6	1	33	DWA71	992889.8383	442814.0558	3653
6	1	33	DWA69	992836.5197	442846.7076	3648
6	1	33	DWA102	993102.1165	442716.8451	3649
6	1	33	DWA78	993111.533	442577.3477	3652
6	1	33	EN10-1	992850.8395	443733.6986	3693
6	1	33	DWA63	993131.584	443631.5125	3718
6	1	33	DWA77	992601.9043	443338.589	3659
6	1	33	DWA72	992755.7447	443245.4475	3674
6	1	33	DWA112	992983.1846	443951.1391	3695
6	1	33	DWA108	992606.4053	443828.9891	3669
6	1	33	DWA110	992808.4258	443825.2869	3693
6	1	33	DWA109	993006.6091	443745.1134	3696
6	1	33	DWA61	993332.5928	443605.7077	3707
6	1	33	DWA47	993210.6264	443443.2843	3683
6	1	33	DWA44	993394.0781	443441.5533	3696
6	1	33	DWA45	993587.3654	443408.8831	3682
6	1	33	DWA40	993502.1793	443324.8976	3680
6	1	33	DWA107	993371.947	443272.8226	3692
6	1	33	DWA54	993229.2668	443153.0379	3675
6	1	33	DWA105	993526.3817	443177.7492	3688
6	1	33	DWT63	993625.842	443135.8648	3670
6	1	33	DWT60	993438.7679	443127.1085	3700
6	1	33	DWT50	993229.0722	442967.2185	3663
6	1	33	DWM34	993236.8417	442735.1478	3662
6	1	33	SWT49	993645.1914	442633.5842	3654
6	1	33	DWT57	993625.5496	442956.8519	3673
6	1	33	DWT2	993568.2065	442497.7394	3660
6	1	32	DWA 150	990563.6611	444009.8704	3628
6	1	32	DWA 149	991088.2329	443985.4537	3640

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	32	DWT 79	990814.3122	443564.5358	3625
6	1	32	DWA 21	991332.1089	443559.5737	3647
6	1	32	DWA 15	991257.6376	443423.7028	3643
6	1	32	DWA 4	990854.6424	443364.05	3629
6	1	32	DWA 7	991062.5633	443344.2404	3632
6	1	32	DWA 151	991074.4818	443282.7216	3632
6	1	32	DWA6	990952.2783	443192.9907	3627
6	1	32	DWA9	991198.4146	443212.4322	3634
6	1	32	DWT6	990939.8573	442980.3775	3626
6	1	32	DWA94	991151.6193	441862.2556	3612
6	1	32	DWA91	991231.1858	441879.0528	3617
6	1	32	DWA86	991376.195	442014.6158	3620
6	1	32	DWA98	991408.0414	441946.1929	3619
6	1	32	DWA89	991394.0582	441809.3156	3622
6	1	32	DWA81	991623.7236	442499.4355	3633
6	1	32	DWA97	991559.1209	442145.7829	3623
6	1	32	DWA93	991427.8193	443199.2399	3645
6	1	32	DWA95	991518.7947	443169.2549	3649
6	1	32	DWA92	991586.4985	443083.7727	3648
6	1	32	DWA90	991682.7838	442889.0611	3646
6	1	32	DWA87	991675.2339	443922.6727	3681
6	1	32	DWA85	991515.1669	442703.3857	3645
6	1	32	DWM33	991710.6857	443762.019	3662
6	1	32	DWA18	991377.3362	443470.1062	3647
6	1	32	DWA152	991417.6102	443382.7313	3647
6	1	32	DWA101	991622.8632	443924.9121	3681
6	1	32	TT57WM	991671.6938	443922.8159	3681
6	1	35	DP248	1005543.802	438435.4147	3744
6	1	35	DW35	1006925.585	438397.7751	3801
7	1	15	B-1 FR	999282.2426	427549.4324	3624
7	1	15	B10FR	999662.3066	427941.5755	3628
7	1	15	B10FU	999710.7151	428008.238	3628
7	1	15	B10LAK	999648.2271	427983.5399	3628
7	1	15	B2	999269.7123	427505.4169	3625
7	1	15	B-2	999246.3095	427540.4085	3624
7	1	15	B2 FU	999191.3248	427526.166	3624
7	1	15	B-2 LAK	999198.1685	427582.4218	3624
7	1	15	B9	999772.2516	426318.8221	3612
7	1	15	BPZ 31	999249.9137	427609.8222	3624
7	1	15	PA156	999807.7234	427931.637	3629
7	1	15	PA37	1000355.669	427992.9498	3631
7	1	15	PA39	999956.9063	427683.5239	3628
7	1	15	PA49	1000012.114	428007.7568	3630

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	15	PA54	1000208.651	427959.6145	3631
7	1	15	PA55	1000172.53	427862.3868	3629
7	1	15	PA58	999585.6539	427768.104	3626
7	1	15	PA59	999570.4631	428024.3121	3627
7	1	15	PA60	999541.3086	427943.9532	3627
7	1	15	PA72	1000722.815	427937.8265	3636
7	1	15	PA75	1000426.549	427651.7303	3631
7	1	15	PA76	1000427.417	427770.1715	3631
7	1	15	PA77	999801.8258	427385.335	3624
7	1	15	PA78	999833.197	427246.0415	3623
7	1	15	PA79	999977.3329	427347.9269	3623
7	1	15	PA80	999300.0802	427305.4716	3624
7	1	15	PA81	999257.6365	427404.3187	3624
7	1	15	PA82	999536.4658	427233.3384	3623
7	1	15	PA83	999546.216	427345.3525	3624
7	1	15	PJ50	999618.3199	427854.842	3626
7	1	15	PM10	999659.279	427400.7356	3624
7	1	15	PM11	999602.5981	427445.1273	3625
7	1	15	PM12	999498.8395	427425.383	3625
7	1	15	PM13	999420.3852	427467.1527	3625
7	1	15	PM130	999054.4209	427898.628	3622
7	1	15	PM14	999324.9153	427508.1252	3625
7	1	15	PM15	999314.8271	427643.6645	3624
7	1	15	PM16	999342.9749	427817.1593	3622
7	1	15	PM17	999283.1578	427896.8799	3622
7	1	15	PM176	1000479.579	428002.8555	3632
7	1	15	PM18	999108.8275	428004.3002	3622
7	1	15	PM19	998969.1095	427841.7937	3622
7	1	15	PM20	998780.8609	427863.125	3622
7	1	15	PM203	999684.0819	427718.5045	3626
7	1	15	PM204	999788.6912	427584.2547	3625
7	1	15	PM205	999441.1798	427751.0547	3625
7	1	15	PM206	1000332.241	427873.8106	3630
7	1	15	PM209	1000284.509	427905.2827	3630
7	1	15	PM21	998835.154	428034.5767	3622
7	1	15	PM210	1000383.514	427847.9346	3630
7	1	15	PM211	999819.6839	427665.1648	3627
7	1	15	PM212	999855.2708	427582.9997	3625
7	1	15	PM213	1000411.844	427898.3794	3631
7	1	15	PM215	1000485.78	427779.7578	3631
7	1	15	PM217	1000207.904	427656.057	3624
7	1	15	PM224	999293.2145	427999.4203	3623
7	1	15	PM225	999192.2984	427775.3396	3623

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	15	PM226	999894.2991	427604.1745	3624
7	1	15	PM25	999848.7801	427727.667	3627
7	1	15	PM26	999934.2964	427770.531	3628
7	1	15	PM27	999760.0705	427543.2204	3625
7	1	15	PM28	999844.5766	427531.3566	3624
7	1	15	PM29	999417.0599	427574.8948	3625
7	1	15	PM30	999539.9337	427744.4633	3626
7	1	15	PM4	999651.9758	427606.2221	3625
7	1	15	PM5	999725.9065	427683.2524	3626
7	1	15	PM50	1000196.512	427599.954	3624
7	1	15	PM51	1000051.058	427458.4004	3623
7	1	15	PM52	1000062.236	427539.0018	3624
7	1	15	PM53	1000262.588	427543.2344	3624
7	1	15	PM54	999196.3657	427909.0238	3623
7	1	15	PM62	1000431.796	427869.1416	3631
7	1	15	PM7	999739.1496	427597.8941	3625
7	1	15	PM77	999461.38	427695.6752	3625
7	1	15	PM78	999898.483	427441.069	3624
7	1	15	PM79	999825.2848	427440.5432	3624
7	1	15	PM8	999780.717	427466.5233	3624
7	1	15	PM80	999447.1938	427640.2013	3625
7	1	15	PM81	999391.4333	427743.0902	3625
7	1	15	PM82	999465.7786	427511.3242	3625
7	1	15	PM83	999531.2596	427481.5892	3625
7	1	15	PM84	999607.482	427651.6064	3626
7	1	15	PM85	999389.8812	427686.1042	3624
7	1	15	PM86	999619.9343	427728.1528	3626
7	1	15	PM87	999445.904	427777.3863	3625
7	1	15	PM88	999636.7696	427592.841	3626
7	1	15	PM89	999750.097	427749.0026	3626
7	1	15	PM9	999709.2424	427447.7247	3624
7	1	15	PM90	999289.7208	427757.3078	3624
7	1	15	PM91	999516.1117	427554.7798	3625
7	1	15	PM92	999756.6004	427655.8006	3625
7	1	15	PM93	1000068.394	427925.0203	3630
7	1	15	PM94	999785.6267	427867.9023	3628
7	1	15	PM95	999912.4103	427889.6738	3629
7	1	15	PM96	999413.9573	427420.873	3625
7	1	15	PS1	999753.4355	427410.4533	3624
7	1	15	PS2	999826.9675	427845.3525	3628
7	1	15	PS27	1000276.345	427673.2269	3629
7	1	15	PS28	1000389.008	427798.9362	3630
7	1	15	PS3	999984.4277	427925.6183	3630

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	15	PS4	1000170.107	427933.8068	3631
7	1	15	PS49	999506.6687	427621.7343	3625
7	1	15	PS5	1000288.257	427757.5549	3629
7	1	15	PS50	999269.7351	427836.6992	3622
7	1	15	PS51	999105.0718	427903.5221	3622
7	1	15	PS52	999006.761	427931.0667	3622
7	1	15	PS53	999111.7541	428059.6354	3622
7	1	15	PS6	1000145.394	427520.6714	3622
7	1	15	PS69	999979.7553	427437.8121	3624
7	1	15	PS71	999895.5808	427339.1774	3623
7	1	15	PS71	1000386.774	427596.5567	3626
7	1	15	PS8	1000386.982	427702.0134	3629
7	1	15	PS9	1000433.882	427940.0397	3632
7	1	15	PT108	999077.8719	427965.5966	3622
7	1	15	PT109	999251.9192	428058.8592	3622
7	1	15	PT119	999522.111	427877.2191	3626
7	1	15	PT120	999516.481	427837.5221	3626
7	1	15	PT122	999505.9057	427704.3358	3625
7	1	15	PT125	999131.5071	427921.9223	3622
7	1	15	PT126	999162.2185	428001.6709	3622
7	1	15	PT132	999098.7713	427384.161	3623
7	1	15	PT133	1000110.269	428010.1816	3630
7	1	15	PT134	999506.6107	426960.4371	3622
7	1	15	PT137	999517.6225	427797.4417	3626
7	1	15	PT138	999376.6519	427912.4731	3623
7	1	15	PT139	999674.2662	427640.3345	3625
7	1	15	PT143	999225.3591	427366.1102	3624
7	1	15	PT149	999578.6865	427486.6451	3625
7	1	15	PT150	999501.8199	427476.306	3625
7	1	15	PT151	999450.1184	427483.9495	3625
7	1	15	PT153	1000117.898	427951.9641	3630
7	1	15	PT154	1000166.25	428009.4336	3631
7	1	15	PT161	1000341.353	427924.47	3631
7	1	15	PT174	999855.2845	427875.2177	3628
7	1	15	PT175	1000009.083	427853.5638	3629
7	1	15	PT176	999947.219	427628.8688	3624
7	1	15	PT177	1000025.198	427956.8563	3630
7	1	15	PT178	1000114.013	427848.0686	3629
7	1	15	PT179	999872.8603	427669.3625	3627
7	1	15	PT180	999994.3425	427668.7636	3628
7	1	15	PT181	1000018.345	427763.5256	3628
7	1	15	PT182	1000358.002	427967.8653	3631
7	1	15	PT183	1000124.092	427900.8667	3629

Powertech (USA) Inc.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	15	PT184	999898.5541	427830.7304	3629
7	1	15	PT185	999880.0125	427928.1523	3629
7	1	15	PT187	999559.1506	427435.9071	3625
7	1	15	PT188	999840.4674	427345.051	3624
7	1	15	PT189	999855.6324	427406.5217	3624
7	1	15	PT190	999858.8817	427480.391	3624
7	1	15	PT191	999959.3616	427489.4932	3624
7	1	15	PT23	999631.7252	427520.483	3625
7	1	15	PT25	999335.7808	427780.9347	3624
7	1	15	PT27	999200.1293	427840.0783	3623
7	1	15	PT30	999123.2693	427843.2037	3622
7	1	15	PT31	999065.1796	427840.7999	3622
7	1	15	PT37	999670.3023	427435.3195	3624
7	1	15	PT38	999231.1123	427854.8072	3623
7	1	15	PT47	999178.6875	428055.5199	3622
7	1	15	PT55	999225.6354	428012.8512	3622
7	1	15	PW11	1000008.898	427401.3372	3623
7	1	15	PW12	1000265.83	427597.6029	3624
7	1	15	PW13	1000336.846	427634.7014	3626
7	1	15	PW14	1000355.408	427731.0646	3629
7	1	15	PW15	1000440.926	427806.7191	3631
7	1	15	PW16	1000078.612	427404.4905	3622
7	1	15	PW17	999740.1139	427500.8972	3624
7	1	15	PW18	999937.7584	427399.2425	3623
7	1	15	PW19	1000518.662	427949.9022	3632
7	1	11	B3FR	1002043.59	429564.5908	3703
7	1	11	B3LAKOTA	1002085.992	429576.9654	3703
7	1	11	B-7	1001765.493	428959.0026	3682
7	1	11	BPZ-10(B-7FR	1001770.642	428982.6897	3682
7	1	11	BPZ6	1006488.679	430301.0765	3742
7	1	11	DK138	1006580.302	433020.4165	3799
7	1	11	DK142	1006894.903	431366.9414	3767
7	1	11	DK143	1007007.392	431480.9291	3774
7	1	11	DK144	1006988.565	431275.3113	3767
7	1	11	DK147	1007049.415	431619.7397	3781
7	1	11	DK148	1006942.732	431045.7021	3763
7	1	11	DK149	1006875.202	430753.7448	3754
7	1	11	DK150	1007056.05	431425.399	3775
7	1	11	DK151	1003210.413	429689.4354	3696
7	1	11	DK209	1007055.906	431323.0673	3772
7	1	11	DK210	1006863.031	431293.4014	3764
7	1	11	DK80	1007006.923	431385.1787	3768
7	1	11	EN86	1002093.029	428073.4739	3703

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBA1	1003113.791	430567.7328	3707
7	1	11	FBA10	1003638.926	430878.7235	3726
7	1	11	FBA11	1003579.588	431074.9336	3726
7	1	11	FBA 12	1003477.596	431278.2707	3720
7	1	11	FBA13	1003245.653	431200.5401	3710
7	1	11	FBA14	1003339.629	431232.065	3715
7	1	11	FBA15	1003216.74	431427.6687	3707
7	1	11	FBA16	1006121.301	430295.5265	3750
7	1	11	FBA17	1003727.641	430558.4728	3722
7	1	11	FBA18	1003935.907	430572.0653	3719
7	1	11	FBA19	1003624.17	430770.7902	3722
7	1	11	FBA2	1003296.113	430502.1971	3702
7	1	11	FBA3	1003456.533	430439.5806	3712
7	1	11	FBA4	1003636.511	430412.3599	3713
7	1	11	FBA5	1003274.194	429516.8658	3690
7	1	11	FBA6	1003715.767	429877.6207	3697
7	1	11	FBA8	1003572.624	430684.9724	3722
7	1	11	FBA9	1006443.366	430255.072	3739
7	1	11	FBH1	1003983.18	429702.4109	3705
7	1	11	FBH2	1003626.161	429671.7232	3692
7	1	11	FBH3	1003926.454	429707.3645	3705
7	1	11	FBH4	1003781.289	429847.1491	3697
7	1	11	FBJ1	1006467.02	430952.3214	3760
7	1	11	FBJ10	1006508.748	430466.3753	3746
7	1	11	FBJ100	1005205.309	430405.655	3739
7	1	11	FBJ101	1005307.674	430548.8893	3741
7	1	11	FBJ102	1004641.587	430666.6506	3747
7	1	11	FBJ103	1004702.284	430740.9011	3764
7	1	11	FBJ105	1005435.625	430526.3383	3744
7	1	11	FBJ106	1005536.189	430362.1327	3741
7	1	11	FBJ107	1005246.801	430927.6583	3760
7	1	11	FBJ108	1005067.729	430940.2987	3756
7	1	11	FBJ109	1004854.395	430718.1389	3764
7	1	11	FBJ11	1006513.675	430375.1294	3742
7	1	11	FBJ110	1004650.461	430818.0933	3762
7	1	11	FBJ111	1005410.877	430529.3257	3738
7	1	11	FBJ112	1005470.064	430417.8221	3741
7	1	11	FBJ113	1004791.248	430769.2509	3764
7	1	11	FBJ114	1005338.435	430884.9332	3760
7	1	11	FBJ115	1004511.545	430802.8521	3749
7	1	11	FBJ116	1005295.569	430909.953	3760
7	1	11	FBJ117	1004882.238	430816.535	3758
7	1	11	FBJ118	1004599.836	430909.765	3762

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
7	1	11	FBJ119	1004633.206	430437.5749	3750
7	1	11	FBJ12	1006457.918	430600.5917	3749
7	1	11	FBJ120	1005155.972	431003.6294	3756
7	1	11	FBJ121	1004863.596	430914.0907	3758
7	1	11	FBJ122	1004502.927	430929.0428	3757
7	1	11	FBJ123	1004474.23	430594.2916	3741
7	1	11	FBJ124	1006341.015	431197.5154	3760
7	1	11	FBJ125	1006364.855	431266.9861	3760
7	1	11	FBJ126	1006290.216	431637.3199	3766
7	1	11	FBJ127	1004418.136	430824.8188	3749
7	1	11	FBJ128	1004761.014	430932.0498	3755
7	1	11	FBJ129	1004529.533	430436.4836	3734
7	1	11	FBJ13	1006388.787	430620.9975	3749
7	1	11	FBJ131	1004250.535	430293.0456	3732
7	1	11	FBJ132	1004424.813	430531.8922	3734
7	1	11	FBJ133	1006215.575	431156.2541	3751
7	1	11	FBJ134	1006294.892	431242.559	3760
7	1	11	FBJ136	1004313.528	430405.8456	3736
7	1	11	FBJ137	1004399.197	430943.5922	3751
7	1	11	FBJ138	1006229.418	431710.5277	3761
7	1	11	FBJ139	1004769.363	431041.2588	3755
7	1	11	FBJ14	1006992.275	430117.8278	3753
7	1	11	FBJ140	1004329.251	430564.283	3733
7	1	11	FBJ141	1004219.884	430480.1634	3722
7	1	11	FBJ142	1005391.846	430961.4019	3764
7	1	11	FBJ144	1004406.035	431044.2143	3751
7	1	11	FBJ145	1004312.747	430652.5099	3733
7	1	11	FBJ146	1004100.511	430466.0394	3720
7	1	11	FBJ147	1004857.986	431092.5951	3742
7	1	11	FBJ148	1003614.248	430541.464	3715
7	1	11	FBJ149	1004031.984	430606.6172	3719
7	1	11	FBJ15	1006987.319	429937.6866	3751
7	1	11	FBJ150	1005491.644	430913.5924	3763
7	1	11	FBJ151	1003714.296	430658.0818	3722
7	1	11	FBJ16	1006933.313	432002.4321	3781
7	1	11	FBJ17	1006960.097	429836.6538	3741
7	1	11	FBJ18	1006975.858	430166.6582	3753
7	1	11	FBJ19	1006957.59	429674.9294	3741
7	1	11	FBJ2	1006682.111	432072.2559	3771
7	1	11	FBJ21	1004314.626	430115.5687	3726
7	1	11	FBJ22	1006848.504	430265.4065	3747
7	1	11	FBJ23	1003710.702	430101.4856	3704
7	1	11	FBJ24	1003636.962	429943.4564	3700

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
7	1	11	FBJ25	1004231.705	430059.4978	3727
7	1	11	FBJ27	1004575.468	430621.7382	3747
7	1	11	FBJ28	1004997.858	430676.3663	3758
7	1	11	FBJ29	1005170.894	430514.1076	3740
7	1	11	FBJ3	1006621.029	432047.5008	3763
7	1	11	FBJ30	1005201.276	430758.4946	3754
7	1	11	FBJ31	1004894.183	430519.3605	3764
7	1	11	FBJ33	1004527.659	430539.7101	3734
7	1	11	FBJ34	1004201.904	430100.8159	3727
7	1	11	FBJ35	1003863.79	429943.9124	3707
7	1	11	FBJ36	1003912.56	429919.6076	3713
7	1	11	FBJ37	1003641.328	430036.4532	3700
7	1	11	FBJ38	1005112.255	430559.2667	3746
7	1	11	FBJ39	1005116.772	430805.9043	3755
7	1	11	FBJ4	1006788.313	431999.5256	3769
7	1	11	FBJ40	1003112.296	430204.8267	3697
7	1	11	FBJ41	1003088.529	430273.6276	3697
7	1	11	FBJ42	1003208.265	430575.7956	3711
7	1	11	FBJ43	1003128.331	430629.496	3707
7	1	11	FBJ44	1003696.355	430037.1512	3701
7	1	11	FBJ46	1003322.179	430662.6556	3713
7	1	11	FBJ47	1007084.262	432029.6346	3787
7	1	11	FBJ49	1007044.281	432220.6641	3777
7	1	11	FBJ48	1007002.445	432157.6608	3775
7	1	11	FBJ5	1006909.07	432436.8617	3784
7	1	11	FBJ51	1005835.079	429801.0236	3720
7	1	11	FBJ52	1006000.285	429460.6948	3719
7	1	11	FBJ53	1006042.378	429707.4699	3708
7	1	11	FBJ54	1006135.013	429359.2242	3721
7	1	11	FBJ55	1006057.978	430131.1107	3735
7	1	11	FBJ57	1006261.009	429444.4225	3746
7	1	11	FBJ58	1006172.347	429769.4564	3727
7	1	11	FBJ59	1005956.684	430197.07	3730
7	1	11	FBJ6	1006946.901	432059.3221	3775
7	1	11	FBJ60	1006223.485	429910.025	3719
7	1	11	FBJ63	1006301.591	429568.7633	3728
7	1	11	FBJ64	1006103.276	429631.9748	3731
7	1	11	FBJ65	1005953.463	430296.8993	3739
7	1	11	FBJ66	1006512.45	430136.725	3732
7	1	11	FBJ7	1006381.514	430715.1846	3751
7	1	11	FBJ71	1006415.484	430136.332	3743
7	1	11	FBJ72	1006221.835	429648.3523	3743
7	1	11	FBJ73	1005856.896	430264.3533	3746

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBJ74	1006153.456	429473.1699	3732
7	1	11	FBJ76	1006336.345	430243.0912	3751
7	1	11	FBJ77	1006278.007	429824.8575	3719
7	1	11	FBJ78	1006063.008	430245.5454	3751
7	1	11	FBJ79	1005856.758	430158.7812	3744
7	1	11	FBJ8	1006432.646	430663.6673	3749
7	1	11	FBJ80	1006399.854	429493.7269	3742
7	1	11	FBJ84	1006062.73	429423.7014	3732
7	1	11	FBJ86	1005088.095	430455.9988	3751
7	1	11	FBJ88	1005082.474	430847.639	3755
7	1	11	FBJ89	1004899.98	430619.3054	3762
7	1	11	FBJ9	1006744.588	431879.894	3776
7	1	11	FBJ90	1005000.318	430430.5097	3763
7	1	11	FBJ91	1005333.908	430385.6268	3733
7	1	11	FBJ92	1005959.482	429598.4933	3719
7	1	11	FBJ93	1005971.398	429499.8648	3719
7	1	11	FBJ94	1005158.181	430898.4971	3755
7	1	11	FBJ95	1004576.276	430725.4661	3752
7	1	11	FBJ96	1004711.333	430499.4695	3753
7	1	11	FBJ97	1005336.614	430492.9216	3738
7	1	11	FBJ99	1004941.736	430662.3104	3760
7	1	11	FBK1	1005828.656	431189.5798	3762
7	1	11	FBK11	1006576.66	429993.1541	3734
7	1	11	FBK12	1006590.081	429697.1798	3733
7	1	11	FBK13	1006714.65	429888.2962	3743
7	1	11	FBK14	1006845.48	429740.9709	3732
7	1	11	FBK15	1006955.34	429571.4318	3742
7	1	11	FBK17	1006874.976	429910.142	3742
7	1	11	FBK18	1006782.245	430197.6051	3736
7	1	11	FBK19	1006618.2	430549.647	3748
7	1	11	FBK2	1004946.773	430539.752	3763
7	1	11	FBK29	1006187.254	429978.5169	3728
7	1	11	FBK3	1003453.61	429945.3417	3703
7	1	11	FBK34	1004365.853	430516.0746	3732
7	1	11	FBK38	1006435	429631.5334	3729
7	1	11	FBK39	1006343.615	429812.6793	3722
7	1	11	FBK5	1003219.39	431049.5478	3715
7	1	11	FBK6	1003349.494	430367.0487	3703
7	1	11	FBK8	1005851.421	430595.511	3755
7	1	11	FBK9	1005998.478	430072.197	3730
7	1	11	FBM1	1006699.747	429698.2787	3732
7	1	11	FBM10	1006735.482	429566.0493	3742
7	1	11	FBM100	1003532.897	429718.3638	3697

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBM101	1003482.529	429711.4259	3697
7	1	11	FBM11	1006569.022	429461.5171	3744
7	1	11	FBM12	1006515.751	429378.3651	3753
7	1	11	FBM120	1006296.18	429094.1544	3735
7	1	11	FBM121	1006297.999	429213.6517	3750
7	1	11	FBM122	1006649.008	429209.0522	3755
7	1	11	FBM123	1006608.875	429258.7326	3755
7	1	11	FBM124	1006565.601	429285.4736	3755
7	1	11	FBM125	1006524.895	429312.8613	3753
7	1	11	FBM126	1006420.453	429364.0333	3749
7	1	11	FBM127	1006357.419	429341.2651	3749
7	1	11	FBM128	1006293.187	429291.2877	3734
7	1	11	FBM129	1006242.175	429283.1241	3732
7	1	11	FBM13	1006078.297	429991.4169	3724
7	1	11	FBM130	1006201.235	429243.9487	3732
7	1	11	FBM131	1006575.252	429333.9687	3752
7	1	11	FBM132	1006408.857	429318.3693	3749
7	1	11	FBM133	1006730.341	429285.0324	3764
7	1	11	FBM134	1006780.035	429249.8685	3764
7	1	11	FBM135	1006805.641	429304.6302	3761
7	1	11	FBM136	1006869.961	429277.5694	3768
7	1	11	FBM137	1006926.308	429234.0669	3773
7	1	11	FBM138	1006921.643	429157.2523	3769
7	1	11	FBM139	1006926.336	429083.0148	3772
7	1	11	FBM14	1006301.616	429961.4731	3733
7	1	11	FBM140	1006870.307	429204.7901	3768
7	1	11	FBM141	1006829.11	429235.3097	3768
7	1	11	FBM142	1006687.937	429251.9057	3764
7	1	11	FBM143	1006457.351	429336.5338	3753
7	1	11	FBM144	1006355.153	429277.7086	3750
7	1	11	FBM145	1006408.043	429264.5124	3750
7	1	11	FBM146	1006343.488	429230.3115	3750
7	1	11	FBM147	1006871.915	429157.5441	3769
7	1	11	FBM148	1006792.062	429202.889	3764
7	1	11	FBM149	1006740.336	429212.8166	3764
7	1	11	FBM15	1005937.262	429963.4536	3723
7	1	11	FBM150	1006462.198	429277.6938	3753
7	1	11	FBM151	1006600.929	429285.8426	3755
7	1	11	FBM152	1004804.184	430468.0486	3764
7	1	11	FBM159	1004265.648	429897.9406	3711
7	1	11	FBM160	1004225.059	429845.521	3711
7	1	11	FBM164	1004279.519	429801.5788	3711
7	1	11	FBM165	1004310.765	429849.2471	3716

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBM167	1004131.491	429820.4852	3708
7	1	11	FBM168	1004142.724	429899.067	3708
7	1	11	FBM172	1004212.572	429999.7045	3721
7	1	11	FBM178	1003942.777	429666.0912	3704
7	1	11	FBM179	1003869.271	429772.9353	3701
7	1	11	FBM179	1003807.375	429636.8992	3702
7	1	11	FBM18	1005971.657	429787.3032	3708
7	1	11	FBM182	1003976.59	429914.1395	3702
7	1	11	FBM184	1003880.024	429620.7298	3702
7	1	11	FBM189	1005928.979	429633.4438	3719
7	1	11	FBM19	1005906.93	429713.6224	3709
7	1	11	FBM192	1003933.115	429737.7775	3705
7	1	11	FBM193	1003534.003	429937.8667	3700
7	1	11	FBM194	1006202.285	432393.1613	3773
7	1	11	FBM195	1003177.531	429735.085	3696
7	1	11	FBM196	1003609.338	429597.887	3692
7	1	11	FBM197	1003685.937	429700.2843	3694
7	1	11	FBM198	1004160.792	430069.6387	3722
7	1	11	FBM199	1003894.115	429662.352	3702
7	1	11	FBM2	1006472.031	429732.2475	3732
7	1	11	FBM20	1005845.248	429611.9821	3708
7	1	11	FBM204	1005995.543	430194.8124	3730
7	1	11	FBM205	1006656.575	429628.9022	3732
7	1	11	FBM206	1006975.499	432592.2311	3792
7	1	11	FBM207	1006690.968	432582.1463	3792
7	1	11	FBM208	1006721.534	432659.2892	3792
7	1	11	FBM21	1006132.761	429895.821	3711
7	1	11	FBM22	1006661.327	430170.8141	3733
7	1	11	FBM23	1006829.758	430288.3871	3747
7	1	11	FBM24	1006873.442	430376.8061	3746
7	1	11	FBM25	1006741.989	430451.7779	3746
7	1	11	FBM26	1006756.611	430545.8767	3746
7	1	11	FBM27	1006575.318	430651.2016	3748
7	1	11	FBM28	1006883.328	429666.5805	3744
7	1	11	FBM29	1006953.343	429700.967	3741
7	1	11	FBM3	1006537.95	429776.1515	3732
7	1	11	FBM30	1006840.669	429568.0488	3744
7	1	11	FBM31	1006779.037	429485.8294	3750
7	1	11	FBM32	1006727.742	429386.396	3758
7	1	11	FBM33	1006669.33	429286.9535	3755
7	1	11	FBM34	1006599.239	429509.3208	3744
7	1	11	FBM35	1006640.11	429661.1422	3732
7	1	11	FBM36	1006486.513	429453.8615	3733

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBM37	1006677.271	429471.2119	3750
7	1	11	FBM38	1006536.877	429692.6704	3732
7	1	11	FBM39	1006444.52	429685.1318	3732
7	1	11	FBM4	1006565.724	429883.01	3737
7	1	11	FBM41	1006538.969	429933.7456	3728
7	1	11	FBM42	1006578.595	429825.0347	3737
7	1	11	FBM43	1006530.83	429641.4492	3729
7	1	11	FBM44	1006558.728	429597.7215	3732
7	1	11	FBM45	1006798.288	430418.0044	3746
7	1	11	FBM46	1006755.529	430240.9096	3736
7	1	11	FBM47	1006133.272	430009.976	3724
7	1	11	FBM48	1006200.344	430041.2602	3728
7	1	11	FBM49	1006238.625	430000.3808	3728
7	1	11	FBM5	1006483.47	429925.3117	3728
7	1	11	FBM6	1006614.044	429584.0675	3732
7	1	11	FBM63	1004303.06	429945.6722	3718
7	1	11	FBM64	1004250.661	429942.4595	3721
7	1	11	FBM65	1004212.112	429898.5116	3711
7	1	11	FBM66	1004207.832	429855.5385	3711
7	1	11	FBM67	1004201.203	429807.3903	3711
7	1	11	FBM7	1006451.523	429989.2323	3728
7	1	11	FBM73	1004014.109	429689.5558	3705
7	1	11	FBM75	1004052.03	429791.0003	3712
7	1	11	FBM76	1004031.42	429838.9682	3702
7	1	11	FBM77	1003930.706	429868.0018	3702
7	1	11	FBM78	1003911.162	429813.4171	3702
7	1	11	FBM8	1006659.948	429594.3769	3732
7	1	11	FBM80	1003861.075	429693.3235	3701
7	1	11	FBM81	1003807.917	429725.844	3701
7	1	11	FBM82	1003787.728	429789.1361	3701
7	1	11	FBM83	1003747.305	429821.9858	3697
7	1	11	FBM84	1003693.133	429848.3857	3697
7	1	11	FBM85	1003680.556	429796.3351	3697
7	1	11	FBM86	1003695.056	429737.7603	3694
7	1	11	FBM 87	1003649.462	429731.7901	3692
7	1	11	FBM88	1003602.483	429699.3477	3692
7	1	11	FBM89	1003567.931	429656.2827	3692
7	1	11	FBM9	1006681.415	429530.0478	3750
7	1	11	FBM90	1003521.923	429671.6714	3697
7	1	11	FBM91	1003472.259	429666.878	3695
7	1	11	FBM92	1003493.707	429748.7731	3697
7	1	11	FBM93	1003498.942	429856.2769	3700
7	1	11	FBM94	1003467.913	429804.3649	3700

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBM95	1006566.645	431534.5106	3773
7	1	11	FBM97	1003417.297	430463.0148	3712
7	1	11	FBM98	1003530.608	430212.4857	3712
7	1	11	FBM99	1003485.953	429899.7766	3700
7	1	11	FBR10	1006648.971	429804.0468	3737
7	1	11	FBR11	1006531.927	429835.7013	3730
7	1	11	FBR12	1006815.201	430364.7126	3746
7	1	11	FBR13	1006983.654	430989.6718	3763
7	1	11	FBR14	1006974.131	431076.9752	3765
7	1	11	FBR15	1006589.011	431665.8594	3773
7	1	11	FBR16	1006801.966	431670.6768	3778
7	1	11	FBR17	1006985.907	431601.2755	3781
7	1	11	FBR18	1006495.123	431552.8707	3769
7	1	11	FBR19	1006470.239	431176.1014	3764
7	1	11	FBR20	1006552.44	431360.9052	3766
7	1	11	FBR21	1004080.477	430707.587	3724
7	1	11	FBR22	1004080.363	430688.4503	3724
7	1	11	FBR23	1007036.84	430613.2937	3751
7	1	11	FBR24	1007004.781	431341.5248	3768
7	1	11	FBR25	1006874.49	431588.0182	3778
7	1	11	FBR28	1006776.211	430323.0501	3741
7	1	11	FBR29	1006143.36	429099.4929	3731
7	1	11	FBR30	1006410.98	429153.627	3735
7	1	11	FBR31	1006543.817	433080.8024	3802
7	1	11	FBR32	1006304.495	429148.9588	3735
7	1	11	FBR34	1006661.304	430433.5709	3746
7	1	11	FBR35	1006570.267	430431.421	3746
7	1	11	FBR36	1006400.017	430792.6904	3751
7	1	11	FBR37	1006269.617	430938.7116	3751
7	1	11	FBR38	1006264.801	431020.4918	3751
7	1	11	FBR39	1006394.58	431147.2914	3762
7	1	11	FBR40	1006970.048	431147.9822	3765
7	1	11	FBR41	1006624.93	429881.0411	3737
7	1	11	FBR42	1006702.504	429759.3758	3732
7	1	11	FBR43	1006446.628	429811.7282	3730
7	1	11	FBR46	1004263.242	430112.7372	3727
7	1	11	FBR47	1004216.298	430167.2127	3727
7	1	11	FBR48	1005040.518	430699.1925	3746
7	1	11	FBR49	1003805.501	430381.4709	3711
7	1	11	FBR50	1003675.353	430468.275	3715
7	1	11	FBR51	1006796.198	429677.3775	3732
7	1	11	FBR52	1004252.506	430208.6907	3732
7	1	11	FBR53	1004186.194	430208.4962	3732

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBR54	1004994.993	430759.8816	3758
7	1	11	FBR55	1005139.998	430739.0802	3746
7	1	11	FBR57	1003141.525	430272.4061	3697
7	1	11	FBR58	1005829.677	431654.8426	3761
7	1	11	FBR59	1005172.249	430571.1485	3744
7	1	11	FBR6	1006144.929	429272.6087	3714
7	1	11	FBR60	1005002.704	430618.9807	3760
7	1	11	FBR61	1005219.633	430802.1336	3757
7	1	11	FBR62	1005239.57	430487.2303	3740
7	1	11	FBR63	1005243.683	430629.2011	3744
7	1	11	FBR64	1005060.718	430805.4668	3755
7	1	11	FBR65	1005891.32	431732.7454	3753
7	1	11	FBR68	1005777.146	431775.4286	3752
7	1	11	FBR7	1006254.308	429193.4006	3732
7	1	11	FBR9	1006648.646	429728.0574	3733
7	1	11	FBS10	1006979.318	431811.9251	3785
7	1	11	FBS100	1003367.135	430461.1034	3702
7	1	11	FBS101	1003486.833	430130.4508	3709
7	1	11	FBS102	1003470.437	430186.8024	3712
7	1	11	FBS103	1003452.928	430238.6952	3712
7	1	11	FBS104	1003396.077	430269.2226	3707
7	1	11	FBS105	1003453.614	430080.6261	3709
7	1	11	FBS106	1003338.698	430300.6158	3703
7	1	11	FBS107	1003349.452	430250.3569	3707
7	1	11	FBS108	1003092.785	430323.7484	3700
7	1	11	FBS109	1007029.413	431159.0762	3765
7	1	11	FBS11	1006927.163	431852.2086	3785
7	1	11	FBS110	1007025.902	431083.4191	3765
7	1	11	FBS111	1007017.417	431024.1802	3763
7	1	11	FBS112	1006984.12	430841.6201	3759
7	1	11	FBS113	1006269.669	431740.2072	3761
7	1	11	FBS114	1003415.575	430067.8091	3709
7	1	11	FBS115	1003400.949	430133.3313	3706
7	1	11	FBS116	1003362.985	430096.1936	3706
7	1	11	FBS117	1003308.593	430086.3997	3706
7	1	11	FBS118	1003268.938	430059.855	3703
7	1	11	FBS119	1003344.223	430047.2696	3706
7	1	11	FBS12	1006867.478	431871.8255	3777
7	1	11	FBS120	1003251.959	430009.1699	3701
7	1	11	FBS121	1003203.3	430011.8111	3701
7	1	11	FBS122	1003172.887	430039.6424	3701
7	1	11	FBS123	1003131.113	430092.2511	3697
7	1	11	FBS124	1003120.346	430031.7127	3699

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBS125	1003064.325	430006.7998	3699
7	1	11	FBS126	1003155.185	429990.0031	3699
7	1	11	FBS127	1003299.97	430014.5931	3702
7	1	11	FBS128	1003070.609	429946.3847	3699
7	1	11	FBS129	1003138.61	429934.4538	3699
7	1	11	FBS13	1006804.994	431931.637	3772
7	1	11	FBS130	1003222.988	429955.3732	3701
7	1	11	FBS131	1003284.192	429977.2302	3702
7	1	11	FBS132	1003414.347	430014.0502	3703
7	1	11	FBS134	1003620.148	430072.8092	3707
7	1	11	FBS135	1003637.949	430146.0741	3707
7	1	11	FBS136	1003704.665	430142.0769	3704
7	1	11	FBS137	1003778.057	430199.8	3708
7	1	11	FBS138	1003764.143	430272.5965	3708
7	1	11	FBS139	1003771.483	430349.3811	3712
7	1	11	FBS14	1006753.353	431827.3541	3776
7	1	11	FBS140	1003754.952	430420.9856	3715
7	1	11	FBS141	1003700.414	430312.926	3712
7	1	11	FBS142	1003658.24	430420.16	3713
7	1	11	FBS143	1003591.764	430452.2497	3715
7	1	11	FBS144	1003511.485	430413.9466	3715
7	1	11	FBS145	1003444.369	430389.2324	3715
7	1	11	FBS146	1003310.843	430450.9485	3702
7	1	11	FBS147	1003244.837	430491.3232	3708
7	1	11	FBS148	1003189.155	430443.1892	3708
7	1	11	FBS149	1003134.525	430473.7205	3703
7	1	11	FBS15	1006674.419	431846.233	3776
7	1	11	FBS150	1003078.495	430496.9741	3703
7	1	11	FBS151	1003181.252	430488.1408	3708
7	1	11	FBS152	1003128.495	430515.0778	3703
7	1	11	FBS153	1003229.572	430530.2704	3708
7	1	11	FBS154	1003115.388	430662.7651	3707
7	1	11	FBS155	1003312.307	430599.1097	3713
7	1	11	FBS156	1003291.039	430540.3724	3702
7	1	11	FBS157	1003166.698	430556.5376	3711
7	1	11	FBS158	1003201.101	430744.1354	3712
7	1	11	FBS159	1003676.508	430097.5051	3704
7	1	11	FBS16	1006690.477	431774.8822	3774
7	1	11	FBS160	1003780.586	430080.5646	3704
7	1	11	FBS161	1003820.453	430129.3071	3708
7	1	11	FBS162	1003982.525	430246.0427	3721
7	1	11	FBS163	1003688.875	430377.3694	3712
7	1	11	FBS164	1004140.98	430247.6386	3725

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBS165	1004638.493	430534.3501	3750
7	1	11	FBS166	1005265.218	430730.9019	3754
7	1	11	FBS167	1006547.576	431420.7624	3766
7	1	11	FBS168	1006656.105	431546.1386	3773
7	1	11	FBS169	1006696.381	431580.4617	3776
7	1	11	FBS17	1006593.418	431723.027	3771
7	1	11	FBS170	1006850.67	431654.3034	3778
7	1	11	FBS171	1006558.182	431280.6357	3762
7	1	11	FBS172	1006622.061	431443.7241	3773
7	1	11	FBS173	1006425.353	431401.1395	3766
7	1	11	FBS174	1006468.165	431059.695	3762
7	1	11	FBS175	1006473.564	430941.6415	3760
7	1	11	FBS176	1006571.21	430741.6326	3750
7	1	11	FBS177	1006794.869	430501.5422	3746
7	1	11	FBS178	1006919.94	430279.0304	3747
7	1	11	FBS179	1006872.997	430313.2541	3746
7	1	11	FBS18	1006508.771	431632.8718	3769
7	1	11	FBS180	1006823.7	430446.9238	3748
7	1	11	FBS181	1006693.442	431491.5513	3774
7	1	11	FBS182	1007053.653	431510.1152	3775
7	1	11	FBS183	1006451.031	430849.0826	3753
7	1	11	FBS184	1006923.715	431692.4613	3782
7	1	11	FBS185	1006456.303	430781.3741	3752
7	1	11	FBS186	1006915.441	431617.5599	3778
7	1	11	FBS187	1007049.486	431880.5066	3788
7	1	11	FBS188	1006994.856	431546.6796	3774
7	1	11	FBS189	1006479.367	430661.1671	3749
7	1	11	FBS19	1006418.415	431517.7072	3770
7	1	11	FBS190	1006691.104	430477.9667	3746
7	1	11	FBS191	1006542.156	430598.4659	3749
7	1	11	FBS192	1007000.838	430220.4288	3754
7	1	11	FBS193	1006619.862	430477.3461	3746
7	1	11	FBS194	1006999.735	431126.3886	3765
7	1	11	FBS195	1007029.075	430979.7021	3763
7	1	11	FBS196	1006547.436	431577.574	3773
7	1	11	FBS197	1006699.873	431627.0009	3776
7	1	11	FBS198	1006557.192	430499.195	3746
7	1	11	FBS199	1006407.99	430989.0672	3760
7	1	11	FBS2	1007050.292	431712.1895	3786
7	1	11	FBS20	1006656.97	431672.79	3773
7	1	11	FBS200	1006491.219	431010.2208	3760
7	1	11	FBS201	1006407.737	431093.5418	3762
7	1	11	FBS202	1006415.723	430910.3279	3752

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBS203	1006940.093	429464.2847	3751
7	1	11	FBS204	1006936.649	429626.0779	3742
7	1	11	FBS21	1006857.189	431801.619	3782
7	1	11	FBS22	1006819.108	431729.628	3782
7	1	11	FBS23	1006740.19	431663.3241	3776
7	1	11	FBS24	1006604.484	431950.3053	3763
7	1	11	FBS25	1006591.025	431589.6035	3773
7	1	11	FBS26	1006530.818	431496.6766	3769
7	1	11	FBS27	1006495.627	431391.7594	3766
7	1	11	FBS28	1006438.211	431307.1331	3766
7	1	11	FBS29a	1006514.393	431265.9401	3764
7	1	11	FBS29b	1006511.735	431254.0374	3764
7	1	11	FBS29c	1006521.642	431187.8147	3764
7	1	11	FBS3	1007031.895	431772.6412	3784
7	1	11	FBS30	1006449.718	431124.2147	3762
7	1	11	FBS31	1006439.299	431017.4039	3760
7	1	11	FBS32	1006455.899	430917.2097	3753
7	1	11	FBS33	1003588.756	430012.7612	3700
7	1	11	FBS33	1006501.098	430818.7046	3753
7	1	11	FBS34	1006502.823	430717.5171	3752
7	1	11	FBS35	1006416.589	431209.8928	3760
7	1	11	FBS36	1006931.634	431927.8268	3781
7	1	11	FBS37	1007001.81	431981.2544	3781
7	1	11	FBS38	1007043.731	432059.5799	3775
7	1	11	FBS39	1006344.246	431328.6218	3765
7	1	11	FBS4	1006863.633	431922.321	3777
7	1	11	FBS40	1006319.983	431428.2816	3770
7	1	11	FBS41	1006075.893	431269.6225	3760
7	1	11	FBS42	1006232.131	431289.1046	3760
7	1	11	FBS43	1006143.026	431350.9627	3764
7	1	11	FBS44	1006203.983	431444.0156	3771
7	1	11	FBS45	1006147.797	431189.5068	3760
7	1	11	FBS46	1006171.552	431085.5513	3751
7	1	11	FBS47	1006500.454	431345.259	3766
7	1	11	FBS48	1006473.532	431235.7067	3764
7	1	11	FBS49	1006528.612	431689.9623	3765
7	1	11	FBS5	1006895.482	431542.0052	3771
7	1	11	FBS50	1006488.231	431807.3982	3762
7	1	11	FBS51	1006385.713	431777.7515	3759
7	1	11	FBS52	1006328.374	431756.3792	3759
7	1	11	FBS53	1006376.872	431728.0194	3759
7	1	11	FBS54	1006365.801	431681.0206	3759
7	1	11	FBS55	1006345.252	431809.2577	3755

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBS56	1006319.778	431706.4653	3759
7	1	11	FBS57	1006298.162	431799.0589	3759
7	1	11	FBS58	1006222.089	431788.0466	3761
7	1	11	FBS59	1006091.765	431850.5558	3752
7	1	11	FBS6	1006959.485	431354.0697	3768
7	1	11	FBS60	1006039.91	431760.1059	3755
7	1	11	FBS61	1006006.496	431715.9189	3755
7	1	11	FBS62	1005966.093	431654.7654	3759
7	1	11	FBS63	1005944.788	431598.3285	3759
7	1	11	FBS64	1005891.265	431592.6591	3761
7	1	11	FBS65	1005951.964	431762.9916	3755
7	1	11	FBS8	1007035.671	431250.6985	3767
7	1	11	FBS9	1007003.656	431729.011	3784
7	1	11	FBS95	1006987.571	431215.5972	3767
7	1	11	FBS96	1003477.325	429955.6065	3703
7	1	11	FBS97	1003458.393	429996.2966	3703
7	1	11	FBS98	1003491.539	430033.4932	3703
7	1	11	FBS99	1003522.101	430088.5831	3709
7	1	11	FBT1	1003828.829	429762.6707	3701
7	1	11	FBT10	1003730.071	429648.7531	3697
7	1	11	FBT100	1006393.843	431585.4146	3765
7	1	11	FBT101	1006453.764	431689.3625	3765
7	1	11	FBT102	1006564.504	431768.6255	3771
7	1	11	FBT103	1006634.295	431750.3355	3771
7	1	11	FBT104	1006739.098	432011.2125	3769
7	1	11	FBT105	1006418.893	431455.1656	3770
7	1	11	FBT106	1006627.204	429154.5119	3751
7	1	11	FBT107	1003981.906	430477.8128	3713
7	1	11	FBT108	1006108.565	431651.6128	3763
7	1	11	FBT109	1006499.987	431283.475	3764
7	1	11	FBT11	1003516.498	429619.7056	3695
7	1	11	FBT110	1003215.212	430644.6205	3711
7	1	11	FBT111	1003414.17	429362.9977	3690
7	1	11	FBT112	1003364.958	430629.2258	3713
7	1	11	FBT113	1005102.918	430633.3325	3746
7	1	11	FBT115	1006007.589	431570.7505	3759
7	1	11	FBT116	1006878.385	431984.1682	3772
7	1	11	FBT117	1006435.013	431772.6917	3765
7	1	11	FBT118	1003946.648	429705.8281	3705
7	1	11	FBT119	1003894.819	429788.1812	3701
7	1	11	FBT12	1003442.889	429780.7438	3697
7	1	11	FBT120	1004297.754	429827.8328	3716
7	1	11	FBT121	1004298.01	429880.6645	3716

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT122	1004265.65	429929.7334	3721
7	1	11	FBT124	1003062.574	430220.0841	3697
7	1	11	FBT125	1006511.989	431434.9318	3769
7	1	11	FBT126	1006883.114	431831.1274	3777
7	1	11	FBT127	1006828.529	431891.3542	3777
7	1	11	FBT129	1005994.062	431618.5727	3759
7	1	11	FBT13	1003381.34	429639.186	3694
7	1	11	FBT130	1006634.482	431805.2029	3768
7	1	11	FBT131	1006523.895	431783.4985	3765
7	1	11	FBT132	1006832.353	431960.1804	3772
7	1	11	FBT133	1005929.802	431555.163	3759
7	1	11	FBT135	1005860.457	431665.4512	3761
7	1	11	FBT136	1006008.523	431828.7772	3751
7	1	11	FBT137	1005956.763	431808.8838	3751
7	1	11	FBT138	1005949.269	431870.6458	3751
7	1	11	FBT139	1006029.495	431985.97	3744
7	1	11	FBT14	1003908.254	429706.8185	3701
7	1	11	FBT14	1004968.524	431619.5616	3763
7	1	11	FBT140	1006276.237	431870.5688	3753
7	1	11	FBT141	1006138.784	431822.0213	3752
7	1	11	FBT142	1006128.312	432001.7858	3750
7	1	11	FBT143	1003194.971	430372.8627	3701
7	1	11	FBT144	1006209.374	432073.9456	3761
7	1	11	FBT146	1003177.357	430186.3371	3703
7	1	11	FBT147	1003084.589	430096.182	3697
7	1	11	FBT148	1006334.581	432176.769	3764
7	1	11	FBT149	1006339.663	432299.1839	3770
7	1	11	FBT 15	1003572.581	429763.7233	3692
7	1	11	FBT150	1003157.749	430319.6031	3701
7	1	11	FBT151	1006453.994	432299.0932	3769
7	1	11	FBT152	1003263.333	430573.0047	3711
7	1	11	FBT153	1006301.372	432122.7527	3764
7	1	11	FBT154	1006554.763	432253.9655	3770
7	1	11	FBT155	1003633.375	429879.4686	3694
7	1	11	FBT156	1003771.012	429890.9614	3697
7	1	11	FBT157	1006839.882	432384.6296	3778
7	1	11	FBT158	1006636.45	432309.2887	3772
7	1	11	FBT159	1006722.131	432350.1257	3775
7	1	11	FBT16	1003829.242	429858.4547	3700
7	1	11	FBT160	1006559.583	432309.8184	3772
7	1	11	FBT161	1006634.789	432199.4339	3770
7	1	11	FBT162	1006640.449	432377.6856	3772
7	1	11	FBT163	1006720.083	432453.4687	3784

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT164	1006805.773	432535.919	3784
7	1	11	FBT165	1006897.424	432586.5073	3792
7	1	11	FBT166	1006718.796	432112.7294	3771
7	1	11	FBT167	1006654.793	432128.4239	3766
7	1	11	FBT168	1006904.406	432317.4482	3778
7	1	11	FBT169	1006887.982	432188.2203	3776
7	1	11	FBT17	1003721.558	429636.6024	3697
7	1	11	FBT170	1006615.399	430599.678	3748
7	1	11	FBT171	1006817.318	432279.4987	3776
7	1	11	FBT172	1006810.269	432126.4809	3772
7	1	11	FBT173	1006765.257	430391.2387	3741
7	1	11	FBT175	1006620.672	430387.4396	3739
7	1	11	FBT176	1006510.939	430548.826	3749
7	1	11	FBT177	1006977.304	430290.3305	3754
7	1	11	FBT178	1006671.246	432006.0917	3763
7	1	11	FBT179	1006988.745	432390.3824	3779
7	1	11	FBT180	1003341.502	430147.653	3706
7	1	11	FBT181	1003578.927	429912.3101	3694
7	1	11	FBT182	1006113.558	433126.5314	3782
7	1	11	FBT184	1007026.915	432289.8472	3777
7	1	11	FBT185	1003874.037	429878.5673	3700
7	1	11	FBT189	1003062.747	430153.1762	3697
7	1	11	FBT19	1003995.709	429779.9863	3705
7	1	11	FBT190	1007101.066	432363.0529	3784
7	1	11	FBT191	1006991.709	432498.3236	3786
7	1	11	FBT192	1006875.45	430214.3048	3747
7	1	11	FBT193	1006886.781	429621.8245	3744
7	1	11	FBT194	1007069.99	432471.1359	3792
7	1	11	FBT195	1006940.232	430371.4141	3750
7	1	11	FBT196	1007015.629	430313.5511	3750
7	1	11	FBT197	1006944.01	430220.4604	3754
7	1	11	FBT199	1007073.416	432592.8984	3796
7	1	11	FBT200	1007112.079	432686.8064	3801
7	1	11	FBT201	1006671.785	431955.2764	3763
7	1	11	FBT202	1006108.651	430053.4616	3735
7	1	11	FBT203	1006159.723	429949.9492	3724
7	1	11	FBT204	1003904.437	429972.1997	3707
7	1	11	FBT205	1004495.97	430683.317	3741
7	1	11	FBT208	1004306.09	430263.9468	3734
7	1	11	FBT209	1003061.256	429876.7502	3699
7	1	11	FBT210	1004721.661	430408.4273	3749
7	1	11	FBT25	1005936.565	429677.9252	3708
7	1	11	FBT28	1006995.707	432025.5234	3781

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT30	1003744.826	429703.0311	3694
7	1	11	FBT31	1003441.599	429860.6924	3700
7	1	11	FBT32	1003491.42	429821.6628	3700
7	1	11	FBT33	1003600.649	430372.6194	3713
7	1	11	FBT34	1003722.572	430232.4302	3708
7	1	11	FBT34	1006089.887	431789.3293	3760
7	1	11	FBT35	1003514.218	430358.2416	3715
7	1	11	FBT36	1004055.345	429976.0244	3721
7	1	11	FBT37	1003929.08	430008.3907	3713
7	1	11	FBT38	1006894.193	429138.2051	3769
7	1	11	FBT39	1006856.676	429174.0649	3768
7	1	11	FBT4	1004918.652	430404.2104	3763
7	1	11	FBT42	1003165.501	430014.4195	3701
7	1	11	FBT43	1003243.831	432871.8832	3711
7	1	11	FBT45	1004926.812	431731.8907	3760
7	1	11	FBT45	1006332.172	432072.4021	3764
7	1	11	FBT47	1003539.282	431640.3901	3709
7	1	11	FBT48	1004053.661	432322.0074	3743
7	1	11	FBT49	1006586.64	431554.4225	3773
7	1	11	FBT5	1003378.696	430062.5454	3706
7	1	11	FBT51	1003124.028	429338.3148	3698
7	1	11	FBT52	1003165.043	429920.5139	3701
7	1	11	FBT53	1003521.352	429897.1871	3700
7	1	11	FBT54	1003215.012	429850.9657	3699
7	1	11	FBT55	1003264.499	429921.0095	3701
7	1	11	FBT6	1007031.211	431451.7069	3774
7	1	11	FBT62	1004287.727	430055.5735	3726
7	1	11	FBT69	1003596.901	430267.2276	3711
7	1	11	FBT7	1006985.133	431795.0194	3784
7	1	11	FBT70	1003563.53	429823.1898	3694
7	1	11	FBT71	1006353.821	429401.4464	3749
7	1	11	FBT72	1006405.442	429222.003	3750
7	1	11	FBT73	1006704.681	429177.8531	3764
7	1	11	FBT74	1006609.061	429410.2922	3752
7	1	11	FBT75	1006924.735	430325.1103	3750
7	1	11	FBT76	1006449.318	430723.8886	3752
7	1	11	FBT77	1006526.53	430616.5192	3749
7	1	11	FBT78	1006571.092	430546.3923	3748
7	1	11	FBT79	1006658.869	430515.3799	3746
7	1	11	FBT80	1006740.55	430501.5974	3746
7	1	11	FBT81	1006495.838	431459.903	3769
7	1	11	FBT82	1006368.535	431036.6716	3760
7	1	11	FBT183	1003813.371	429924.5121	3707

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT83	1006368.94	430951.7545	3760
7	1	11	FBT84	1006327.232	431088.6826	3762
7	1	11	FBT85	1006700.114	429123.6163	3760
7	1	11	FBT86	1006700.886	429351.3892	3758
7	1	11	FBT92	1006289.431	431129.1828	3751
7	1	11	FBT93	1006317.898	430990.5072	3760
7	1	11	FBT94	1006314.513	430910.263	3752
7	1	11	FBT95	1006035.049	431650.3335	3759
7	1	11	FBT96	1006760.022	431961.4648	3769
7	1	11	FBT97	1006801.659	431863.9952	3777
7	1	11	FBT98	1006400.334	431837.9932	3755
7	1	11	FBT99	1006071.865	431706.6904	3760
7	1	11	FBW1	1006910.609	429582.2649	3744
7	1	11	FBW2	1006959.475	429529.9166	3751
7	1	11	FBW3	1006925.174	429116.1995	3772
7	1	11	FBW4	1006786.627	429118.0987	3760
7	1	11	FBW5	1006472.523	429223.1673	3753
7	1	11	FBW6	1006189.561	429126.8986	3727
7	1	11	FBW8	1005939.316	429550.9867	3719
7	1	11	PA100	1001988.006	429061.1105	3686
7	1	11	PA35	1001941.387	429263.4024	3691
7	1	11	PA50	1001765.251	429244.1937	3691
7	1	11	PA51	1001689.159	429228.0059	3691
7	1	11	PA52	1001735.129	429290.748	3695
7	1	11	PA53	1001816.953	429273.3943	3692
7	1	11	PA67	1001634.975	428490.9881	3671
7	1	11	PA68	1001661.054	428400.4189	3680
7	1	11	PA84	1001652.151	428627.426	3673
7	1	11	PA85	1001645.658	428551.9208	3671
7	1	11	PA91	1002097.605	429083.9964	3693
7	1	11	PA92	1002010.251	429112.1612	3686
7	1	11	PA93	1002445.662	429082.9255	3713
7	1	11	PA94	1002043.741	429058.9181	3693
7	1	11	PA97	1001844.223	428885.5541	3678
7	1	11	PA98	1001720.38	428798.5329	3675
7	1	11	PM100	1001785.57	429154.8585	3687
7	1	11	PM101	1002286.535	429233.3774	3714
7	1	11	PM102	1002517.021	429189.0378	3712
7	1	11	PM103	1002441.409	429160.961	3713
7	1	11	PM104	1005865.734	429064.7955	3706
7	1	11	PM105	1005877.086	428942.7479	3722
7	1	11	PM106	1005946.226	428964.6435	3735
7	1	11	PM107	1006000.89	428913.171	3737

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	PM108	1006026.522	428977.1583	3735
7	1	11	PM109	1006085.915	428983.4346	3739
7	1	11	PM110	1006131.507	429025.2054	3739
7	1	11	PM111	1006193.089	429038.6337	3741
7	1	11	PM112	1006245.351	429017.4404	3741
7	1	11	PM113	1002070.58	429286.8717	3699
7	1	11	PM114	1001800.186	429022.8735	3682
7	1	11	PM116	1001913.092	429100.9855	3686
7	1	11	PM148	1001672.05	428849.9837	3675
7	1	11	PM49	1002559.512	429228.7759	3703
7	1	11	PM56	1002036.797	429199.8036	3699
7	1	11	PM57	1002315.833	429174.2206	3714
7	1	11	PM66	1002183.999	429156.7068	3705
7	1	11	PM68	1002207.018	429240.3165	3712
7	1	11	PM97	1001899.226	429169.0573	3692
7	1	11	PM98	1001991.157	429204.6527	3691
7	1	11	PM99	1001889.39	429249.774	3692
7	1	11	PR1	1002478.366	429041.7714	3713
7	1	11	PR2	1002393.967	429251.378	3714
7	1	11	PR4	1005865.797	429012.8266	3722
7	1	11	PR5	1005799.092	429075.7488	3706
7	1	11	PR6	1006215.316	429076.1579	3727
7	1	11	PS18	1001750.82	428896.6362	3675
7	1	11	PS19	1001867.937	429051.3934	3687
7	1	11	PS20	1001727.531	429196.8968	3691
7	1	11	PS21	1001935.982	429237.1922	3691
7	1	11	PS22	1002433.359	429210.4068	3712
7	1	11	PS23	1002631.857	429130.924	3706
7	1	11	PS24	1001692.431	429047.0783	3686
7	1	11	PS26	1001850.652	429144.1872	3687
7	1	11	PS32	1001721.316	428977.7889	3682
7	1	11	PS33	1001769.635	429084.8959	3686
7	1	11	PS34	1001829.562	429208.5166	3692
7	1	11	PS35	1001710.56	429121.4559	3686
7	1	11	PS36	1001656.103	428771.577	3674
7	1	11	PS37	1001778.458	429228.1461	3692
7	1	11	PS46	1001670.88	428921.5766	3682
7	1	11	PT1	1005997.371	428955.9905	3735
7	1	11	PT121	1001705.664	428885.9056	3675
7	1	11	PT140	1006225.919	428963.0231	3741
7	1	11	PT141	1006195.113	428930.9285	3741
7	1	11	PT142	1002942.324	429197.3522	3702
7	1	11	PT144	1002110.807	429217.3111	3699

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	PT16	1002067.549	429145.561	3693
7	1	11	PT163	1002308.63	429132.2727	3709
7	1	11	PT169	1001747.702	429046.9063	3686
7	1	11	PT173	1002501.909	429075.2858	3713
7	1	11	PT18	1002114.017	429245.1895	3699
7	1	11	PT22	1002221.677	429197.0932	3712
7	1	11	PT24	1002516.917	429125.7535	3713
7	1	11	PT26	1002056.432	429289.0393	3699
7	1	11	PT3	1002382.014	429130.7737	3709
7	1	11	PT35	1002010.771	429163.6529	3686
7	1	11	PT4	1002550.306	429152.755	3706
7	1	11	PT5	1001967.386	429149.5822	3686
7	1	11	PT-52	1006161.24	429027.3177	3739
7	1	11	PT6	1002028.361	429238.1149	3699
7	1	11	PT7	1002142.346	429190.2318	3699
7	1	11	PT8	1002279.178	429188.7929	3714
7	1	11	PT9	1001643.978	428829.304	3672
7	1	11	PW1	1006172.957	429002.5416	3741
7	1	11	PW10	1006027.194	429058.5445	3729
7	1	11	PW2	1006050.147	429015.7362	3739
7	1	11	PW3	1005972.211	429013.8852	3735
7	1	11	PW4	1006092.17	429057.6358	3731
7	1	11	PW5	1006133.56	428960.8173	3739
7	1	11	PW6	1006056.275	428942.0661	3739
7	1	11	PW7	1005925.816	429067.3063	3729
7	1	11	PW8	1005829.469	429019.4258	3722
7	1	11	PW9	1006100.405	428902.2794	3743
7	1	11	RCP58	1006539.164	433096.5196	3802
7	1	11	RON2	1002520.44	429424.7104	3710
7	1	11	RON3	1002039.513	431152.7695	3680
7	1	11	RON5	1001814.332	430318.9252	3674
7	1	11	RONA1	1002091.371	430645.8805	3673
7	1	11	RONA10	1001745.319	430580.3291	3666
7	1	11	RONA100	1002185.611	430015.188	3695
7	1	11	RONA101	1002096.421	429615.0295	3703
7	1	11	RONA102	1001907.211	429333.5626	3703
7	1	11	RONA103	1001697.585	429760.339	3694
7	1	11	RONA104	1001717.747	429461.0494	3696
7	1	11	RONA105	1002163.549	429459.5893	3707
7	1	11	RONA106	1002169.514	429534.7249	3707
7	1	11	RONA107	1001761.903	429660.732	3696
7	1	11	RONA108	1001691.868	429338.2718	3695
7	1	11	RONA109	1001821.069	429427.7817	3700

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONA11	1002687.692	430539.5899	3690
7	1	11	RONA110	1001749.929	429357.1284	3695
7	1	11	RONA112	1002105.053	430017.0711	3692
7	1	11	RONA113	1002218.376	429402.3239	3710
7	1	11	RONA114	1002225.541	429469.9515	3707
7	1	11	RONA115	1002086.969	429461.9526	3706
7	1	11	RONA116	1002065.56	429526.4982	3706
7	1	11	RONA117	1001930.45	429505.8643	3703
7	1	11	RONA118	1001720.299	429531.1312	3696
7	1	11	RONA119	1001922.353	429378.7548	3703
7	1	11	RONA12	1002867.722	430520.4052	3692
7	1	11	RONA120	1002143.404	429650.8327	3703
7	1	11	RONA121	1002740.386	430209.6621	3687
7	1	11	RONA122	1002841.766	430252.7725	3689
7	1	11	RONA123	1002832.188	430141.7993	3696
7	1	11	RONA124	1002625.116	430132.9593	3708
7	1	11	RONA125	1002473.736	429959.3367	3712
7	1	11	RONA127	1001810.522	431342.892	3671
7	1	11	RONA128	1002006.058	431440.0811	3685
7	1	11	RONA129	1003048.848	431363.5228	3704
7	1	11	RONA13	1003041.812	430536.4908	3703
7	1	11	RONA130	1002072.256	431619.8718	3691
7	1	11	RONA131	1002120.444	431782.4111	3692
7	1	11	RONA132	1002310.454	431762.7132	3700
7	1	11	RONA133	1002525.388	431904.4896	3690
7	1	11	RONA134	1001890.273	431482.1778	3672
7	1	11	RONA135	1002588.078	432109.2866	3690
7	1	11	RONA136	1001990.417	431562.2851	3686
7	1	11	RONA137	1002183.037	431716.9655	3697
7	1	11	RONA138	1001890.07	431401.6796	3671
7	1	11	RONA139	1002617.31	432348.669	3694
7	1	11	RONA14	1002099.011	429394.1579	3701
7	1	11	RONA140	1002306.715	431896.0408	3694
7	1	11	RONA141	1002485.575	432030.9571	3682
7	1	11	RONA142	1002107.897	431694.734	3692
7	1	11	RONA143	1002370.895	432060.6809	3681
7	1	11	RONA144	1002480.117	432529.3068	3682
7	1	11	RONA145	1002425.808	431980.3142	3682
7	1	11	RONA146	1002478.767	432260.491	3684
7	1	11	RONA147	1002499.669	432404.0188	3682
7	1	11	RONA148	1006866.038	432448.4862	3784
7	1	11	RONA149	1002354.413	432476.2649	3678
7	1	11	RONA15	1001835.782	430603.8329	3669

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONA150	1002219.935	432376.8505	3679
7	1	11	RONA151	1002038.562	432397.8879	3674
7	1	11	RONA16	1002483.62	429858.5854	3710
7	1	11	RONA17	1002563.875	429915.4835	3711
7	1	11	RONA18	1002652.242	429916.3183	3711
7	1	11	RONA19	1002747.136	429892.1021	3715
7	1	11	RONA2	1002212.291	430631.1985	3673
7	1	11	RONA21	1002081.951	429333.5457	3701
7	1	11	RONA21	1002574.286	430612.5804	3685
7	1	11	RONA22	1002296.917	429863.9186	3703
7	1	11	RONA23	1002364.179	429845.5432	3703
7	1	11	RONA26	1002120.688	429794.749	3690
7	1	11	RONA27	1002207.935	429802.6038	3701
7	1	11	RONA28	1002199.895	429874.2557	3701
7	1	11	RONA29	1002182.805	429722.3793	3699
7	1	11	RONA3	1002306.708	430540.523	3680
7	1	11	RONA30	1002292.464	429805.752	3703
7	1	11	RONA31	1002612.907	429897.2045	3711
7	1	11	RONA32	1002250.66	429736.7423	3699
7	1	11	RONA33	1002343.929	429802.2466	3703
7	1	11	RONA34	1002097.691	429702.5687	3696
7	1	11	RONA38	1002023.555	430665.2791	3670
7	1	11	RONA39	1001745.392	429714.2108	3694
7	1	11	RONA4	1002436.669	430591.6256	3683
7	1	11	RONA40	1001670.442	429666.3716	3696
7	1	11	RONA42	1002022.498	430623.8333	3670
7	1	11	RONA43	1002270.59	430633.1716	3673
7	1	11	RONA44	1002736.997	430661.3258	3693
7	1	11	RONA45	1002966.272	430565.8196	3700
7	1	11	RONA46	1002748.26	430499.2007	3690
7	1	11	RONA47	1002653.582	430473.5529	3682
7	1	11	RONA48	1002518.353	430637.7223	3683
7	1	11	RONA49	1001967.333	430537.3175	3672
7	1	11	RONA5	1001934.195	430673.7425	3668
7	1	11	RONA50	1001863.636	430540.2306	3670
7	1	11	RONA51	1002145.579	429969.7205	3692
7	1	11	RONA52	1002251.741	429910.128	3701
7	1	11	RONA53	1002429.728	430555.469	3683
7	1	11	RONA54	1002618.254	430593.8026	3685
7	1	11	RONA55	1002571.381	430424.3338	3682
7	1	11	RONA56	1002700.107	430698.8804	3690
7	1	11	RONA57	1002758.484	430631.7131	3693
7	1	11	RONA58	1003018.147	430483.6054	3702

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONA6	1002600.412	430524.7304	3682
7	1	11	RONA60	1001761.434	429508.8711	3696
7	1	11	RONA61	1001820.384	429637.3479	3698
7	1	11	RONA62	1001989.528	429697.7182	3697
7	1	11	RONA63	1001926.994	429554.5769	3701
7	1	11	RONA64	1001911.432	429766.4496	3697
7	1	11	RONA67	1001852.548	429529.6587	3700
7	1	11	RONA68	1001929.579	429640.671	3701
7	1	11	RONA69	1001862.286	429710.1538	3694
7	1	11	RONA7	1002721.336	430606.0054	3693
7	1	11	RONA7	1003012.84	430109.7034	3693
7	1	11	RONA70	1001743.485	429406.087	3695
7	1	11	RONA71	1001744.035	429613.4451	3696
7	1	11	RONA72	1002340.951	430114.0085	3705
7	1	11	RONA74	1001834.925	429847.0487	3691
7	1	11	RONA76	1002464.172	430239.7755	3702
7	1	11	RONA77	1002477.774	430082.904	3708
7	1	11	RONA78	1001941.453	429430.2767	3703
7	1	11	RONA79	1002563.763	430170.6123	3699
7	1	11	RONA8	1001813.399	430692.2977	3667
7	1	11	RONA80	1002026.218	429360.2903	3703
7	1	11	RONA81	1001863.086	429369.4865	3697
7	1	11	RONA82	1002042.419	429658.484	3703
7	1	11	RONA83	1001780.063	429304.8343	3697
7	1	11	RONA84	1002019.124	429483.2603	3703
7	1	11	RONA85	1002135.508	429497.7554	3706
7	1	11	RONA86	1001891.423	429466.7992	3700
7	1	11	RONA87	1001829.87	429578.805	3698
7	1	11	RONA88	1001767.254	429564.1362	3696
7	1	11	RONA89	1001979.992	429767.7573	3697
7	1	11	RONA9	1002687.073	430432.0542	3690
7	1	11	RONA90	1002077.926	429758.5874	3696
7	1	11	RONA91	1001850.846	429762.7237	3694
7	1	11	RONA92	1001936.057	429809.8975	3691
7	1	11	RONA95	1001793.208	429500.345	3700
7	1	11	RONA96	1001996.049	429434.9331	3703
7	1	11	RONA97	1001984.034	429381.5919	3703
7	1	11	RONA98	1001779.117	429870.3246	3691
7	1	11	RONA99	1002052.79	429712.3922	3696
7	1	11	RONJ2	1001681.052	429299.551	3695
7	1	11	RONJ3	1001769.354	430948.9538	3661
7	1	11	RONJ4	1002651.872	430077.9401	3708
7	1	11	RONJ5	1002834.488	430026.0448	3704

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONJ6	1002739.381	430257.8533	3687
7	1	11	RONJ7	1002300.607	429537.0212	3706
7	1	11	RONJ8	1001868.355	429937.8218	3680
7	1	11	RONM1	1001859.393	430215.1555	3676
7	1	11	RONM10	1002013.945	429829.719	3691
7	1	11	RONM13	1001740.444	430984.4497	3661
7	1	11	RONM14	1002778.219	429461.9779	3714
7	1	11	RONM15	1002897.524	429810.8908	3708
7	1	11	RONM16	1003010.575	429926.4821	3700
7	1	11	RONM17	1002902.462	429722.0371	3711
7	1	11	RONM18	1002650.674	429463.6196	3713
7	1	11	RONM19	1002910.546	429981.2757	3700
7	1	11	RONM2	1001942.936	430038.8933	3688
7	1	11	RONM3	1002049.355	429877.0937	3690
7	1	11	RONM4	1002077.755	429831.8444	3690
7	1	11	RONM5	1002140.706	429754.2646	3696
7	1	11	RONM6	1002221.915	429693.3516	3699
7	1	11	RONM7	1002305.774	429624.6372	3701
7	1	11	RONM8	1002414.874	429541.3276	3710
7	1	11	RONM9	1002468.876	429489.9444	3710
7	1	11	RONR1	1002157.281	429397.6647	3710
7	1	11	RONR10	1002483.999	429343.9113	3710
7	1	11	RONR11	1002460.656	429280.973	3712
7	1	11	RONR12	1002305.16	429348.035	3712
7	1	11	RONR13	1002117.716	429333.2403	3701
7	1	11	RONR15	1002431.304	429327.2929	3710
7	1	11	RONR16	1002444.873	429386.3105	3710
7	1	11	RONR17	1002248.391	429540.5882	3707
7	1	11	RONR18	1002378.754	429193.7875	3714
7	1	11	RONR19	1002152.46	429268.9058	3699
7	1	11	RONR2	1002530.439	429313.9928	3708
7	1	11	RONR20	1002249.362	429263.781	3712
7	1	11	RONR22	1002949.653	429824.9049	3704
7	1	11	RONR23	1002379.449	429354.381	3712
7	1	11	RONR24	1002675.702	429232.1913	3702
7	1	11	RONR25	1002365.532	429423.0805	3706
7	1	11	RONR26	1002596.662	429545.8421	3715
7	1	11	RONR27	1002875.396	430051.7412	3696
7	1	11	RONR28	1002716.791	429702.1664	3719
7	1	11	RONR29	1002982.245	430138.0582	3693
7	1	11	RONR3	1002598.336	429354.9862	3708
7	1	11	RONR30	1002819.097	430287.4373	3689
7	1	11	RONR31	1002619.311	430300.947	3681

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONR32	1002428.856	429690.9371	3714
7	1	11	RONR33	1003033.609	430793.1355	3711
7	1	11	RONR4	1002840.502	429378.8266	3709
7	1	11	RONR5	1002905.874	429536.3342	3713
7	1	11	RONR6	1002897.879	429611.2214	3713
7	1	11	RONR8	1002282.637	429404.2592	3712
7	1	11	RONR9	1002353.266	429299.4237	3712
7	1	11	RONS1	1003024.205	430327.7272	3695
7	1	11	RONS10	1002601.624	429993.3209	3713
7	1	11	RONS11	1002589.383	429695.1859	3714
7	1	11	RONS12	1002702.961	429819.6697	3715
7	1	11	RONS13	1002914.125	430199.0828	3692
7	1	11	RONS14	1002234.956	429311.6387	3710
7	1	11	RONS15	1002807.977	429294.5537	3709
7	1	11	RONS16	1002809.7	429500.41	3713
7	1	11	RONS17	1002631.569	429321.9427	3708
7	1	11	RONS18	1002606.843	429414.4588	3708
7	1	11	RONS19	1003012.598	429975.0199	3700
7	1	11	RONS2	1002957.82	430287.6265	3692
7	1	11	RONS20	1002964.965	429978.8394	3700
7	1	11	RONS21	1002988.699	430037.0078	3700
7	1	11	RONS22	1002886.284	430147.0857	3696
7	1	11	RONS23	1002963.453	429918.0829	3704
7	1	11	RONS24	1002893.842	429924.4805	3704
7	1	11	RONS25	1002832.201	429920.8755	3704
7	1	11	RONS26	1002868.383	429851.1814	3708
7	1	11	RONS27	1002815.738	429813.2615	3708
7	1	11	RONS28	1002843.259	429718.5367	3711
7	1	11	RONS29	1002834.552	429634.4888	3713
7	1	11	RONS30	1002781.485	429558.6316	3713
7	1	11	RONS31	1002737.453	429485.8494	3714
7	1	11	RONS32	1002682.496	429396.9794	3709
7	1	11	RONS33	1002913.953	430245.6452	3692
7	1	11	RONS33	1002914.297	429770.6628	3706
7	1	11	RONS34	1003015.851	429892.5054	3704
7	1	11	RONS35	1002921.186	429869.8753	3704
7	1	11	RONS36	1002858.52	429775.7031	3711
7	1	11	RONS37	1002806.894	429599.2955	3713
7	1	11	RONS38	1002731.315	429432.7709	3714
7	1	11	RONS39	1002878.278	429673.1292	3711
7	1	11	RONS4	1002866.052	430198.5882	3689
7	1	11	RONS40	1002671.551	429335.6194	3709
7	1	11	RONS41	1003019.152	430586.1368	3700

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONS42	1002976.433	430520.4794	3702
7	1	11	RONS43	1002913.994	430526.1646	3702
7	1	11	RONS44	1002839.029	430577.051	3694
7	1	11	RONS45	1002789.478	430535.4091	3692
7	1	11	RONS46	1002753.661	430153.0614	3703
7	1	11	RONS47	1002637.401	430193.8429	3699
7	1	11	RONS48	1002992.668	430220.9733	3692
7	1	11	RONS49	1002629.382	429261.714	3703
7	1	11	RONS5	1002809.936	430193.1489	3689
7	1	11	RONS50	1002748.98	429364.2169	3709
7	1	11	RONS51	1002621.467	429196.6659	3703
7	1	11	RONS52	1002711.008	429259.6626	3702
7	1	11	RONS53	1002748.901	429568.6292	3718
7	1	11	RONS6	1002706.112	430209.3754	3687
7	1	11	RONS7	1002600.457	430242.6593	3699
7	1	11	RONS8	1002685.531	430283.8805	3687
7	1	11	RONS9	1002786.409	430244.0654	3689
7	1	11	RONT1	1002806.477	429574.0876	3713
7	1	11	RONT10	1002513.51	430448.2561	3681
7	1	11	RONT11	1002488.69	429924.6713	3712
7	1	11	RONT12	1002469.078	430557.3956	3683
7	1	11	RONT13	1002315.272	429924.8224	3702
7	1	11	RONT14	1002237.492	429852.8113	3701
7	1	11	RONT15	1002579.891	430578.4496	3685
7	1	11	RONT16	1002038.193	429750.812	3696
7	1	11	RONT17	1002666.246	430578.365	3693
7	1	11	RONT18	1001943.953	429696.5752	3697
7	1	11	RONT19	1002208.708	429954.0145	3695
7	1	11	RONT2	1002761.911	429834.7527	3715
7	1	11	RONT20	1002754.69	430583.8881	3693
7	1	11	RONT21	1002092.363	429946.6489	3692
7	1	11	RONT22	1002804.138	430670.2912	3694
7	1	11	RONT23	1001968.451	429912.8635	3691
7	1	11	RONT24	1002765.892	430767.5141	3690
7	1	11	RONT25	1002672.235	430842.2547	3703
7	1	11	RONT26	1002672.652	430660.0821	3693
7	1	11	RONT27	1002529.904	430675.6472	3690
7	1	11	RONT28	1002397.395	430653.1252	3680
7	1	11	RONT29	1002207.175	430577.4375	3673
7	1	11	RONT3	1002689.951	429881.8425	3715
7	1	11	RONT30	1002123.636	430694.9619	3670
7	1	11	RONT31	1001994.999	430690.1735	3668
7	1	11	RONT32	1001912.244	430750.6643	3668

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	RONT33	1001869.534	430919.0817	3663
7	1	11	RONT34	1001913.143	431007.5507	3670
7	1	11	RONT35	1001834.555	431071.3133	3664
7	1	11	RONT36	1002609.442	430630.6747	3685
7	1	11	RONT37	1002373.529	430562.3874	3680
7	1	11	RONT38	1002495.37	430593.5668	3683
7	1	11	RONT39	1002326.437	430612.6309	3680
7	1	11	RONT4	1002755.642	430456.3343	3690
7	1	11	RONT40	1002146.67	430630.851	3673
7	1	11	RONT41	1002042.949	430733.0374	3670
7	1	11	RONT42	1002148.199	429902.698	3690
7	1	11	RONT43	1002396.853	429883.0356	3703
7	1	11	RONT44	1002540.076	429864.5895	3711
7	1	11	RONT45	1002804.313	429631.3491	3713
7	1	11	RONT46	1002597.814	429247.3528	3703
7	1	11	RONT47	1002853.9	429569.401	3713
7	1	11	RONT48	1002769.531	429627.5644	3718
7	1	11	RONT49	1002017.461	429674.5379	3697
7	1	11	RONT5	1002608.143	429842.0061	3711
7	1	11	RONT50	1002895.874	429241.8148	3703
7	1	11	RONT51	1001777.487	429537.1995	3700
7	1	11	RONT52	1002107.535	429431.8142	3706
7	1	11	RONT53	1002400.922	429278.0102	3714
7	1	11	RONT54	1002769.863	430048.0042	3703
7	1	11	RONT55	1002693.213	430158.1031	3703
7	1	11	RONT56	1002389.209	429468.803	3706
7	1	11	RONT57	1002579.366	429101.6147	3706
7	1	11	RONT58	1003020.267	430178.5558	3692
7	1	11	RONT59	1001776.917	429460.6884	3700
7	1	11	RONT6	1002561.588	429782.8845	3714
7	1	11	RONT60	1001782.221	429390.93	3697
7	1	11	RONT62	1002338.816	429470.623	3706
7	1	11	RONT63	1002846.357	429967.9059	3704
7	1	11	RONT64	1002679.119	430104.4394	3703
7	1	11	RONT66	1002791.542	429980.664	3704
7	1	11	RONT67	1002681.125	430050.875	3703
7	1	11	RONT68	1002735.79	429975.3507	3710
7	1	11	RONT69	1002720.925	430024.1496	3710
7	1	11	RONT7	1002697.943	430510.8228	3690
7	1	11	RONT8	1002601.138	430469.6071	3682
7	1	11	RONT9	1002499.821	429822.8687	3710
7	1	12	BPZ LA8	1009566.482	432108.3439	3794
7	1	12	COM2	1007140.076	428985.6662	3774

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	COS1	1007038.967	429035.4679	3772
7	1	12	DK211	1007091.855	431592.36	3781
7	1	12	DR301	1008916.853	433038.0092	3800
7	1	12	DRA4	1010013.926	432986.7262	3836
7	1	12	DRA5	1010065.427	432999.108	3839
7	1	12	DRJ1	1008274.833	433051.5991	3842
7	1	12	DRJ5	1007935.119	433055.5383	3839
7	1	12	DRS1	1009962.381	433000.212	3836
7	1	12	DS690	1008322.948	433063.4611	3832
7	1	12	DS693	1008360.345	433057.7882	3832
7	1	12	DTW-1	1007137.064	429034.1106	3774
7	1	12	EN91	1010214.021	432089.5265	3825
7	1	12	EN94(400)	1008251.759	432603.0389	3861
7	1	12	FBS1	1007113.282	431972.7253	3787
7	1	12	FBS7	1007079.468	431363.7747	3772
7	1	12	IHA1	1009938.454	432829.3926	3836
7	1	12	IHA10	1009599.356	432797.5419	3814
7	1	12	IHA11	1009569.392	432737.5613	3814
7	1	12	IHA12	1008761.44	432008.5207	3806
7	1	12	IHA13	1008558.647	432451.3003	3842
7	1	12	IHA14	1009355.107	431554.587	3772
7	1	12	IHA15	1010099.128	431726.7044	3808
7	1	12	IHA16	1009884.362	432918.2958	3831
7	1	12	IHA17	1008844.663	432033.8656	3809
7	1	12	IHA18	1008095.425	432384.1245	3838
7	1	12	IHA19	1008781.485	432348.4229	3830
7	1	12	IHA2	1009986.781	432606.4202	3821
7	1	12	IHA20	1008691.143	432413.8653	3830
7	1	12	IHA21	1008810.565	431852.6359	3793
7	1	12	IHA22	1008849.639	431905.5391	3793
7	1	12	IHA23	1008773.323	432294.4567	3819
7	1	12	IHA24	1008817.543	432244.2043	3825
7	1	12	IHA25	1008830.075	432139.1547	3822
7	1	12	IHA26	1008301.65	432496.728	3852
7	1	12	IHA27	1008123.118	432330.5686	3838
7	1	12	IHA28	1008814.535	431940.9416	3809
7	1	12	IHA29	1009147.303	431748.3874	3792
7	1	12	IHA3	1009604.844	432541.6168	3808
7	1	12	IHA30	1009283.011	431545.478	3796
7	1	12	IHA31	1008727.415	432366.1863	3830
7	1	12	IHA32	1008057.549	432378.1818	3838
7	1	12	IHA33	1008045.334	432066.7843	3811
7	1	12	IHA34	1007764.42	431829.4059	3804

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHA35	1008154.151	432271.2165	3830
7	1	12	IHA36	1008916.847	431819.5612	3793
7	1	12	IHA37	1007254.207	431242.9045	3773
7	1	12	IHA38	1007251.995	431207.7607	3773
7	1	12	IHA39	1007114.913	430941.512	3764
7	1	12	IHA4	1009696.366	432564.1395	3823
7	1	12	IHA40	1007198.687	431027.6367	3767
7	1	12	IHA41	1007242.983	431062.9387	3770
7	1	12	IHA42	1008426.777	432419.7447	3841
7	1	12	IHA43	1009406.737	431595.0814	3772
7	1	12	IHA44	1009442.841	431519.3384	3761
7	1	12	IHA45	1010182.33	431367.2993	3793
7	1	12	IHA46	1010300.837	431404.7751	3794
7	1	12	IHA47	1010194.942	431230.7977	3792
7	1	12	IHA48	1010397.943	431128.3789	3781
7	1	12	IHA49	1010081.132	431713.0295	3808
7	1	12	IHA5	1009567.361	432569.7655	3811
7	1	12	IHA50	1010354.519	431770.9025	3819
7	1	12	IHA51	1010110.273	431206.6529	3795
7	1	12	IHA52	1010145.201	431162.891	3778
7	1	12	IHA53	1010202.834	431141.7306	3779
7	1	12	IHA54	1010307.019	431141.9098	3779
7	1	12	IHA55	1010331.905	431080.7108	3781
7	1	12	IHA56	1010427.427	431116.3329	3781
7	1	12	IHA57	1010052.229	431167.8098	3779
7	1	12	IHA58	1010060.481	431221.397	3801
7	1	12	IHA59	1010284.799	431085.9163	3779
7	1	12	IHA6	1009624.698	432610.6858	3811
7	1	12	IHA60	1010230.022	431410.0172	3794
7	1	12	IHA61	1010259.886	431493.4908	3796
7	1	12	IHA7	1009528.272	432594.1947	3812
7	1	12	IHA8	1009642.979	432413.9035	3799
7	1	12	IHA9	1009393.724	432669.2291	3808
7	1	12	IHH1	1008222.478	432420.3789	3847
7	1	12	IHH2	1008240.85	432482.8302	3852
7	1	12	IHJ1	1008845.146	432486.4988	3835
7	1	12	IHJ10	1009973.193	432397.8067	3813
7	1	12	IHJ100	1010112.146	431462.3739	3787
7	1	12	IHJ101	1008709.669	432891.1964	3836
7	1	12	IHJ102	1008027.048	432527.8865	3842
7	1	12	IHJ103	1007790.094	432703.8345	3831
7	1	12	IHJ104	1007967.704	432183.319	3827
7	1	12	IHJ105	1010240.08	431682.6094	3817

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHJ106	1007767.943	432806.5209	3827
7	1	12	IHJ107	1007838.646	432919.7283	3831
7	1	12	IHJ108	1008106.393	432571.0128	3856
7	1	12	IHJ11	1010098.494	431318.8813	3793
7	1	12	IHJ12	1010005.729	431367.9388	3797
7	1	12	IHJ13	1009828.082	431517.5606	3788
7	1	12	IHJ130	1007763.913	432464.9386	3834
7	1	12	IHJ14	1009955.216	431417.4606	3797
7	1	12	IHJ15	1009608.152	431470.6766	3768
7	1	12	IHJ16	1009817.038	432448.7408	3805
7	1	12	IHJ17	1009847.593	432504.0686	3805
7	1	12	IHJ18	1009987.709	432443.118	3809
7	1	12	IHJ19	1009745.705	431392.8151	3808
7	1	12	IHJ2	1008807.974	432532.2124	3835
7	1	12	IHJ20	1009866.356	431354.8742	3802
7	1	12	IHJ21	1009587.44	431415.3572	3802
7	1	12	IHJ22	1009563.568	431352.2839	3802
7	1	12	IHJ23	1009506.587	431445.6829	3761
7	1	12	IHJ24	1009639.615	432516.9245	3808
7	1	12	IHJ25	1009887.14	432794.5465	3835
7	1	12	IHJ26	1009934.575	432929.7133	3831
7	1	12	IHJ27	1007501.216	431809.1847	3798
7	1	12	IHJ28	1007758.81	432339.5845	3831
7	1	12	IHJ29	1007573.639	431894.1891	3801
7	1	12	IHJ3	1008692.242	432586.2652	3841
7	1	12	IHJ31	1008010.381	432261.1291	3827
7	1	12	IHJ32	1007678.676	432412.1828	3831
7	1	12	IHJ33	1007698.341	432342.7348	3831
7	1	12	IHJ34	1007596.629	432414.7674	3821
7	1	12	IHJ35	1007666.558	432281.4046	3808
7	1	12	IHJ36	1007709.349	432473.7925	3834
7	1	12	IHJ37	1008537.094	432527.3616	3841
7	1	12	IHJ38	1008496.783	432444.5922	3841
7	1	12	IHJ39	1007606.904	432340.1789	3821
7	1	12	IHJ4	1008638.316	432645.6052	3841
7	1	12	IHJ40	1008574.836	432565.5091	3841
7	1	12	IHJ41	1007712.866	432260.3741	3823
7	1	12	IHJ42	1007753.361	432510.7011	3834
7	1	12	IHJ43	1007641.414	432519.1556	3832
7	1	12	IHJ44	1007678.466	432627.0469	3831
7	1	12	IHJ45	1007169.337	431140.2788	3768
7	1	12	IHJ46	1007633.574	432449.929	3832
7	1	12	IHJ47	1007735.92	432621.8293	3831

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHJ48	1007347.854	429969.53	3754
7	1	12	IHJ49	1007748.22	432571.3671	3831
7	1	12	IHJ5	1008398.346	432836.0781	3838
7	1	12	IHJ50	1007608.343	432477.6601	3832
7	1	12	IHJ51	1007788.88	432618.2635	3831
7	1	12	IHJ52	1007295.234	432545.7819	3799
7	1	12	IHJ53	1007393.371	432321.1539	3800
7	1	12	IHJ54	1007372.508	432609.3687	3808
7	1	12	IHJ55	1007801.018	433012.4536	3826
7	1	12	IHJ56	1007409.833	432549.4806	3803
7	1	12	IHJ57	1007340.684	432321.8781	3800
7	1	12	IHJ58	1007487.918	432612.284	3822
7	1	12	IHJ59	1007697.807	433007.9189	3826
7	1	12	IHJ6	1008316.916	432934.2194	3836
7	1	12	IHJ60	1007327.834	432269.9	3796
7	1	12	IHJ61	1007450.496	432718.9661	3824
7	1	12	IHJ62	1007419.31	432256.2061	3796
7	1	12	IHJ63	1007350.348	432186.0901	3796
7	1	12	IHJ64	1007149.229	432259.4236	3781
7	1	12	IHJ65	1007218.938	432215.1303	3793
7	1	12	IHJ66	1007147.341	432147.9515	3782
7	1	12	IHJ67	1007237.642	432105.2959	3790
7	1	12	IHJ68	1009240.399	432571.3122	3794
7	1	12	IHJ69	1009409.927	432463.8047	3791
7	1	12	IHJ7	1008182.375	433018.3082	3842
7	1	12	IHJ70	1009415.683	432378.2332	3776
7	1	12	IHJ71	1009201.945	432677.6764	3794
7	1	12	IHJ72	1009213.09	432344.5191	3777
7	1	12	IHJ73	1009286.392	432511.5268	3786
7	1	12	IHJ74	1009529.35	432344.719	3778
7	1	12	IHJ75	1009862.457	432585.4592	3823
7	1	12	IHJ76	1009816.53	431354.8258	3802
7	1	12	IHJ77	1009852.121	431684.7317	3777
7	1	12	IHJ78	1010029.854	431711.3041	3786
7	1	12	IHJ79	1009761.488	431461.6735	3799
7	1	12	IHJ8	1008429.058	432867.0819	3838
7	1	12	IHJ80	1009211.177	431929.6791	3790
7	1	12	IHJ81	1009104.319	431808.4264	3814
7	1	12	IHJ82	1009810.771	432653.4505	3823
7	1	12	IHJ83	1009593.225	432301.3029	3780
7	1	12	IHJ84	1009141.731	432108.2486	3826
7	1	12	IHJ85	1009545.81	432213.6603	3774
7	1	12	IHJ86	1009771.928	431721.3642	3770

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHJ87	1009466.928	432292.7604	3774
7	1	12	IHJ88	1010024.929	431444.8691	3782
7	1	12	IHJ89	1010291.267	431606.7409	3788
7	1	12	IHJ9	1008040.052	432964.3904	3839
7	1	12	IHJ90	1009980.445	431469.6416	3782
7	1	12	IHJ91	1010346.988	431655.5614	3802
7	1	12	IHJ92	1010255.823	431631.8671	3788
7	1	12	IHJ93	1009772.708	431598.806	3776
7	1	12	IHJ94	1010322.052	431722.7832	3819
7	1	12	IHJ95	1010436.259	431676.1422	3802
7	1	12	IHJ96	1010019.501	431535.7756	3782
7	1	12	IHJ97	1010285.307	431687.1913	3817
7	1	12	IHJ98	1010066.197	431495.9007	3787
7	1	12	IHJ99	1009949.516	431105.4242	3779
7	1	12	IHK1	1008934.514	432371.2876	3835
7	1	12	IHK10	1007154.007	431408.7374	3772
7	1	12	IHK11	1007563.257	431764.06	3795
7	1	12	IHK13	1009403.328	431319.9683	3768
7	1	12	IHK14	1008862.51	432189.5742	3825
7	1	12	IHK15	1009415.866	431439.3448	3770
7	1	12	IHK16	1008250.144	432453.5075	3852
7	1	12	IHK17	1008241.519	432758.148	3854
7	1	12	IHK18	1007834.195	432121.288	3821
7	1	12	IHK19	1008893.207	432518.4114	3835
7	1	12	IHK2	1009449.525	431585.5153	3762
7	1	12	IHK20	1009258.411	432578.4495	3794
7	1	12	IHK21	1009279.067	432265.2999	3783
7	1	12	IHK22	1010691.777	432191.2223	3823
7	1	12	IHK23	1008995.81	432221.5098	3831
7	1	12	IHK24	1009193.434	431664.0286	3784
7	1	12	IHK25	1009139.579	431461.1259	3800
7	1	12	IHK26	1008732.315	432084.2785	3810
7	1	12	IHK27	1008768.176	432123.8783	3810
7	1	12	IHK28	1008737.503	432112.7181	3810
7	1	12	IHK29	1008730.858	432049.6828	3806
7	1	12	IHK3	1009295.095	431061.7633	3779
7	1	12	IHK30	1008701.897	432077.9558	3810
7	1	12	IHK31	1008763.754	432091.4043	3810
7	1	12	IHK32	1008740.786	432142.0792	3810
7	1	12	IHK33	1008701.437	432112.9574	3810
7	1	12	IHK44	1008639.5	432511.9743	3842
7	1	12	IHK5	1007373.621	430274.1551	3760
7	1	12	IHK7	1008421.906	432091.0042	3842

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHK8	1007139.029	431384.0093	3772
7	1	12	IHK9	1007127.149	431549.3027	3775
7	1	12	IHM1	1008797.627	432122.9213	3810
7	1	12	IHM10	1008673.18	432078.8674	3813
7	1	12	IHM100	1007048.747	429395.5523	3759
7	1	12	IHM101	1007364.676	429923.2636	3754
7	1	12	IHM102	1007407.544	430050.9836	3754
7	1	12	IHM103	1007280.458	430256.7032	3755
7	1	12	IHM104	1007205.797	429057.3676	3772
7	1	12	IHM105	1007106.638	429111.8758	3772
7	1	12	IHM106	1007097.581	429184.2882	3760
7	1	12	IHM107	1010116.185	432571.7375	3831
7	1	12	IHM108	1009995.828	432265.7787	3802
7	1	12	IHM109	1010048.992	432284.677	3802
7	1	12	IHM110	1010114.622	432297.0033	3802
7	1	12	IHM111	1008909.02	432075.706	3822
7	1	12	IHM113	1008899.366	432131.2844	3822
7	1	12	IHM114	1008642.509	432082.2196	3813
7	1	12	IHM115	1008112.989	432227.1553	3830
7	1	12	IHM116	1008617.552	432133.7881	3813
7	1	12	IHM118	1008153.605	432087.4565	3823
7	1	12	IHM119	1007442.466	431407.6225	3783
7	1	12	IHM12	1008671.734	432017.2795	3814
7	1	12	IHM12	1008490.553	431978.9459	3835
7	1	12	IHM120	1007410.899	431501.995	3782
7	1	12	IHM121	1007563.22	431728.4999	3795
7	1	12	IHM122	1008072.553	432128.174	3823
7	1	12	IHM123	1008112.03	432227.1941	3830
7	1	12	IHM124	1008149.949	432484.819	3844
7	1	12	IHM125	1008134.272	432366.1169	3838
7	1	12	IHM126	1008002.402	432038.9804	3812
7	1	12	IHM127	1007974.239	431855.3681	3807
7	1	12	IHM128	1007909.56	431842.6594	3805
7	1	12	IHM129	1007811.098	431909.3842	3805
7	1	12	IHM13	1008639.52	432052.0177	3814
7	1	12	IHM130	1007928.555	431952.2508	3812
7	1	12	IHM131	1008406.642	432373.7693	3841
7	1	12	IHM132	1008727.847	432320.755	3830
7	1	12	IHM133	1008888.01	431771.3889	3803
7	1	12	IHM134	1008809.792	431762.5745	3803
7	1	12	IHM135	1007245.326	431728.0533	3788
7	1	12	IHM136	1007344.273	431586.8702	3787
7	1	12	IHM137	1009449.771	432630.0862	3812

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHM138	1009189.827	431690.5408	3780
7	1	12	IHM139	1009169.111	432255.9868	3812
7	1	12	IHM14	1008758.318	432049.4788	3806
7	1	12	IHM140	1007132.083	431489.2863	3775
7	1	12	IHM141	1009233.167	432458.2266	3786
7	1	12	IHM142	1009317.114	432424.523	3776
7	1	12	IHM143	1009333.284	432525.9248	3791
7	1	12	IHM144	1009561.633	432662.6077	3811
7	1	12	IHM146	1007532.994	432763.2784	3824
7	1	12	IHM15	1008644.002	432012.3338	3814
7	1	12	IHM16	1009159.013	431667.9859	3783
7	1	12	IHM17	1009181.362	431693.839	3792
7	1	12	IHM17	1008937.882	432103.5475	3820
7	1	12	IHM18	1009229.965	431644.1755	3784
7	1	12	IHM19	1009157.949	431592.8553	3783
7	1	12	IHM2	1008800.66	432089.958	3810
7	1	12	IHM20	1009011.199	431578.4941	3801
7	1	12	IHM21	1008965.742	431792.4365	3789
7	1	12	IHM22	1008874.635	431856.3772	3793
7	1	12	IHM23	1008816.697	431927.6709	3809
7	1	12	IHM24	1008891.597	431546.1607	3802
7	1	12	IHM25	1008835.207	432095.1128	3822
7	1	12	IHM26	1008822.451	432130.9872	3822
7	1	12	IHM27	1008819.862	432160.2731	3822
7	1	12	IHM28	1008849.001	432152.6668	3822
7	1	12	IHM29	1008857.867	432116.4493	3822
7	1	12	IHM3	1008768.803	432148.0142	3810
7	1	12	IHM30	1008874.241	432141.2149	3822
7	1	12	IHM31	1009019.647	432266.3658	3831
7	1	12	IHM32	1009155.798	432054.9781	3826
7	1	12	IHM33	1008648.255	432698.9834	3839
7	1	12	IHM34	1009358.905	431940.3727	3786
7	1	12	IHM35	1008395.167	432757.6864	3841
7	1	12	IHM36	1008599.984	432701.1084	3839
7	1	12	IHM37	1008551.633	432702.6424	3838
7	1	12	IHM38	1008907.305	432111.947	3822
7	1	12	IHM39	1008904.736	432138.0575	3822
7	1	12	IHM4	1008793.126	432149.4541	3810
7	1	12	IHM40	1008912.292	432164.556	3822
7	1	12	IHM41	1008958.863	432159.8569	3820
7	1	12	IHM42	1009074.838	432153.2098	3826
7	1	12	IHM43	1009064.077	432185.0002	3812
7	1	12	IHM44	1008881.668	432170.5647	3822

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface Elevation
				East (ft)	North (ft)	
7	1	12	IHM45	1008911.073	432195.929	3825
7	1	12	IHM45	1009711.842	432660.2054	3823
7	1	12	IHM47	1009214.169	432127.0708	3784
7	1	12	IHM48	1009206.855	432168.5581	3784
7	1	12	IHM49	1009188.601	432208.0017	3783
7	1	12	IHM5	1008770.553	432175.1072	3810
7	1	12	IHM50	1009175.482	432233.5538	3812
7	1	12	IHM51	1009166.952	432254.5729	3812
7	1	12	IHM52	1009183.908	432221.5311	3783
7	1	12	IHM53	1009308.325	432219.8908	3783
7	1	12	IHM54	1009315.94	432162.6277	3773
7	1	12	IHM55	1009319.626	431786.8007	3782
7	1	12	IHM56	1008906.815	432436.51	3835
7	1	12	IHM57	1009644.122	431675.0067	3769
7	1	12	IHM58	1009309.482	432246.1634	3772
7	1	12	IHM59	1009276.37	432192.4403	3783
7	1	12	IHM6	1008736.548	432171.2598	3810
7	1	12	IHM60	1009312.674	432187.7344	3772
7	1	12	IHM61	1009312.238	432279.7056	3772
7	1	12	IHM62	1009359.024	432246.4578	3772
7	1	12	IHM63	1009366.216	432275.348	3772
7	1	12	IHM64	1009364.408	432302.5068	3772
7	1	12	IHM65	1009497.384	432292.2632	3774
7	1	12	IHM66	1009280.541	432156.9601	3784
7	1	12	IHM68	1009273.781	432222.6802	3783
7	1	12	IHM69	1009079.631	432214.5216	3812
7	1	12	IHM7	1008705.717	432171.9443	3810
7	1	12	IHM70	1008918.166	432404.1172	3834
7	1	12	IHM71	1009030.216	432333.3396	3835
7	1	12	IHM72	1008605.385	431982.3849	3814
7	1	12	IHM73	1008592.467	432016.5144	3814
7	1	12	IHM74	1008597.78	432046.1218	3814
7	1	12	IHM75	1008665.882	431918.2282	3818
7	1	12	IHM76	1008456.803	431984.4712	3835
7	1	12	IHM77	1008449.56	432012.9445	3835
7	1	12	IHM78	1008487.573	431935.9358	3835
7	1	12	IHM79	1008467.361	431958.5065	3835
7	1	12	IHM8	1008703.163	432053.3992	3810
7	1	12	IHM80	1008341.264	431977.4013	3822
7	1	12	IHM81	1008581.505	432730.6776	3839
7	1	12	IHM82	1007034.616	429785.3662	3741
7	1	12	IHM83	1007078.21	429889.0676	3743
7	1	12	IHM84	1007137.918	429948.6706	3752

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHM84b	1007158.148	429930.0713	3752
7	1	12	IHM85	1007173.789	429838.3612	3743
7	1	12	IHM86	1007272.18	429917.0599	3753
7	1	12	IHM87	1007296.555	430023.5405	3752
7	1	12	IHM88	1007354.432	430132.8882	3754
7	1	12	IHM89	1007373.602	430184.3603	3760
7	1	12	IHM9	1008674.897	432048.3032	3814
7	1	12	IHM90	1007107.994	429811.6647	3743
7	1	12	IHM91	1007020.098	429733.1428	3741
7	1	12	IHM92	1006989.664	429088.131	3772
7	1	12	IHM93	1007074.865	429083.9019	3772
7	1	12	IHM94	1007150.837	429081.3442	3772
7	1	12	IHM95	1007163.765	429159.0131	3772
7	1	12	IHM96	1007133.882	429229.6095	3760
7	1	12	IHM97	1007084.757	429158.6754	3772
7	1	12	IHM98	1007073.348	429238.6737	3760
7	1	12	IHM99	1007102.991	429313.0234	3757
7	1	12	IHR1	1009036.565	432154.3048	3820
7	1	12	IHR10	1008738.36	432437.9772	3833
7	1	12	IHR100	1008803.044	432085.8425	3810
7	1	12	IHR101	1009080.497	432151.9644	3826
7	1	12	IHR102	1008764.59	432237.0106	3819
7	1	12	IHR103	1008494.46	432338.4078	3832
7	1	12	IHR104	1008343.708	432438.869	3840
7	1	12	IHR105	1008830.644	431968.1574	3809
7	1	12	IHR106	1009144.685	432063.6066	3826
7	1	12	IHR107	1009042.649	432218.2229	3831
7	1	12	IHR108	1008152.712	432271.2747	3830
7	1	12	IHR109	1009492.859	432689.7548	3804
7	1	12	IHR11	1008649.818	432409.188	3832
7	1	12	IHR110	1009432.679	432717.3987	3793
7	1	12	IHR111	1008246.268	432050.5384	3821
7	1	12	IHR112	1009436.901	432778.3113	3804
7	1	12	IHR113	1009523.05	432786.6797	3804
7	1	12	IHR114	1009341.689	432929.3675	3791
7	1	12	IHR115	1008206.832	432098.0951	3830
7	1	12	IHR116	1009288.768	432915.7296	3794
7	1	12	IHR117	1009442.761	432982.1863	3799
7	1	12	IHR12	1008551.283	432407.4198	3832
7	1	12	IHR13	1008457.094	432402.3636	3832
7	1	12	IHR14	1008535.008	432303.6452	3829
7	1	12	IHR15	1008968.9	432026.3995	3802
7	1	12	IHR16	1009021.932	431943.3722	3802

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface Elevation
				East (ft)	North (ft)	
7	1	12	IHR17	1009085.171	431858.5871	3814
7	1	12	IHR18	1009137.309	431771.2485	3792
7	1	12	IHR19	1009267.202	431933.527	3790
7	1	12	IHR2	1008985.143	432193.9487	3831
7	1	12	IHR 20	1009367.104	431857.2173	3783
7	1	12	IHR21	1009410.411	431671.3574	3772
7	1	12	IHR22	1009013.966	432192.9076	3831
7	1	12	IHR24	1009502.542	431921.2309	3774
7	1	12	IHR 25	1009499.538	431811.8555	3774
7	1	12	IHR26	1010093.068	431725.6516	3808
7	1	12	IHR27	1010081.559	431842.6857	3810
7	1	12	IHR28	1010047.102	431992.3315	3823
7	1	12	IHR29	1009804.334	431895.7033	3795
7	1	12	IHR3	1008961.851	432213.2505	3831
7	1	12	IHR30	1009770.385	431753.3602	3770
7	1	12	IHR31	1010401.107	431840.5162	3825
7	1	12	IHR32	1010348.452	431697.6007	3819
7	1	12	IHR33	1010309.196	431621.5132	3788
7	1	12	IHR34	1010561.144	431688.667	3821
7	1	12	IHR35	1010506.662	431474.1547	3796
7	1	12	IHR36	1010307.586	431467.0242	3796
7	1	12	IHR37	1010073.045	431544.3059	3787
7	1	12	IHR37	1008886.18	432483.4937	3835
7	1	12	IHR38	1009876.123	431531.4898	3788
7	1	12	IHR39	1008571.802	432534.4489	3842
7	1	12	IHR4	1009026.607	432115.3616	3820
7	1	12	IHR40	1008581.5	432504.1403	3842
7	1	12	IHR41	1008608.556	432521.108	3842
7	1	12	IHR42	1008552.15	432535.1815	3841
7	1	12	IHR43	1008608.049	432493.7614	3842
7	1	12	IHR45	1008615.417	432562.6631	3841
7	1	12	IHR46	1009005.559	432172.4175	3820
7	1	12	IHR46	1008552.825	432565.0078	3843
7	1	12	IHR47	1008590.996	432547.0901	3842
7	1	12	IHR48	1008520.039	432542.1417	3841
7	1	12	IHR49	1008377.077	432589.5239	3854
7	1	12	IHR5	1008938.752	432229.886	3831
7	1	12	IHR50	1008704.652	432496.8902	3833
7	1	12	IHR51	1008757.272	432492.9002	3833
7	1	12	IHR52	1008691.748	432564.9075	3841
7	1	12	IHR53	1008746.027	431787.6111	3811
7	1	12	IHR54	1008824.205	431659.4975	3807
7	1	12	IHR55	1009024.459	432238.6632	3831

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHR56	1009072.111	432237.3452	3812
7	1	12	IHR57	1009049.779	432292.5295	3831
7	1	12	IHR58	1009040.527	432311.4197	3835
7	1	12	IHR59	1008973.543	432248.4486	3831
7	1	12	IHR6	1008837.512	432451.6057	3835
7	1	12	IHR60	1008948.654	432273.4918	3831
7	1	12	IHR61	1009104.727	432184.9663	3812
7	1	12	IHR62	1009096.112	432289.4664	3812
7	1	12	IHR63	1009128.676	432257.6697	3812
7	1	12	IHR64	1009140.823	432230.6555	3812
7	1	12	IHR65	1009157.635	432194.445	3812
7	1	12	IHR66	1009169.618	432165.7641	3826
7	1	12	IHR67	1009179.67	432139.5072	3826
7	1	12	IHR68	1009052.563	432216.4769	3831
7	1	12	IHR69	1009059.398	432265.7115	3812
7	1	12	IHR7	1008721.737	432571.4351	3841
7	1	12	IHR71	1009248.047	431663.6174	3784
7	1	12	IHR72	1009272.405	432083.4605	3784
7	1	12	IHR73	1008920.612	432474.125	3835
7	1	12	IHR74	1008962.33	432434.3264	3830
7	1	12	IHR75	1008949.301	431715.9419	3789
7	1	12	IHR76	1008955.349	432374.7609	3835
7	1	12	IHR77	1008850.148	432407.307	3834
7	1	12	IHR78	1008806.345	432469.3495	3833
7	1	12	IHR79	1008747.805	432533.8805	3833
7	1	12	IHR8	1008448.589	432780.3275	3838
7	1	12	IHR80	1008754.728	432867.7768	3836
7	1	12	IHR81	1008939.291	431814.728	3813
7	1	12	IHR82	1008892.095	432367.718	3834
7	1	12	IHR83	1008946.569	432132.0332	3820
7	1	12	IHR84	1008991.984	432138.9689	3820
7	1	12	IHR85	1008943.377	432186.3493	3831
7	1	12	IHR86	1008814.33	432426.7559	3834
7	1	12	IHR88	1008973.421	432406.8546	3835
7	1	12	IHR89	1008677.041	432551.8658	3842
7	1	12	IHR9	1008486.823	432796.6396	3838
7	1	12	IHR90	1008637.369	432550.1243	3842
7	1	12	IHR91	1008850.034	432364.916	3834
7	1	12	IHR92	1008496.981	431902.1985	3830
7	1	12	IHR93	1008465.028	431879.8304	3830
7	1	12	IHR94	1008386.342	431923.2202	3830
7	1	12	IHR95	1008373.868	431983.573	3822
7	1	12	IHR96	1008587.729	432045.3712	3814

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHR97	1008557.427	432137.5969	3813
7	1	12	IHR98	1008580.739	432018.8342	3814
7	1	12	IHR99	1008648.822	431978.5945	3814
7	1	12	IHS10	1008284.604	433029.7635	3842
7	1	12	IHS13	1006975.109	429079.2743	3772
7	1	12	IHS16	1008157.58	432427.8681	3838
7	1	12	IHS17	1008037.665	432433.3922	3842
7	1	12	IHS18	1007168.98	431663.0684	3781
7	1	12	IHS19	1007192.843	431756.3084	3788
7	1	12	IHS2	1008506.613	432819.2809	3834
7	1	12	IHS20	1007175.274	431866.957	3794
7	1	12	IHS21	1007128.334	431322.3264	3772
7	1	12	IHS22	1007184.73	431403.8976	3774
7	1	12	IHS23	1007237.749	431354.681	3774
7	1	12	IHS24	1007299.338	431318.6136	3774
7	1	12	IHS25	1007116.961	431430.3785	3775
7	1	12	IHS26	1007092.226	430905.4764	3764
7	1	12	IHS27	1007166.716	430975.6502	3764
7	1	12	IHS28	1007234.114	431012.3008	3767
7	1	12	IHS29	1007252.961	431167.4684	3770
7	1	12	IHS3	1008320.205	432947.7855	3836
7	1	12	IHS30	1007396.101	431345.4906	3779
7	1	12	IHS31	1007396.091	431443.3559	3782
7	1	12	IHS32	1007458.626	431528.7917	3786
7	1	12	IHS33	1007523.328	431373.731	3783
7	1	12	IHS34	1010911.568	431200.8497	3829
7	1	12	IHS35	1007104.817	430205.1968	3755
7	1	12	IHS36	1007184.686	431948.4587	3793
7	1	12	IHS37	1007278.782	431981.2142	3793
7	1	12	IHS38	1007361.359	432032.9829	3796
7	1	12	IHS39	1007151.358	430143.6378	3754
7	1	12	IHS4	1008358.363	432964.3509	3836
7	1	12	IHS40	1007018.81	429246.2755	3773
7	1	12	IHS41	1007222.372	429902.7798	3753
7	1	12	IHS42	1007097.431	430141.1906	3754
7	1	12	IHS43	1010541.773	431342.3883	3800
7	1	12	IHS44	1010325.859	431207.3916	3795
7	1	12	IHS45	1010486.169	431674.5764	3806
7	1	12	IHS46	1010504.629	431783.1417	3821
7	1	12	IHS47	1010479.858	431906.3422	3830
7	1	12	IHS48	1010406.587	431809.6277	3825
7	1	12	IHS49	1010857.197	431955.7714	3848
7	1	12	IHS5	1008260.561	432938.204	3842

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHS50	1010815.621	432029.9374	3841
7	1	12	IHS51	1010726.044	432096.5373	3834
7	1	12	IHS52	1010598.024	431679.9343	3831
7	1	12	IHS53	1010685.6	431822.1251	3835
7	1	12	IHS54	1010766.343	431995.2435	3841
7	1	12	IHS55	1010797.315	431863.9886	3840
7	1	12	IHS56	1010612.784	432014.358	3839
7	1	12	IHS57	1010379.503	431721.6473	3819
7	1	12	IHS58	1010317.976	431817.3726	3825
7	1	12	IHS59	1010148.751	431908.0566	3810
7	1	12	IHS6	1008387.033	432961.0955	3836
7	1	12	IHS60	1010565.036	432303.5355	3821
7	1	12	IHS61	1010291.635	431915.9749	3822
7	1	12	IHS62	1010949.854	432076.6448	3848
7	1	12	IHS63	1010145	431780.7087	3808
7	1	12	IHS64	1009809.341	431967.9846	3802
7	1	12	IHS65	1010007.305	432012.8798	3823
7	1	12	IHS66	1009664.759	432166.4364	3794
7	1	12	IHS67	1009786.995	432187.9666	3789
7	1	12	IHS68	1009748.533	432230.511	3789
7	1	12	IHS69	1009850.182	432202.9877	3794
7	1	12	IHS7	1008085.241	432947.643	3843
7	1	12	IHS70	1009923.878	432225.9658	3794
7	1	12	IHS71	1009814.322	432267.8209	3794
7	1	12	IHS72	1009846.6	432075.6642	3811
7	1	12	IHS73	1009917.993	432326.524	3793
7	1	12	IHS74	1009858.504	432432.7384	3805
7	1	12	IHS75	1009938.016	431953.5832	3823
7	1	12	IHS76	1010230.281	431776.9612	3817
7	1	12	IHS77	1009938.338	432112.1902	3815
7	1	12	IHS78	1009960.282	432518.854	3809
7	1	12	IHS79	1010052.489	432461.6714	3809
7	1	12	IHS8	1007895.475	432991.4611	3832
7	1	12	IHS80-A	1010061.117	432340.9381	3813
7	1	12	IHS81	1010444.108	431736.5484	3821
7	1	12	IHS82	1010338.499	431457.7511	3792
7	1	12	IHS83	1010302.005	431341.7052	3794
7	1	12	IHS84	1010573.62	431411.019	3803
7	1	12	IHS85	1009716.361	431429.2513	3799
7	1	12	IHS86	1010120.712	431425.5118	3787
7	1	12	IHS87	1010217.146	432403.575	3814
7	1	12	IHS88	1010162.46	432644.7888	3831
7	1	12	IHS89	1010019.038	431862.261	3815

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHS9	1008343.345	433005.1804	3836
7	1	12	IHS90	1010051.998	432592.303	3821
7	1	12	IHS91	1010125.643	432524.3146	3819
7	1	12	IHS92	1009906.872	432726.8002	3835
7	1	12	IHS93	1009783.441	432753.0936	3823
7	1	12	IHS94	1009845.448	432866.4808	3831
7	1	12	IHS95	1010000.531	432814.9333	3836
7	1	12	IHT1	1007572.607	431683.3161	3795
7	1	12	IHT10	1008235.704	432377.6671	3847
7	1	12	IHT100	1008717.009	431779.7149	3811
7	1	12	IHT101	1008618.397	431958.4791	3814
7	1	12	IHT102	1010107.635	432427.8351	3803
7	1	12	IHT103	1008668.128	432029.0916	3814
7	1	12	IHT104	1008745.7	432066.8631	3810
7	1	12	IHT105	1008863.489	432074.53	3822
7	1	12	IHT106	1008805.445	432195.0576	3819
7	1	12	IHT107	1008966.943	432290.0635	3831
7	1	12	IHT108	1008837.287	432345.7743	3834
7	1	12	IHT109	1008742.524	432405.7344	3830
7	1	12	IHT11	1009121.152	431604.5403	3783
7	1	12	IHT110	1008606.892	432408.7198	3832
7	1	12	IHT111	1010567.738	431405.8773	3803
7	1	12	IHT112	1008692.43	432311.4757	3830
7	1	12	IHT113	1008885.313	431691.1168	3803
7	1	12	IHT114	1009947.367	431770.3923	3786
7	1	12	IHT115	1008628.343	432486.3253	3842
7	1	12	IHT116	1010495.659	431612.9056	3806
7	1	12	IHT118	1010359.084	431426.0637	3792
7	1	12	IHT119	1010073.332	431282.805	3795
7	1	12	IHT12	1008295.967	432438.2046	3852
7	1	12	IHT121	1008322.107	432556.0924	3854
7	1	12	IHT122	1008237.667	432509.0281	3852
7	1	12	IHT123	1008065.478	432456.1467	3844
7	1	12	IHT124	1007969.368	432497.3484	3842
7	1	12	IHT126	1007944.951	432388.9302	3831
7	1	12	IHT129	1009885.879	432199.2759	3794
7	1	12	IHT13	1009058.364	431819.2934	3814
7	1	12	IHT131	1009892.366	431943.1227	3812
7	1	12	IHT132	1010037.871	432898.9175	3836
7	1	12	IHT133	1009972.219	432701.512	3837
7	1	12	IHT134	1010112.928	432368.7738	3803
7	1	12	IHT135	1010001.844	432320.6606	3813
7	1	12	IHT136	1010165.588	432477.0501	3819

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHT137	1009919.49	432440.9207	3805
7	1	12	IHT138	1009951.538	431858.4396	3815
7	1	12	IHT139	1009895.274	432136.7176	3811
7	1	12	IHT14	1008480.342	432393.6195	3832
7	1	12	IHT14	1007855.896	431829.8334	3805
7	1	12	IHT141	1009841.36	432349.9231	3793
7	1	12	IHT142	1009712.921	432436.189	3801
7	1	12	IHT143	1009734.339	432397.7121	3801
7	1	12	IHT144	1009653.262	432471.6622	3808
7	1	12	IHT145	1010522.643	431445.6249	3796
7	1	12	IHT146	1007019.358	429139.5997	3772
7	1	12	IHT147	1007294.415	429957.3361	3752
7	1	12	IHT148	1007055.688	429850.5742	3743
7	1	12	IHT149	1007026.251	429341.9002	3759
7	1	12	IHT15	1008916.097	431896.3447	3793
7	1	12	IHT150	1007048.079	429195.721	3773
7	1	12	IHT151	1007042.678	429438.4125	3751
7	1	12	IHT152	1010401.135	431405.9716	3797
7	1	12	IHT-153	1010248.509	431224.9867	3792
7	1	12	IHT154	1009904.607	432168.1328	3811
7	1	12	IHT155	1007228.239	431970.5764	3793
7	1	12	IHT156	1007342.856	431925.8423	3796
7	1	12	IHT157	1007331.397	431870.7897	3796
7	1	12	IHT158	1007276.727	431858.6769	3794
7	1	12	IHT159	1007811.537	431963.7411	3810
7	1	12	IHT16	1008448.614	432342.0142	3832
7	1	12	IHT160	1007316.002	431816.4124	3796
7	1	12	IHT161	1007389.799	431862.8909	3796
7	1	12	IHT162	1007376.39	431808.9336	3796
7	1	12	IHT163	1007323.037	431759.3293	3792
7	1	12	IHT164	1007381.585	431747.64	3792
7	1	12	IHT165	1007356.355	431694.0985	3792
7	1	12	IHT166	1008446.119	432615.9117	3843
7	1	12	IHT167	1007410.181	431688.9495	3792
7	1	12	IHT168	1007814.104	432435.4312	3839
7	1	12	IHT169	1007824.921	432329.5284	3831
7	1	12	IHT17	1009224.236	431486.0219	3796
7	1	12	IHT17	1008768.099	431935.3921	3806
7	1	12	IHT170	1007441.486	431752.2224	3793
7	1	12	IHT171	1008369.127	432625.2665	3854
7	1	12	IHT172	1007455.141	431864.7979	3798
7	1	12	IHT173	1008516.9	432577.158	3843
7	1	12	IHT174	1007785.76	432271.6245	3823

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHT175	1007437.693	431810.2066	3798
7	1	12	IHT176	1007774.196	432387.5036	3831
7	1	12	IHT177	1007727.147	432413.5058	3831
7	1	12	IHT179	1007691.944	432053.0269	3820
7	1	12	IHT18	1008334.75	432351.1874	3841
7	1	12	IHT180	1007636.131	432096.2419	3804
7	1	12	IHT181	1007514.029	432092.5653	3799
7	1	12	IHT182	1007592.794	432176.4061	3804
7	1	12	IHT183	1007453.651	432097.1037	3799
7	1	12	IHT184	1007503.774	432151.0142	3799
7	1	12	IHT185	1007652.533	432171.3931	3804
7	1	12	IHT186	1007707.923	432136.2021	3820
7	1	12	IHT187	1007616.491	432236.1555	3808
7	1	12	IHT188	1007414.207	432065.5149	3795
7	1	12	IHT189	1007522.669	431937.5523	3798
7	1	12	IHT19	1008857.439	431789.9531	3803
7	1	12	IHT190	1007559.525	432064.3739	3804
7	1	12	IHT191	1007658.475	432227.5447	3808
7	1	12	IHT192	1007452.488	432173.9821	3799
7	1	12	IHT193	1007735.577	432304.4468	3831
7	1	12	IHT194	1007476.912	432223.6622	3801
7	1	12	IHT195	1007403.452	429980.3542	3754
7	1	12	IHT197	1007540.154	432484.1722	3817
7	1	12	IHT198	1007825.714	432589.3905	3840
7	1	12	IHT199	1007116.345	431280.2594	3771
7	1	12	IHT2	1007636.91	431760.4702	3795
7	1	12	IHT20	1008381.951	432253.7742	3844
7	1	12	IHT20	1008412.704	432464.7739	3840
7	1	12	IHT200	1007048.968	430128.2637	3753
7	1	12	IHT201	1007196.998	432427.2298	3796
7	1	12	IHT202	1007868.041	432689.5776	3834
7	1	12	IHT203	1007159.013	432524.8957	3792
7	1	12	IHT204	1007815.826	432789.9773	3834
7	1	12	IHT205	1007483.869	432457.3152	3817
7	1	12	IHT206	1007455.557	432392.4354	3811
7	1	12	IHT207	1007216.421	432719.0691	3803
7	1	12	IHT208	1007540.145	432395.2528	3811
7	1	12	IHT209	1007797.01	432889.9953	3827
7	1	12	IHT21	1008938.678	431692.1792	3789
7	1	12	IHT210	1007212.606	432604.7194	3803
7	1	12	IHT211	1007483.703	432341.2226	3811
7	1	12	IHT212	1007442.31	432306.3974	3811
7	1	12	IHT213	1007294.653	432655.3522	3803

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHT214	1007898.077	432938.7953	3832
7	1	12	IHT215	1007262.499	432324.1657	3796
7	1	12	IHT216	1007327.829	432718.0021	3811
7	1	12	IHT217	1007727.537	432820.119	3827
7	1	12	IHT218	1007253.687	432766.4313	3803
7	1	12	IHT22	1008827.615	431689.0255	3803
7	1	12	IHT23	1008432.299	432162.5515	3829
7	1	12	IHT24	1008721.232	431838.5945	3808
7	1	12	IHT25	1008477.143	432033.7536	3835
7	1	12	IHT25	1007961.623	432613.0573	3850
7	1	12	IHT26	1009333.693	431625.7635	3772
7	1	12	IHT27	1008291.844	432104.3983	3830
7	1	12	IHT27	1007927.259	432293.2042	3828
7	1	12	IHT28	1010250.127	431264.9555	3792
7	1	12	IHT28	1007995.816	431986.139	3812
7	1	12	IHT29	1008050.503	432106.0621	3811
7	1	12	IHT30	1007544.187	431575.4509	3790
7	1	12	IHT30	1009961.343	432861.4791	3836
7	1	12	IHT31	1007407.553	431381.7461	3779
7	1	12	IHT32	1008139.424	432201.2207	3830
7	1	12	IHT32	1007939.469	432022.7919	3812
7	1	12	IHT33	1007631.6	431682.3525	3795
7	1	12	IHT34	1007493.434	431496.779	3786
7	1	12	IHT35	1007238.583	431119.3054	3770
7	1	12	IHT36	1007693.23	431640.6536	3793
7	1	12	IHT37	1009791.911	431403.3626	3808
7	1	12	IHT37	1009700.858	431344.6494	3808
7	1	12	IHT38	1007551.553	431502.0279	3789
7	1	12	IHT40	1009910.289	431290.8872	3799
7	1	12	IHT40	1009809.161	432410.6204	3801
7	1	12	IHT41	1010000.629	431317.211	3797
7	1	12	IHT42	1010009.827	431431.7965	3782
7	1	12	IHT43	1010185.781	431304.5436	3793
7	1	12	IHT44	1010281.331	431213.6658	3792
7	1	12	IHT45	1010416.837	431222.6645	3795
7	1	12	IHT46	1010524.11	431091.2938	3791
7	1	12	IHT47	1010517.851	431283.3986	3798
7	1	12	IHT48	1010438.503	431331.1783	3797
7	1	12	IHT49	1010507.584	431454.1472	3796
7	1	12	IHT5	1007986.657	432091.7245	3811
7	1	12	IHT50	1010370.958	431297.9898	3795
7	1	12	IHT51	1010556.219	431609.2513	3806
7	1	12	IHT52	1010660.347	431666.7474	3825

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHT53	1010761.261	431630.9342	3828
7	1	12	IHT54	1010568.55	431720.1602	3831
7	1	12	IHT55	1010450.525	431489.1243	3796
7	1	12	IHT56	1010680.717	431773.2494	3831
7	1	12	IHT57	1010337.032	431249.304	3795
7	1	12	IHT58	1010747.293	431847.2777	3840
7	1	12	IHT59	1010205.443	431260.0701	3792
7	1	12	IHT6	1008068.865	432167.4035	3823
7	1	12	IHT60	1010856.618	431893.6635	3842
7	1	12	IHT61	1010627.653	431849.6317	3835
7	1	12	IHT62	1010580.669	431927.2693	3835
7	1	12	IHT63	1010698.425	431935.5005	3841
7	1	12	IHT64	1010462.468	431578.6243	3806
7	1	12	IHT65	1010427.696	431422.0054	3797
7	1	12	IHT66	1010236.274	431192.4378	3792
7	1	12	IHT67	1010375.795	431365.1955	3797
7	1	12	IHT68	1010120.696	431278.1207	3795
7	1	12	IHT69	1009901.444	431454.6192	3788
7	1	12	IHT7	1009472.421	431480.672	3761
7	1	12	IHT70	1008910.389	431555.7842	3807
7	1	12	IHT70	1009668.731	431561.3209	3769
7	1	12	IHT71	1009568.084	431376.9506	3802
7	1	12	IHT72	1010290.533	431290.3594	3792
7	1	12	IHT73	1010513.422	431391.8266	3800
7	1	12	IHT74	1010419.555	431625.2583	3802
7	1	12	IHT75	1007369.955	431327.2507	3779
7	1	12	IHT76	1007430.16	431456.0833	3786
7	1	12	IHT77	1007589.863	431626.3355	3792
7	1	12	IHT78	1007306.105	431260.1963	3772
7	1	12	IHT78	1007605.186	432003.867	3804
7	1	12	IHT79	1007679.749	431755.6562	3801
7	1	12	IHT8	1008117.982	432258.4646	3830
7	1	12	IHT80	1007212.003	431162.2916	3770
7	1	12	IHT81	1007300.513	431135.6753	3773
7	1	12	IHT82	1008102.58	432047.2191	3822
7	1	12	IHT83	1007736.652	431853.205	3804
7	1	12	IHT84	1007928.427	431885.2613	3807
7	1	12	IHT85	1007505.721	431581.6049	3790
7	1	12	IHT86	1007601.712	431578.3936	3792
7	1	12	IHT87	1009871.265	431869.1625	3807
7	1	12	IHT88	1009370.568	431478.5845	3770
7	1	12	IHT89	1007683.357	431638.8636	3793
7	1	12	IHT9	1009239.559	431536.6801	3796

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	12	IHT90	1009388.425	431510.8746	3770
7	1	12	IHT91	1007440.999	431587.2886	3790
7	1	12	IHT92	1009124.342	431669.6233	3783
7	1	12	IHT93	1009244.324	431650.9289	3784
7	1	12	IHT94	1009307.872	431685.5146	3780
7	1	12	IHT95	1010008.61	432554.7279	3809
7	1	12	IHT96	1008743.449	431882.4683	3808
7	1	12	IHT196	1007796.75	432545.9304	3834
7	1	12	IHT97	1009946.187	432774.3141	3837
7	1	12	IHT98	1008787.303	431805.9739	3808
7	1	12	IHT99	1009986.649	432924.7289	3836
7	1	12	IHW1	1007004.964	429459.1423	3751
7	1	12	IHW10	1007348.274	431376.9508	3779
7	1	12	IHW11	1007518.212	431632.4403	3790
7	1	12	IHW12	1007625.883	431809.364	3801
7	1	12	IHW13	1007704.707	431810.8351	3804
7	1	12	IHW14	1007756.381	431898.4149	3804
7	1	12	IHW15	1007847.078	431906.521	3805
7	1	12	IHW16	1007955.014	431917.7142	3807
7	1	12	IHW17	1008115.404	432258.5689	3830
7	1	12	IHW18	1008152.449	432116.7001	3823
7	1	12	IHW19	1007803.505	431860.6651	3805
7	1	12	IHW2	1006992.668	429396.7422	3759
7	1	12	IHW3	1007000.928	429301.8897	3759
7	1	12	IHW4	1007138.353	429880.2695	3743
7	1	12	IHW5	1007117.482	431007.2769	3764
7	1	12	IHW6	1007181.702	431078.3979	3770
7	1	12	IHW7	1007288.085	431216.5593	3773
7	1	12	IHW8	1007355.081	431277.2936	3772
7	1	12	IHW9	1007467.655	431425.0723	3783
7	1	12	Q+186.4	1008646.205	432836.4964	3834
7	1	14	PM191	1003351.63	426245.5326	3630
7	1	1	C	1008854.196	437700.1224	3924
7	1	1	D	1008841.231	437403.5648	3922
7	1	1	DK158	1009743.216	435097.0054	3882
7	1	1	DK163	1010498.156	435040.7675	3908
7	1	1	DK164	1010523.889	434947.0064	3908
7	1	1	DK165	1010552.425	434851.5525	3901
7	1	1	DK166	1010262.877	435030.6135	3904
7	1	1	DK167	1010651.866	434982.2069	3913
7	1	1	DK168	1010683.031	435042.4674	3913
7	1	1	DK169	1010216.182	434898.5288	3904
7	1	1	DK173	1009757.177	435199.1221	3879

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Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DK175	1010328.062	434868.3084	3901
7	1	1	DK177	1010939.916	435107.7169	3922
7	1	1	DK178	1010937.252	435122.8532	3922
7	1	1	DK179	1010931.844	435133.2839	3922
7	1	1	DK180	1010919.559	435127.1815	3922
7	1	1	DK181	1010882.633	435138.2305	3922
7	1	1	DK182	1010878.656	435117.5455	3922
7	1	1	DK183	1010416.8	434938.1716	3901
7	1	1	DK185	1010845.422	435138.9385	3922
7	1	1	DK186	1010844.26	435052.0518	3911
7	1	1	DK188	1009931.304	434703.1433	3882
7	1	1	DK190	1010020.153	434927.7281	3892
7	1	1	DK193	1009725.554	435235.2751	3879
7	1	1	DK195	1009787.509	435292.6165	3879
7	1	1	DK196	1009789.883	435265.7006	3879
7	1	1	DK33	1007463.968	434546.8125	3810
7	1	1	DK34	1007301.871	434383.3348	3801
7	1	1	DM39	1007998.594	433243.3204	3835
7	1	1	DM40	1008191.233	433210.9586	3837
7	1	1	DP1	1007832.63	438286.9826	3861
7	1	1	DP2	1007386.208	438041.2719	3836
7	1	1	DP28	1009081.632	438208.3631	3888
7	1	1	DP29	1008631.132	438294.7418	3926
7	1	1	DP3	1007787.281	437978.3019	3844
7	1	1	DP30	1008283.584	438130.51	3899
7	1	1	DR285	1009116.519	433169.2531	3837
7	1	1	DR291	1009068.989	433115.1595	3837
7	1	1	DR292	1009014.469	433140.0723	3814
7	1	1	DR293	1009033.802	433123.3233	3814
7	1	1	DR294	1008992.148	433158.5842	3814
7	1	1	DR295	1008975.063	433175.9146	3814
7	1	1	DR302	1008896.35	433093.3384	3820
7	1	1	DR303	1008885.513	433182.9625	3813
7	1	1	DR307	1008924.301	433192.9187	3813
7	1	1	DR308	1008947.021	433152.669	3814
7	1	1	DR309	1008973.915	433103.227	3814
7	1	1	DR310	1009011.289	433048.779	3800
7	1	1	DR311	1008882.496	433197.425	3813
7	1	1	DR312	1008765.26	433102.411	3828
7	1	1	DR313	1008730.001	433081.8031	3828
7	1	1	DR314	1008806.247	433196.96	3835
7	1	1	DR315	1008861.256	433180.0969	3820
7	1	1	DR316	1008890.701	433140.4196	3820

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DR317	1008833.572	433084.8377	3820
7	1	1	DR318	1008802.899	433086.063	3828
7	1	1	DR44	1009834.899	434956.1474	3896
7	1	1	DR45	1009788.822	434999.3752	3886
7	1	1	DR46	1009776.437	435038.6125	3886
7	1	1	DR47	1009857.077	435006.2938	3896
7	1	1	DR476	1009770.838	436751.6631	3922
7	1	1	DR477	1009757.777	436823.5807	3922
7	1	1	DR478	1009760.487	436896.3772	3923
7	1	1	DR48	1009894.224	435046.8268	3896
7	1	1	DR49	1009945.494	435038.8256	3902
7	1	1	DR50	1009885.651	434923.9746	3890
7	1	1	DR506	1009799.292	436617.5075	3926
7	1	1	DR507	1009700.135	436338.3553	3912
7	1	1	DR509	1009760.387	437512.3142	3911
7	1	1	DR51	1009942.676	434945.3595	3902
7	1	1	DR510	1009818.571	437452.5204	3911
7	1	1	DR514	1009773.795	437269.9868	3924
7	1	1	DR516	1009922.334	437453.608	3911
7	1	1	DR517	1010020.535	437597.4801	3892
7	1	1	DR52	1010098.85	434912.0647	3899
7	1	1	DR53	1009699.472	434934.8851	3881
7	1	1	DR54	1009663.215	434969.0518	3878
7	1	1	DR58	1009783.833	434925.6075	3881
7	1	1	DR59	1010208.485	434841.6663	3904
7	1	1	DR60	1010125.049	434676.0695	3901
7	1	1	DR61	1010329.285	434758.8842	3897
7	1	1	DR62	1010309.799	434727.6608	3904
7	1	1	DR63	1009662.665	435267.2666	3875
7	1	1	DR631	1008912.355	433115.8826	3820
7	1	1	DR633	1008916.748	433061.0175	3820
7	1	1	DR65	1009958.025	435245.4488	3886
7	1	1	DR66	1010015.79	435243.2368	3886
7	1	1	DR67	1009697.764	435291.1807	3879
7	1	1	DR68	1010010.058	435297.0771	3886
7	1	1	DR688	1008173.374	433225.9433	3843
7	1	1	DR69	1009721.235	435316.0031	3879
7	1	1	DR70	1009756.241	435225.1666	3879
7	1	1	DR714	1008151.418	433126.1362	3842
7	1	1	DR715	1008208.718	433182.5087	3838
7	1	1	DR717	1008320.868	433094.8689	3832
7	1	1	DR72	1009832.47	435234.859	3881
7	1	1	DR73	1009853.242	435306.4086	3881

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DR735	1008467.117	433211.2282	3833
7	1	1	DR74	1009849.852	435375.8237	3886
7	1	1	DR75	1009906.357	435436.6854	3886
7	1	1	DR76	1009989.354	435457.864	3902
7	1	1	DR77	1010002.991	435437.7017	3889
7	1	1	DR78	1009982.389	435402.395	3889
7	1	1	DR79	1010085.72	435348.9848	3900
7	1	1	DR80	1010003.618	435323.3755	3889
7	1	1	DR81	1010177.441	435354.4692	3900
7	1	1	DR82	1010031.74	435334.1542	3889
7	1	1	DR824	1009381.031	437688.0183	3914
7	1	1	DR825	1009374.941	437711.5503	3904
7	1	1	DR826	1009369.407	437741.7373	3904
7	1	1	DR827	1009355.356	437778.3835	3904
7	1	1	DR828	1009310.804	437778.6378	3904
7	1	1	DR829	1009260.094	437721.3106	3905
7	1	1	DR83	1009984.262	435292.3502	3886
7	1	1	DR830	1009176.379	437750.0474	3912
7	1	1	DR84	1010037.732	435286.3711	3886
7	1	1	DR848	1009780.602	437333.9695	3921
7	1	1	DR851	1009743.921	437404.1373	3921
7	1	1	DR852	1009734.142	437342.0889	3921
7	1	1	DR856	1009762.207	437489.9871	3911
7	1	1	DR857	1009792.132	437496.6894	3911
7	1	1	DR858	1009774.531	437541.1421	3911
7	1	1	DR859	1009786.878	437573.5457	3911
7	1	1	DR860	1009802.877	437643.2711	3901
7	1	1	DR861	1009754.961	437702.7276	3888
7	1	1	DR862	1009743.759	437732.8624	3888
7	1	1	DR863	1009727.258	437753.0311	3888
7	1	1	DR864	1009710.801	437778.3586	3888
7	1	1	DR872	1009729.283	437221.8075	3924
7	1	1	DR873	1009741.462	437169.8801	3926
7	1	1	DR874	1009759.045	437142.521	3926
7	1	1	DR875	1009762.178	437200.3656	3926
7	1	1	DR877	1009781.662	437169.9113	3926
7	1	1	DR878	1009798.396	437113.9214	3926
7	1	1	DR879	1009837.249	437077.6948	3920
7	1	1	DR881	1009784.634	437233.2829	3924
7	1	1	DR882	1009829.518	437141.0771	3920
7	1	1	DR883	1009921.136	437080.9315	3920
7	1	1	DR884	1009955.442	437079.4184	3919
7	1	1	DR885	1010007.959	437064.5328	3921

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DR886	1010061.948	437050.3694	3921
7	1	1	DR887	1010122.578	437034.0608	3920
7	1	1	DR889	1009725.274	437132.4869	3926
7	1	1	DR923	1007349.044	437797.7691	3835
7	1	1	DRA1	1009159.897	434878.258	3861
7	1	1	DRA10	1007525.844	438210.5688	3831
7	1	1	DRA11	1008357.912	437034.7716	3885
7	1	1	DRA12	1008438.084	436973.666	3899
7	1	1	DRA13	1010134.404	433679.7611	3874
7	1	1	DRA14	1010013.837	434007.5715	3851
7	1	1	DRA15	1009904.919	434095.6905	3855
7	1	1	DRA16	1009865.103	434374.1162	3872
7	1	1	DRA17	1010264.108	433561.8546	3875
7	1	1	DRA18	1010315.003	433636.0638	3879
7	1	1	DRA19	1010289.434	433705.5631	3876
7	1	1	DRA2	1009267.074	434859.8158	3846
7	1	1	DRA20	1010299.591	433547.7988	3873
7	1	1	DRA21	1008670.656	435352.7065	3895
7	1	1	DRA22	1010124.917	433395.7455	3865
7	1	1	DRA23	1010079.719	433311.7664	3865
7	1	1	DRA24	1010159.09	433346.4469	3865
7	1	1	DRA25	1010109.684	433260.4643	3849
7	1	1	DRA26	1009918.507	433330.8621	3843
7	1	1	DRA27	1010039.3	433761.1752	3856
7	1	1	DRA28	1010342.388	433580.3153	3879
7	1	1	DRA29	1009431.044	434679.1424	3841
7	1	1	DRA3	1010200.896	433483.5148	3873
7	1	1	DRA30	1009602.796	434531.8078	3860
7	1	1	DRA31	1009641.47	434575.0314	3858
7	1	1	DRA32	1009395.639	434750.9162	3845
7	1	1	DRA45	1007464.775	437827.6633	3844
7	1	1	DRA46	1009146.693	434833.9257	3861
7	1	1	DRA47	1009121.007	434898.3785	3861
7	1	1	DRA6	1010020.133	433195.1066	3849
7	1	1	DRA7	1008174.059	437316.2882	3877
7	1	1	DRA8	1008073.634	437494.0153	3881
7	1	1	DRA9	1007652.303	438123.2572	3819
7	1	1	DRJ106	1007474.378	437640.2711	3842
7	1	1	DRJ107	1007488.853	437571.4396	3847
7	1	1	DRJ108	1007534.751	437177.6225	3810
7	1	1	DRJ109	1008934.525	436068.3392	3884
7	1	1	DRJ11	1007439.127	434952.7419	3792
7	1	1	DRJ110	1007495.176	437753.0424	3844

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRJ111	1007457.048	437601.6417	3842
7	1	1	DRJ112	1007478.443	437482.7533	3847
7	1	1	DRJ113	1007692.846	437235.3748	3862
7	1	1	DRJ114	1007491.433	437029.3718	3841
7	1	1	DRJ115	1007447.167	437941.7069	3842
7	1	1	DRJ117	1007492.568	437047.2162	3841
7	1	1	DRJ12	1007484.178	434952.5769	3792
7	1	1	DRJ15	1007850.307	433226.8789	3831
7	1	1	DRJ182	1009573.068	433073.6219	3822
7	1	1	DRJ183	1009884.799	433013.3595	3833
7	1	1	DRJ184	1009880.377	433065.5672	3841
7	1	1	DRJ185	1009450.966	433036.964	3799
7	1	1	DRJ186	1009463.023	433119.0781	3800
7	1	1	DRJ187	1010018.877	433585.9448	3861
7	1	1	DRJ188	1009896.542	433478.2355	3850
7	1	1	DRJ189	1010149.291	433582.5606	3874
7	1	1	DRJ190	1010096.142	433618.7713	3874
7	1	1	DRJ191	1009969.923	433870.0729	3851
7	1	1	DRJ192	1009910.629	433666.2956	3856
7	1	1	DRJ193	1009779.359	433551.2224	3838
7	1	1	DRJ194	1009685.762	433650.4659	3828
7	1	1	DRJ195	1009675.815	433524.9482	3821
7	1	1	DRJ196	1009983.753	433721.934	3856
7	1	1	DRJ197	1009907.898	433166.2752	3841
7	1	1	DRJ198	1009729.148	433474.0299	3838
7	1	1	DRJ2	1008047.226	433242.0878	3835
7	1	1	DRJ20	1007769.336	433250.9383	3820
7	1	1	DRJ21	1007709.13	433295.7542	3820
7	1	1	DRJ22	1007652.527	433333.5277	3812
7	1	1	DRJ23	1007619.208	433255.7769	3812
7	1	1	DRJ24	1007675.59	433377.0076	3812
7	1	1	DRJ25	1007726.494	433445.1644	3824
7	1	1	DRJ26	1007770.239	433522.3839	3824
7	1	1	DRJ27	1007837.824	433580.7486	3832
7	1	1	DRJ28	1007909.549	433607.8254	3832
7	1	1	DRJ29	1007965.476	433644.3615	3843
7	1	1	DRJ3	1008051.195	433456.8454	3838
7	1	1	DRJ30	1007660.346	433199.5189	3812
7	1	1	DRJ31	1007954.449	433691.8166	3841
7	1	1	DRJ32	1007747.911	433176.913	3821
7	1	1	DRJ33	1007931.006	433751.5834	3841
7	1	1	DRJ34	1007869.645	433768.2949	3825
7	1	1	DRJ35	1007885.961	433847.1639	3828

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRJ36	1007851.956	433885.5698	3828
7	1	1	DRJ37	1007775.196	433140.6071	3821
7	1	1	DRJ4	1007999.433	433243.2865	3835
7	1	1	DRJ49	1009435.554	434791.4311	3883
7	1	1	DRJ50	1009303.527	434686.5065	3839
7	1	1	DRJ51	1009352.049	434829.1358	3856
7	1	1	DRJ52	1009908.105	433271.0596	3841
7	1	1	DRJ53	1009905.768	434142.5087	3855
7	1	1	DRJ54	1009891.832	434227.035	3867
7	1	1	DRJ59	1007920.871	437857.2982	3864
7	1	1	DRJ6	1008393.679	433117.4761	3832
7	1	1	DRM15	1008911.687	435270.5177	3879
7	1	1	DRM16	1008989.001	435460.6174	3865
7	1	1	DRM17	1008841.992	435651.4421	3882
7	1	1	DRM18	1008951.707	435347.2155	3872
7	1	1	DRM19	1008926.65	435470.5057	3880
7	1	1	DRM20	1008989.74	435199.067	3874
7	1	1	DRM21	1008969.609	435543.6129	3865
7	1	1	DRM22	1008953.302	435407.2023	3872
7	1	1	DRM23	1008923.509	435700.4387	3879
7	1	1	DRM24	1008963.136	435274.0972	3874
7	1	1	DRM25	1008952.542	435622.8237	3867
7	1	1	DRM26	1008900.313	435774.9714	3879
7	1	1	DRM27	1008675.301	436724.8795	3905
7	1	1	DRM28	1008939.621	435666.7429	3867
7	1	1	DRM29	1008936.716	435738.2496	3876
7	1	1	DRM30	1008941.112	435804.9727	3876
7	1	1	DRM31	1008936.041	435220.2715	3874
7	1	1	DRM32	1008636.609	436771.5929	3905
7	1	1	DRM33	1008763.035	436550.5902	3904
7	1	1	DRM34	1008495.439	436787.0785	3891
7	1	1	DRM35	1008823.555	436435.8737	3902
7	1	1	DRM36	1009227.787	434820.902	3846
7	1	1	DRM37	1008460.869	436845.6354	3892
7	1	1	DRM38	1008687.058	436655.9703	3907
7	1	1	DRM39	1008952.573	435304.9569	3874
7	1	1	DRM40	1008970.609	435965.5114	3884
7	1	1	DRM41	1008882.24	435665.452	3882
7	1	1	DRM42	1008930.968	435578.5798	3882
7	1	1	DRM43	1008949.54	435508.9883	3865
7	1	1	DRM44	1008885.075	435729.7205	3879
7	1	1	DRM45	1009120.415	434855.9755	3861
7	1	1	DRM46	1009548.589	434476.1546	3846

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRM47	1009270.889	434807.0384	3849
7	1	1	DRM48	1008538.407	436815.053	3891
7	1	1	DRM49	1008392.814	436883.9974	3881
7	1	1	DRM5	1007507.035	437971.2027	3843
7	1	1	DRM50	1008504.356	436841.8899	3892
7	1	1	DRM51	1009605.949	434485.1873	3860
7	1	1	DRM52	1009682.218	434456.5172	3860
7	1	1	DRM53	1009553.826	434521.7631	3846
7	1	1	DRM54	1009476.454	434603.9924	3871
7	1	1	DRM55	1008695.25	436851.5252	3910
7	1	1	DRM56	1008725.361	436634.2941	3907
7	1	1	DRM57	1008914.233	435434.0234	3879
7	1	1	DRM58	1008914.412	435844.4452	3880
7	1	1	DRM59	1008917.615	435378.8082	3879
7	1	1	DRM60	1008860.742	435445.336	3880
7	1	1	DRM61	1009034.395	435967.4971	3884
7	1	1	DRM62	1008857.436	435847.1413	3880
7	1	1	DRM63	1009000.365	435910.9024	3882
7	1	1	DRM64	1009076.989	435954.6236	3871
7	1	1	DRM65	1008240.983	436890.1559	3875
7	1	1	DRR111	1007358.86	436003.3537	3791
7	1	1	DRR134	1007259.885	435437.7461	3791
7	1	1	DRS10	1010137.493	433450.2212	3872
7	1	1	DRS11	1010212.44	433561.2552	3875
7	1	1	DRS12	1010273.627	433649.5291	3875
7	1	1	DRS13	1010226.522	433746.4381	3876
7	1	1	DRS14	1010180.695	433886.8795	3866
7	1	1	DRS15	1010101.781	433958.6309	3874
7	1	1	DRS16	1010043.153	434071.4724	3854
7	1	1	DRS17	1009951.128	434173.9988	3854
7	1	1	DRS19	1009757.862	434306.8939	3873
7	1	1	DRS2	1010011.598	433043.8692	3836
7	1	1	DRS20	1009855.336	434323.6398	3872
7	1	1	DRS21	1009944.166	434342.221	3884
7	1	1	DRS22	1009877.812	434439.7211	3877
7	1	1	DRS23	1009788.583	434435.2931	3879
7	1	1	DRS24	1009724.663	434514.3352	3865
7	1	1	DRS25	1009649.158	434530.2135	3860
7	1	1	DRS26	1009557.106	434589.4384	3871
7	1	1	DRS27	1009638.038	434640.2571	3858
7	1	1	DRS28	1010030.032	433282.8596	3849
7	1	1	DRS29	1009599.946	434804.9222	3872
7	1	1	DRS3	1009957.152	433105.8262	3843

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
7	1	1	DRS30	1009446.896	434871.4941	3867
7	1	1	DRS31	1009277.187	434816.9016	3846
7	1	1	DRS32	1009271.895	434751.9193	3849
7	1	1	DRS33	1009525.497	434630.1886	3871
7	1	1	DRS34	1009175.166	434821.2482	3861
7	1	1	DRS35	1009149.324	435035.6637	3857
7	1	1	DRS36	1008866.273	435029.5694	3878
7	1	1	DRS37	1008972.817	435027.7452	3874
7	1	1	DRS38	1008285.839	437179.2618	3880
7	1	1	DRS39	1008195.688	437364.2204	3882
7	1	1	DRS4	1010018.712	433129.1545	3843
7	1	1	DRS40	1008824.122	436499.2019	3904
7	1	1	DRS41	1008924.917	435941.9946	3880
7	1	1	DRS42	1008964.663	435832.1846	3882
7	1	1	DRS43	1008904.281	435613.329	3882
7	1	1	DRS44	1008956.733	435885.5508	3882
7	1	1	DRS45	1008828.901	436381.7989	3902
7	1	1	DRS46	1008849.906	436238.4991	3898
7	1	1	DRS47	1008742.331	436408.5088	3902
7	1	1	DRS48	1008636.316	436647.4987	3903
7	1	1	DRS49	1008700.828	436590.3107	3907
7	1	1	DRS5	1009962.973	433309.0772	3851
7	1	1	DRS50	1008772.039	436470.3451	3904
7	1	1	DRS51	1008836.735	436314.1587	3898
7	1	1	DRS6	1009912.538	433420.9304	3843
7	1	1	DRS7	1009917.175	433526.7397	3850
7	1	1	DRS8	1010028.363	433524.6026	3859
7	1	1	DRS9	1010096.316	433559.6199	3874
7	1	1	DRT1	1007476.06	437601.2322	3842
7	1	1	DRT10	1008367.202	436988.1218	3885
7	1	1	DRT103	1010015.059	433212.78	3849
7	1	1	DRT104	1010054.139	433273.2206	3849
7	1	1	DRT105	1009099.933	433243.9875	3844
7	1	1	DRT11	1008349.667	436916.4569	3881
7	1	1	DRT12	1008284.796	436765.9818	3875
7	1	1	DRT13	1008242.282	436637.1996	3879
7	1	1	DRT14	1007797.749	438008.9988	3844
7	1	1	DRT16	1008306.381	436602.0315	3881
7	1	1	DRT17	1008415.94	436563.6011	3888
7	1	1	DRT18	1008524.799	436524.1981	3892
7	1	1	DRT19	1008466.366	436646.2583	3895
7	1	1	DRT2	1008346.237	437130.1063	3892
7	1	1	DRT20	1008642.24	436577.4962	3903

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRT21	1008438.408	436892.1926	3892
7	1	1	DRT22	1008543.372	436884.7244	3892
7	1	1	DRT23	1008865.843	436128.3544	3889
7	1	1	DRT24	1009247.841	435991.4673	3893
7	1	1	DRT25	1009333.004	435742.2178	3895
7	1	1	DRT26	1009099.066	435817.5045	3864
7	1	1	DRT27	1009292.935	435591.5212	3884
7	1	1	DRT28	1009160.529	435291.1636	3866
7	1	1	DRT29	1009152.18	434955.3076	3857
7	1	1	DRT3	1008164.923	437248.6465	3877
7	1	1	DRT30	1008633.457	436817.5722	3905
7	1	1	DRT31	1008723.724	436698.9311	3910
7	1	1	DRT32	1009255.575	435103.6298	3851
7	1	1	DRT34	1009239.535	435030.6064	3847
7	1	1	DRT36	1009209.004	434941.1235	3847
7	1	1	DRT4	1008086.154	437449.5963	3879
7	1	1	DRT5	1007882.364	437653.6025	3862
7	1	1	DRT52	1009868.147	434224.8186	3867
7	1	1	DRT53	1010178.49	433679.0565	3874
7	1	1	DRT54	1010274.38	433474.8181	3873
7	1	1	DRT55	1009030.77	434959.3909	3874
7	1	1	DRT56	1010038.932	433429.0467	3851
7	1	1	DRT57	1009978.775	433223.2557	3849
7	1	1	DRT6	1007866.025	437904.6964	3864
7	1	1	DRT61	1008124.292	437503.8979	3881
7	1	1	DRT63	1010234.377	433680.7519	3875
7	1	1	DRT64	1010247.822	433661.6608	3875
7	1	1	DRT65	1008411.346	437021.5847	3885
7	1	1	DRT66	1008609.166	436890.4446	3907
7	1	1	DRT67	1008512.09	436969.7647	3899
7	1	1	DRT68	1009841.056	434432.0441	3872
7	1	1	DRT69	1009898.81	434291.9177	3867
7	1	1	DRT7	1007958.365	437611.7444	3874
7	1	1	DRT70	1010133.498	433515.3603	3872
7	1	1	DRT71	1010052.696	433352.6281	3851
7	1	1	DRT72	1010176.01	433830.9429	3866
7	1	1	DRT73	1010234.023	433841.7633	3880
7	1	1	DRT74	1009958.51	434099.7932	3854
7	1	1	DRT75	1010121.228	433798.2701	3870
7	1	1	DRT76	1010067.795	434016.8983	3874
7	1	1	DRT77	1010062.66	433206.835	3849
7	1	1	DRT78	1008604.43	436687.0715	3903
7	1	1	DRT79	1008568.536	436824.6714	3907

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRT8	1008324.987	437049.7404	3885
7	1	1	DRT80	1008669.241	436625.2112	3903
7	1	1	DRT81	1008317.91	437119.6487	3892
7	1	1	DRT82	1010086.382	433887.6458	3866
7	1	1	DRT86	1010135.833	433981.2581	3874
7	1	1	DRT87	1010038.986	433923.8114	3851
7	1	1	DRT88	1010019.139	433871.4283	3851
7	1	1	DRT89	1010266.834	433604.4527	3875
7	1	1	DRT9	1008142.625	437414.815	3879
7	1	1	DRT90	1008678.269	436732.4223	3905
7	1	1	DRW1	1007518.921	437588.5825	3842
7	1	1	DRW10	1007609.607	437985.5998	3848
7	1	1	DRW11	1007541.966	437939.0287	3842
7	1	1	DRW12	1007519.517	438097.3997	3823
7	1	1	DRW13	1007377.389	438235.9198	3816
7	1	1	DRW14	1007703.452	437956.1248	3844
7	1	1	DRW15	1007870.831	437967.3057	3854
7	1	1	DRW16	1007618.635	437838.8907	3853
7	1	1	DRW17	1007425.416	437676.1404	3837
7	1	1	DRW18	1007488.399	437880.5817	3842
7	1	1	DRW19	1007418.116	437597.3368	3837
7	1	1	DRW2	1007590.464	437489.9029	3854
7	1	1	DRW20	1007482.76	437519.063	3847
7	1	1	DRW21	1007451.444	437774.2502	3844
7	1	1	DRW22	1007424.523	437892.0486	3838
7	1	1	DRW23	1007425.117	437929.2908	3838
7	1	1	DRW24	1007413.811	437975.6156	3836
7	1	1	DRW25	1007964.652	437875.9036	3848
7	1	1	DRW26	1008020.26	437828.1149	3875
7	1	1	DRW27	1008032.071	437761.0801	3875
7	1	1	DRW28	1007992.223	437781.5366	3875
7	1	1	DRW29	1007978.143	437740.5707	3875
7	1	1	DRW3	1007754.984	437396.0315	3861
7	1	1	DRW30	1007882.104	437817.9879	3864
7	1	1	DRW31	1007917.104	437760.9618	3864
7	1	1	DRW32	1007923.309	437705.9139	3864
7	1	1	DRW33	1007888.262	437579.2536	3862
7	1	1	DRW34	1007928.816	437553.5923	3872
7	1	1	DRW35	1007892.847	437463.6413	3863
7	1	1	DRW36	1007972.648	437510.3616	3872
7	1	1	DRW37	1008019.654	437482.766	3872
7	1	1	DRW38	1008056.356	437395.5984	3879
7	1	1	DRW39	1008129.728	437332.6567	3879

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DRW4	1007622.648	437222.5452	3855
7	1	1	DRW40	1008041.561	437536.3481	3872
7	1	1	DRW41	1008186.725	437447.5916	3882
7	1	1	DRW42	1008205.466	437293.2801	3881
7	1	1	DRW43	1008222.985	437168.4965	3880
7	1	1	DRW5	1007746.861	437286.9385	3862
7	1	1	DRW6	1007680.761	437550.8048	3858
7	1	1	DRW7	1007768.878	437541.7038	3858
7	1	1	DRW8	1007545.66	437807.7202	3844
7	1	1	DRW9	1007576.84	437892.2039	3853
7	1	1	DS423	1009755.695	437020.0673	3925
7	1	1	DS424	1009765.815	436972.7271	3925
7	1	1	DS472	1009737.681	436640.5803	3926
7	1	1	DS473	1009801.101	436650.7284	3926
7	1	1	DS474	1009774.65	436651.8612	3926
7	1	1	DS604	1008304.312	433216.7048	3837
7	1	1	DS683	1007973.165	433104.3702	3843
7	1	1	DS684	1007920.165	433099.0706	3840
7	1	1	DS685	1007982.137	433154.7537	3843
7	1	1	DS686	1007917.964	433164.1997	3840
7	1	1	DS688	1008098.582	433139.6586	3842
7	1	1	DS692	1008315.4	433136.0939	3832
7	1	1	DS694	1008429.73	433163.3705	3832
7	1	1	DS695	1008232.666	433131.3093	3838
7	1	1	DS696	1010664.373	434211.3233	3912
7	1	1	DS697	1010565.61	435252.2059	3920
7	1	1	DS715	1008347.34	434034.6961	3851
7	1	1	DS716	1008148.328	433832.8185	3831
7	1	1	DS717	1007969.532	433601.9425	3843
7	1	1	DS718	1007970.044	433481.866	3838
7	1	1	DS719	1007897.299	433522.2944	3831
7	1	1	DS720	1007810.959	433313.1214	3831
7	1	1	DS721	1007902.303	433685.8257	3825
7	1	1	DS722	1007838.423	433693.9149	3825
7	1	1	DS723	1007688.038	433698.7482	3821
7	1	1	DS724	1008224.343	433267.0431	3837
7	1	1	DS727	1008169.566	433193.3819	3843
7	1	1	DS733	1008860.068	438264.1329	3913
7	1	1	DS734	1008958.076	438109.5389	3907
7	1	1	DS735	1009094.906	437980.8194	3906
7	1	1	DS736	1008854.229	437912.3494	3923
7	1	1	DW38	1010576.733	435122.5673	3917
7	1	1	DW39	1010618.63	435166.9741	3917

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DW40	1010584.604	435076.9757	3917
7	1	1	DW41	1010639.31	435064.2221	3913
7	1	1	DW42	1009983.752	435272.5413	3886
7	1	1	DW43	1009992.727	435221.6194	3886
7	1	1	DW44	1010038.429	435255.3476	3886
7	1	1	DW45	1010033.388	435309.2381	3886
7	1	1	DW46	1009929.342	435294.8537	3881
7	1	1	DW47	1009873.442	435271.7655	3881
7	1	1	DW48	1009877.864	435230.3482	3881
7	1	1	DW49	1009928.057	435260.4543	3881
7	1	1	DW5	1009979.649	435324.0794	3889
7	1	1	DW50	1009874.724	435299.3466	3881
7	1	1	DW51	1009737.633	435223.214	3879
7	1	1	DW52	1009745.798	435015.253	3886
7	1	1	DW53	1009748.345	435122.5855	3882
7	1	1	DW54	1009760.62	434935.0696	3881
7	1	1	DW55	1009756.125	434908.9164	3881
7	1	1	DW56	1009764.044	434957.7631	3886
7	1	1	DW57	1009985.711	435038.2931	3902
7	1	1	DW58	1009810.531	434919.1164	3881
7	1	1	DW59	1009812.483	434946.217	3896
7	1	1	DW6	1009969.214	435430.045	3889
7	1	1	DW60	1009812.489	434892.9837	3890
7	1	1	DW61	1009861.625	434905.2892	3890
7	1	1	DW62	1009909.426	434916.4602	3890
7	1	1	DW63	1009840.929	434932.8212	3890
7	1	1	DW64	1009838.457	435038.8243	3896
7	1	1	DW65	1009751.849	435063.6122	3886
7	1	1	DW7	1009963.505	435524.4502	3902
7	1	1	E	1008829.941	437103.0924	3915
7	1	1	EN93	1008963.325	435835.4133	3882
7	1	1	FR736	1008502.177	433185.6797	3833
7	1	1	L1	1009036.159	434791.5139	3882
7	1	1	O-1	1009002.986	434062.6535	3865
7	1	10	B11FR	999262.397	428402.1353	3623
7	1	10	B11LAK	999300.392	428418.7542	3624
7	1	10	B6FR	1000499.226	431127.2787	3647
7	1	10	BPZ-6ABN	1000435.138	431109.401	3647
7	1	10	PA1	999516.8406	433274.9517	3640
7	1	10	PA10	1000028.499	431317.2512	3649
7	1	10	PA101	1000389.265	430788.6219	3656
7	1	10	PA 102	1000328.618	430918.7278	3653
7	1	10	PA103	999763.1558	431391.1189	3670

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PA104	999646.2503	431712.9792	3649
7	1	10	PA105	999666.9513	431253.8593	3675
7	1	10	PA106	1000440.229	430876.3966	3650
7	1	10	PA107	1000224.892	431045.7363	3654
7	1	10	PA108	1000183.24	431181.0357	3650
7	1	10	PA109	999707.6009	431777.1477	3649
7	1	10	PA11	999624.7695	431531.8334	3664
7	1	10	PA110	1000270.442	432801.9742	3646
7	1	10	PA 111	1000449.794	430966.1158	3649
7	1	10	PA112	1000387.833	432753.75	3646
7	1	10	PA113	1000570.147	431016.2209	3648
7	1	10	PA114	1000230.509	431122.8721	3652
7	1	10	PA115	999727.6301	431657.3919	3655
7	1	10	PA116	1000636.696	430934.072	3648
7	1	10	PA117	999821.944	433002.2131	3642
7	1	10	PA118	999743.2013	432849.4845	3639
7	1	10	PA119	999925.3497	433040.5345	3644
7	1	10	PA12	999651.6567	431755.8285	3649
7	1	10	PA120	999773.2405	433097.9825	3643
7	1	10	PA121	999645.5733	432694.9396	3638
7	1	10	PA122	1000589.832	430828.7046	3650
7	1	10	PA123	999829.2681	429330.9042	3646
7	1	10	PA124	1000261.321	430446.5015	3667
7	1	10	PA125	1000129.848	430307.6351	3687
7	1	10	PA126	1000079.498	429827.1409	3675
7	1	10	PA127	999486.1509	430636.8908	3722
7	1	10	PA128	999540.199	430737.8234	3710
7	1	10	PA129	999726.4106	430823.1032	3693
7	1	10	PA13	999551.7993	431330.1107	3676
7	1	10	PA130	999764.5252	430859.359	3693
7	1	10	PA131	1000681.345	430789.456	3651
7	1	10	PA132	999936.2258	429298.803	3648
7	1	10	PA133	1000283.907	430750.7392	3656
7	1	10	PA134	1000254.531	430617.1875	3662
7	1	10	PA135	1000759.856	430850.1167	3650
7	1	10	PA136	999478.5751	430560.2253	3722
7	1	10	PA137	1000863.947	430885.869	3651
7	1	10	PA138	999803.5918	430744.2283	3691
7	1	10	PA139	1000154.123	429775.5477	3662
7	1	10	PA14	999597.0376	431249.7758	3682
7	1	10	PA141	999387.5983	430559.9809	3720
7	1	10	PA142	999534.3446	430598.05	3713
7	1	10	PA15	999583.768	431119.6385	3687

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PA16	999549.9263	430966.2035	3692
7	1	10	PA17	999534.507	430674.9217	3710
7	1	10	PA18	999540.2413	430811.4315	3706
7	1	10	PA19	999759.5305	429151.4606	3635
7	1	10	PA2	999523.818	432994.3517	3640
7	1	10	PA20	999659.625	429314.4823	3645
7	1	10	PA21	999793.0392	429240.6823	3639
7	1	10	PA22	999959.7418	429745.6562	3663
7	1	10	PA23	999865.9471	430169.6696	3706
7	1	10	PA24	999866.9979	430279.5856	3706
7	1	10	PA25	1000062.161	430393.4759	3687
7	1	10	PA 26	1000257.606	430101.7916	3681
7	1	10	PA27	999927.6158	429976.3865	3687
7	1	10	PA28	999443.5679	428483.8189	3627
7	1	10	PA29	1001491.167	429222.1921	3679
7	1	10	PA3	999575.9347	432746.0327	3636
7	1	10	PA30	1001401.245	429165.1691	3679
7	1	10	PA31	1001274.438	429072.8726	3673
7	1	10	PA32	1001167.552	429009.0763	3663
7	1	10	PA33	1001414.148	429057.5711	3679
7	1	10	PA34	1000418.937	428393.5471	3645
7	1	10	PA36	1000205.114	428154.6585	3634
7	1	10	PA38	1000066.969	428037.0174	3631
7	1	10	PA4	999681.9775	432381.1216	3636
7	1	10	PA40	1000906.466	430792.8783	3659
7	1	10	PA41	1001251.679	428770.3934	3664
7	1	10	PA45	1000798.627	428589.0685	3651
7	1	10	PA46	1000641.288	428549.0353	3657
7	1	10	PA47	1000534.834	428464.6102	3651
7	1	10	PA48	1000130.36	428068.0283	3631
7	1	10	PA5	999592.6692	433093.7628	3641
7	1	10	PA57	999835.8565	428052.2481	3630
7	1	10	PA6	999598.8701	433308.0703	3640
7	1	10	PA61	1000450.405	428259.3947	3642
7	1	10	PA62	1000456.1	428345.1753	3645
7	1	10	PA63	1000746.592	428597.9139	3651
7	1	10	PA64	1000742.365	428513.8724	3655
7	1	10	PA65	1001049.958	428776.8503	3661
7	1	10	PA66	1001335.886	428839.7205	3670
7	1	10	PA69	1001333.793	428334.1542	3661
7	1	10	PA7	999569.3288	433128.0794	3641
7	1	10	PA70	1001345.59	428439.9865	3660
7	1	10	PA71	1000762.4	428037.327	3650

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
7	1	10	PA73	1001034.189	428074.5281	3662
7	1	10	PA74	1001038.019	428139.3818	3662
7	1	10	PA8	999586.889	432789.502	3636
7	1	10	PA86	1001392.559	428466.5168	3660
7	1	10	PA87	1001383.276	428392.2035	3661
7	1	10	PA88	1001089.412	428089.3396	3662
7	1	10	PA89	1001080.544	428039.2021	3662
7	1	10	PA9	1000167.974	431019.8276	3654
7	1	10	PA90	1000994.838	428103.0964	3672
7	1	10	PA95	1001524.948	428435.5291	3662
7	1	10	PA95	999640.0131	430819.4364	3706
7	1	10	PA96	1001124.167	428168.471	3657
7	1	10	PA99	1001296.329	428744.3474	3664
7	1	10	PJ1	999893.1251	430046.2311	3698
7	1	10	PJ10	1000235.974	430945.7778	3654
7	1	10	PJ11	1000174.33	431135.826	3652
7	1	10	PJ12	1000119.356	431223.3575	3654
7	1	10	PJ13	1000002.433	431250.0913	3657
7	1	10	PJ14	999958.5384	431359.6625	3654
7	1	10	PJ15	999851.8381	431412.9276	3660
7	1	10	PJ16	999799.7421	431339.5802	3660
7	1	10	PJ17	999896.8117	431196.7529	3657
7	1	10	PJ19	999844.3333	430951.7743	3673
7	1	10	PJ2	999912.7627	430106.3324	3698
7	1	10	PJ20	999725.4671	430973.1758	3681
7	1	10	PJ21	999604.8069	430918.757	3706
7	1	10	PJ22	999489.5126	430770.8381	3724
7	1	10	PJ23	999371.5138	430732.7319	3727
7	1	10	PJ24	999347.5368	430911.3382	3729
7	1	10	PJ25	999359.605	431080.229	3708
7	1	10	PJ26	999473.3436	431092.6105	3699
7	1	10	PJ27	999646.1397	431066.6344	3679
7	1	10	PJ28	999675.6935	431173.2495	3679
7	1	10	PJ29	999623.0971	431273.1642	3682
7	1	10	PJ3	999920.3159	430262.4808	3704
7	1	10	PJ30	999539.1598	431352.8442	3676
7	1	10	PJ31	999618.7227	431410.2395	3676
7	1	10	PJ32	999632.4909	431632.9201	3661
7	1	10	PJ33	999597.1434	431771.6864	3655
7	1	10	PJ34	999637.3109	431876.7618	3651
7	1	10	PJ35	999548.7246	431952.1729	3646
7	1	10	PJ36	999570.9162	432049.9688	3646
7	1	10	PJ37	999667.0048	432482.1257	3636

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PJ38	999644.1351	431705.5584	3649
7	1	10	PJ38	999830.7664	431033.9398	3673
7	1	10	PJ39	999452.3888	433304.6138	3639
7	1	10	PJ3C	999913.2159	430319.2356	3701
7	1	10	PJ4	1000018.333	430360.0316	3701
7	1	10	PJ40	999623.7942	433220.9258	3640
7	1	10	PJ41	999991.0897	430149.4842	3698
7	1	10	PJ42	1000192.7	430701.0869	3663
7	1	10	PJ43	999945.4022	429927.1254	3687
7	1	10	PJ44	999963.8743	429826.0142	3677
7	1	10	PJ45	999922.4788	429709.663	3663
7	1	10	PJ46	999757.7343	428680.6308	3630
7	1	10	PJ47	999771.9099	428591.2626	3634
7	1	10	PJ48	999821.1683	428500.9754	3634
7	1	10	PJ49	999915.8311	428460.2232	3636
7	1	10	PJ5	1000070.659	430523.431	3683
7	1	10	PJ51	1000023.75	428117.3332	3631
7	1	10	PJ52	999816.1592	428615.8073	3634
7	1	10	PJ53	1000324.795	430998.1101	3650
7	1	10	PJ54	999743.5692	431507.1817	3660
7	1	10	PJ55	1000229.875	430563.1224	3662
7	1	10	PJ56	1000206.614	430646.6341	3662
7	1	10	PJ57	1000309.211	430848.5663	3653
7	1	10	PJ58	999675.886	431616.7927	3655
7	1	10	PJ59	999707.6437	431422.2333	3670
7	1	10	PJ6	1000178.28	430467.5326	3667
7	1	10	PJ7	1000171.964	430590.1897	3662
7	1	10	PJ8	1000143.424	430683.3605	3669
7	1	10	PJ9	1000210.037	430783.6128	3663
7	1	10	PK4	1000309.83	428424.1974	3647
7	1	10	PM115	1001470.022	428519.4618	3662
7	1	10	PM117	999705.2219	429360.5065	3645
7	1	10	PM118	999692.8746	429249.5827	3638
7	1	10	PM119	999748.7757	429549.8452	3654
7	1	10	PM120	999816.1691	429632.0818	3655
7	1	10	PM121	999921.8591	429658.8322	3657
7	1	10	PM122	999903.6631	429762.1091	3663
7	1	10	PM123	999999.568	429882.6731	3677
7	1	10	PM124	1000020.191	429985.355	3684
7	1	10	PM125	1000033.483	430091.3301	3691
7	1	10	PM126	999971.2712	430035.4378	3687
7	1	10	PM127	999650.81	429219.9141	3638
7	1	10	PM128	999283.5136	428578.2447	3624

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface Elevation
				East (ft)	North (ft)	
7	1	10	PM129	999323.0418	428666.9257	3626
7	1	10	PM131	999751.5199	429389.6442	3645
7	1	10	PM132	999590.4476	428956.7856	3632
7	1	10	PM133	999220.9184	428529.0456	3622
7	1	10	PM134	999259.1926	428633.3218	3622
7	1	10	PM135	999360.5231	428726.6178	3626
7	1	10	PM136	999232.0285	428422.2239	3622
7	1	10	PM138	999196.6836	428166.2621	3623
7	1	10	PM139	999705.9544	428988.3933	3632
7	1	10	PM149	1001597.478	428780.1417	3671
7	1	10	PM150	1001584.724	428677.6947	3671
7	1	10	PM151	1001593.182	428591.3884	3671
7	1	10	PM152	999606.6133	432536.77	3633
7	1	10	PM153	999578.5683	432901.0275	3638
7	1	10	PM154	999527.036	433051.9897	3640
7	1	10	PM155	999551.281	433245.2842	3640
7	1	10	PM156	999608.4481	432985.4073	3640
7	1	10	PM157	999592.6315	433184.9829	3640
7	1	10	PM158	999753.4731	432042.9893	3639
7	1	10	PM159	1000959.51	433086.5185	3653
7	1	10	PM160	999623.7966	433086.6547	3641
7	1	10	PM161	999232.8429	432325.9649	3637
7	1	10	PM 161	999985.0895	432296.4551	3642
7	1	10	PM162	999842.7097	432487.2617	3638
7	1	10	PM163	999643.3096	432846.9422	3639
7	1	10	PM164	1000861.086	433097.3345	3652
7	1	10	PM165	999647.015	432928.7217	3639
7	1	10	PM166	999819.308	432557.3099	3640
7	1	10	PM167	1000904.361	432968.9598	3653
7	1	10	PM168	999732.2537	432754.0173	3638
7	1	10	PM169	1001021.501	432975.1048	3653
7	1	10	PM170	1000464.734	432723.8502	3650
7	1	10	PM171	1000832.875	433005.6779	3652
7	1	10	PM172	999599.2551	433034.5241	3640
7	1	10	PM173	1000812.545	433168.6234	3652
7	1	10	PM174	999550.125	430876.1029	3706
7	1	10	PM175	1000112.359	431111.0757	3654
7	1	10	PM176	1000877.984	432857.7592	3652
7	1	10	PM177	1000758.844	433245.5318	3650
7	1	10	PM178	999559.1915	432951.6196	3640
7	1	10	PM179	999638.3754	432767.9492	3636
7	1	10	PM180	1000699.442	432717.0752	3653
7	1	10	PM181	999738.7374	432569.7852	3639

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PM182	999677.1265	433013.0922	3641
7	1	10	PM183	999624.5013	433144.5819	3641
7	1	10	PM184	1000870.392	432651.2959	3655
7	1	10	PM185	1000110.204	432851.527	3644
7	1	10	PM186	999523.475	432896.4694	3638
7	1	10	PM187	1000869.067	432419.9486	3653
7	1	10	PM188	999887.7376	432941.9551	3642
7	1	10	PM189	999302.7994	428069.9994	3624
7	1	10	PM190	999269.6553	428169.1115	3624
7	1	10	PM2	1000313.494	428503.007	3647
7	1	10	PM20	1000842.53	428130.3548	3668
7	1	10	PM207	1001289.996	428396.3998	3661
7	1	10	PM208	1001489.508	428395.7559	3671
7	1	10	PM214	1000456.491	428073.1927	3633
7	1	10	PM216	1000634.494	428299.5655	3649
7	1	10	PM218	1000547.008	428204.3175	3643
7	1	10	PM219	1000736.064	428188.3019	3659
7	1	10	PM22	999005.684	428147.9519	3622
7	1	10	PM221	1000978.402	428007.2413	3649
7	1	10	PM222	1000968.059	428163.1521	3660
7	1	10	PM223	999721.5959	428909.5998	3631
7	1	10	PM229	1000974.403	430762.1503	3659
7	1	10	PM23	999124.9416	428150.0077	3622
7	1	10	PM24	999216.6801	428117.584	3622
7	1	10	PM3	1000293.827	428308.8135	3645
7	1	10	PM31	999352.6019	428191.5589	3624
7	1	10	PM32	999292.1722	428262.7031	3624
7	1	10	PM33	999180.8908	428440.072	3622
7	1	10	PM36	1000237.932	428671.1647	3642
7	1	10	PM37	999390.853	428785.5984	3627
7	1	10	PM38	999811.718	428855.3009	3632
7	1	10	PM39	999902.2967	429031.493	3635
7	1	10	PM40	999758.1099	429095.9706	3635
7	1	10	PM41	999536.1693	429039.0813	3632
7	1	10	PM42	999465.1794	429269.5387	3635
7	1	10	PM43	999606.7664	429438.303	3650
7	1	10	PM44	999840.5784	429467.2979	3650
7	1	10	PM45	1000737.702	428419.2143	3655
7	1	10	PM46	1001212.806	428496.5745	3657
7	1	10	PM47	1001466.166	428701.0073	3668
7	1	10	PM48	1000615.479	428177.7769	3643
7	1	10	PM55	1001107.465	428490.8593	3654
7	1	10	PM58	1001335.847	428531.9434	3660

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PM59	1001017.304	428376.2028	3654
7	1	10	PM60	1000534.666	428024.3032	3632
7	1	10	PM61	1001066.63	428316.2514	3654
7	1	10	PM63	1001136.947	428330.9683	3654
7	1	10	PM64	1001522.588	428595.0108	3666
7	1	10	PM65	1001112.945	428278.9097	3657
7	1	10	PM67	1001536.537	428543.0588	3671
7	1	10	PM69	1000978.026	428317.2559	3654
7	1	10	PM70	1000921.6	428351.3942	3654
7	1	10	PM71	1001221.472	428342.6082	3657
7	1	10	PM72	1001263.779	428502.4409	3657
7	1	10	PM73	1001065.685	428577.4973	3660
7	1	10	PM74	1001006.577	428448.4795	3651
7	1	10	PM75	1000861.21	428496.131	3654
7	1	10	PR 10	1001099.854	430834.3557	3662
7	1	10	PR11	1001196.185	430854.7071	3665
7	1	10	PR 12	1001288.369	430823.3562	3663
7	1	10	PR3	1001149.332	428226.9725	3658
7	1	10	PR7	1001003.887	430758.4639	3659
7	1	10	PR8	1001106.317	430720.9539	3662
7	1	10	PR 9	1001171.845	430751.7936	3665
7	1	10	PS1	999659.1761	429078.2986	3635
7	1	10	PS10	1000512.871	428136.0923	3633
7	1	10	PS11	1000704.159	428239.964	3659
7	1	10	PS12	1000850.016	428371.0391	3659
7	1	10	PS13	1001021.381	428516.2984	3651
7	1	10	PS14	1001150.226	428385.4312	3657
7	1	10	PS15	1001301.073	428452.9691	3660
7	1	10	PS16	1001451.65	428591.0157	3666
7	1	10	PS17	1001594.539	428712.4996	3671
7	1	10	PS25	1001600.72	428851.6499	3672
7	1	10	PS29	1000687.44	428144.1048	3650
7	1	10	PS30	1000621.835	428243.0289	3643
7	1	10	PS31	1000920.089	428440.422	3651
7	1	10	PS38	1001486.698	428647.4127	3666
7	1	10	PS39	1001143.735	428555.2137	3660
7	1	10	PS40	1000756.21	428358.5236	3661
7	1	10	PS41	1001232.334	428633.9494	3662
7	1	10	PS42	1001354.012	428664.8696	3664
7	1	10	PS43	1001542.711	428796.5728	3672
7	1	10	PS44	1001601.173	428635.306	3671
7	1	10	PS45	1001318.293	428595.4886	3661
7	1	10	PS47	1001291.547	428683.8015	3664

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PS48	1001249.127	428568.4333	3662
7	1	10	PS54	999637.728	428976.5005	3632
7	1	10	PS55	999709.4105	428871.9822	3631
7	1	10	PS56	999683.0225	429054.4392	3635
7	1	10	PS57	999663.8786	429131.9825	3635
7	1	10	PS58	999618.0229	429028.9043	3632
7	1	10	PS59	999607.4773	428908.509	3630
7	1	10	PS60	999603.1059	429111.9221	3634
7	1	10	PS62	999571.9306	428863.2667	3630
7	1	10	PS63	999493.7072	428823.2071	3628
7	1	10	PS64	999552.2102	428817.9314	3630
7	1	10	PS65	999527.1095	428781.3054	3628
7	1	10	PS66	999487.7721	428733.2138	3627
7	1	10	PS67	999425.8598	428739.1279	3627
7	1	10	PS68	1000789.556	428207.312	3663
7	1	10	PS70	999855.9496	429556.3464	3655
7	1	10	PS72	999935.8377	428781.5016	3634
7	1	10	PS73	999815.5001	431502.5982	3654
7	1	10	PS74	999688.4654	431541.8608	3660
7	1	10	PS75	999579.2066	431535.569	3664
7	1	10	PT10	1001395.837	428749.6419	3664
7	1	10	PT100	999434.5033	430676.6689	3724
7	1	10	PT101	999942.4108	430169.6567	3704
7	1	10	PT102	1000017.88	430419.1942	3701
7	1	10	PT103	999641.5012	432031.068	3646
7	1	10	PT104	999744.2258	429205.7976	3638
7	1	10	PT105	999702.2584	429149.4459	3635
7	1	10	PT106	999932.6671	429800.2818	3677
7	1	10	PT107	999937.6985	429880.0997	3677
7	1	10	PT11	1001391.176	428609.8671	3661
7	1	10	PT110	999292.9925	428322.1114	3624
7	1	10	PT111	1000181.366	430375.4855	3672
7	1	10	PT112	999940.8774	430298.5802	3701
7	1	10	PT113	999346.2908	428422.0735	3624
7	1	10	PT114	999356.5668	428312.2986	3624
7	1	10	PT115	1000224.945	430739.1284	3663
7	1	10	PT116	1000174.119	430965.9706	3654
7	1	10	PT117	1000073.04	431241.4328	3654
7	1	10	PT118	999923.2825	431202.3126	3657
7	1	10	PT12	1001219.501	428423.1787	3657
7	1	10	PT123	999716.6411	429244.7741	3638
7	1	10	PT124	1000054.824	431276.2771	3654
7	1	10	PT127	999330.3317	428134.942	3624

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PT128	999246.4461	428230.3834	3623
7	1	10	PT129	999845.2888	428883.7025	3632
7	1	10	PT13	1000895.152	428315.8705	3659
7	1	10	PT130	999739.9351	428759.5271	3630
7	1	10	PT131	1000020.265	428067.9631	3631
7	1	10	PT135	999694.9271	428700.6243	3630
7	1	10	PT136	999827.9895	428924.8588	3634
7	1	10	PT137	999760.7239	429487.559	3650
7	1	10	PT14	1001183.588	428652.0761	3662
7	1	10	PT145	1001580.402	428563.5687	3671
7	1	10	PT146	1000960.226	428439.0014	3651
7	1	10	PT147	1000950.472	428330.8189	3654
7	1	10	PT148	1000899.79	428241.213	3660
7	1	10	PT15	1000832.593	428432.4991	3654
7	1	10	PT155	1000371.698	428192.3316	3643
7	1	10	PT156	1001348.137	428883.5909	3670
7	1	10	PT157	1000558.161	428155.9034	3640
7	1	10	PT158	1000401.582	428304.704	3645
7	1	10	PT159	1001382.528	428808.1362	3670
7	1	10	PT160	1000761.009	428091.883	3650
7	1	10	PT162	1000861.564	428243.6353	3663
7	1	10	PT164	1000812.125	428395.4511	3659
7	1	10	PT165	1000788.342	428318.3466	3659
7	1	10	PT166	1001137.161	428454.1118	3654
7	1	10	PT167	1001549.949	428654.5494	3671
7	1	10	PT168	1000683.71	428319.7338	3661
7	1	10	PT17	1001019.417	428276.11	3660
7	1	10	PT170	1001628.75	429036.7062	3681
7	1	10	PT171	1001607.742	428883.0648	3672
7	1	10	PT172	1001532.309	428708.0739	3671
7	1	10	PT186	1000065.564	428090.5575	3631
7	1	10	PT19	1000729.64	428292.5101	3661
7	1	10	PT2	1001554.292	428558.1352	3671
7	1	10	PT20	1000819.371	428277.6982	3663
7	1	10	PT21	1001426.194	428764.0051	3668
7	1	10	PT28	1000932.361	428239.5042	3660
7	1	10	PT29	1001069.391	428241.1381	3657
7	1	10	PT32	999200.1045	428213.5861	3623
7	1	10	PT33	999246.2478	428348.2734	3623
7	1	10	PT34	999272.0949	428474.7116	3624
7	1	10	PT36	1001420.63	428577.6801	3666
7	1	10	PT39	1000140.514	430812.5886	3660
7	1	10	PT40	1001249.629	428896.2714	3664

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PT40	1000189.519	431030.3719	3654
7	1	10	PT41	1000066.126	431182.4275	3654
7	1	10	PT42	1001063.799	428682.8041	3661
7	1	10	PT42	1000084.668	430416.4138	3687
7	1	10	PT43	1001088.671	428868.2384	3658
7	1	10	PT43	999982.6011	430322.5252	3701
7	1	10	PT44	1000922.945	428775.0926	3653
7	1	10	PT44	999721.9656	429310.9592	3645
7	1	10	PT45	999637.2221	429189.9377	3637
7	1	10	PT46	999234.131	428282.7853	3623
7	1	10	PT48	999333.0513	428505.1328	3624
7	1	10	PT49	999739.2158	429263.049	3638
7	1	10	PT50	999803.6949	429523.7747	3650
7	1	10	PT51	999838.1724	429616.1474	3655
7	1	10	PT52	999882.4025	429664.1036	3655
7	1	10	PT53	1000002.599	430196.5796	3704
7	1	10	PT54	1000063.279	430373.2572	3687
7	1	10	PT56	999690.3095	429197.47	3638
7	1	10	PT57	999757.958	429338.1837	3645
7	1	10	PT58	999716.011	429431.4122	3650
7	1	10	PT59	999937.9268	430087.1737	3698
7	1	10	PT60	999680.5932	429105.9564	3635
7	1	10	PT61	999520.7868	433218.6034	3640
7	1	10	PT62	999998.3911	429944.3262	3687
7	1	10	PT63	999970.8206	430263.4673	3704
7	1	10	PT64	1000138.984	430438.2211	3683
7	1	10	PT65	1000141.894	430544.2566	3683
7	1	10	PT66	1000164.467	430640.6765	3662
7	1	10	PT67	1000203.331	430838.1038	3657
7	1	10	PT68	1000147.061	431075.1734	3652
7	1	10	PT69	999888.6259	431096.8735	3667
7	1	10	PT70	999588.5235	431953.8311	3646
7	1	10	PT71	999638.8363	431566.0439	3661
7	1	10	PT72	999987.1052	431180.6985	3657
7	1	10	PT73	999567.7533	431954.9217	3646
7	1	10	PT74	999395.5063	430776.7527	3724
7	1	10	PT75	999794.6389	430966.4833	3673
7	1	10	PT76	999473.3825	431007.5206	3708
7	1	10	PT77	999585.5001	430824.5976	3706
7	1	10	PT78	999427.4194	430895.142	3721
7	1	10	PT79	999571.5512	431065.5236	3687
7	1	10	PT80	999569.1359	431198.9697	3682
7	1	10	PT81	999621.5881	431367.2432	3676

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	10	PT82	999646.235	431479.0611	3660
7	1	10	PT83	999589.6128	431684.5257	3655
7	1	10	PT84	999636.6416	431817.9104	3651
7	1	10	PT85	999740.6374	430917.7496	3693
7	1	10	PT86	1000129.101	430554.814	3675
7	1	10	PT87	999903.4753	431057.2706	3661
7	1	10	PT88	999946.5678	431140.7875	3661
7	1	10	PT89	999599.9032	431006.5928	3692
7	1	10	PT90	999532.4663	430914.6465	3706
7	1	10	PT91	999471.5745	430841.0608	3721
7	1	10	PT92	1000129.958	431164.0658	3654
7	1	10	PT93	999469.1797	430727.8265	3724
7	1	10	PT94	999766.2466	430907.4868	3693
7	1	10	PT96	1000157.273	430737.2687	3663
7	1	10	PT97	1000201.072	430875.0491	3657
7	1	10	PT98	1000114.313	430469.5421	3683
7	1	10	PT99	999549.3561	431998.2493	3646
7	1	10	PW20	999769.9385	429439.755	3650
7	1	10	RON1	1000991.866	429482.1765	3659
7	1	10	RONA11	1001614.206	429661.7972	3693
7	1	10	RONA14	1001630.431	430611.3593	3665
7	1	10	RONA20	1001551.245	430529.8969	3671
7	1	10	RONA24	1001448.464	430490.6589	3671
7	1	10	RONA25	1001358.237	430474.1203	3672
7	1	10	RONA35	1001666.672	430493.5748	3668
7	1	10	RONA36	1001672.249	430591.5894	3666
7	1	10	RONA37	1001201.546	430321.2925	3673
7	1	10	RONA41	1001058.972	430343.9504	3671
7	1	10	RONA59	1001363.603	429541.231	3680
7	1	10	RONA65	1001624.823	429366.475	3688
7	1	10	RONA66	1001521.325	429571.8031	3689
7	1	10	RONA73	1001660.881	429559.8389	3696
7	1	10	RONA75	1001508.792	429433.7855	3686
7	1	10	RONA93	1001653.714	429614.5034	3696
7	1	10	RONA94	1001624.651	429498.5323	3690
7	1	10	RONJ1	1000442.048	430646.3509	3654
7	1	10	RONM11	1000855.102	429507.1328	3661
7	1	10	RONM12	1001654.659	430931.7318	3661
7	1	10	RONM20	1000746.974	430629.6351	3652
7	1	10	RONT61	1001648.324	429751.6198	3694
7	1	10	RONT65	1001672.556	429799.478	3691
7	1	3	EM2-1	999408.6694	435150.0208	3654
7	1	3	EM2-3	999418.0966	435416.8677	3653

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	3	KLA1	999191.2556	437468.6036	3666
7	1	3	KLA10	998891.4704	435702.2126	3652
7	1	3	KLA11	999085.5924	435260.2846	3648
7	1	3	KLA12	999327.6152	436082.5005	3652
7	1	3	KLA13	999222.6027	436430.4492	3652
7	1	3	KLA14	999209.2649	436108.6977	3652
7	1	3	KLA15	998972.7397	435200.1545	3644
7	1	3	KLA16	999359.3136	436376.4078	3652
7	1	3	KLA2	998960.9424	437592.4102	3667
7	1	3	KLA3	999190.3511	436986.9785	3663
7	1	3	KLA4	999147.1431	437293.6122	3662
7	1	3	KLA5	999355.3618	437115.7932	3661
7	1	3	KLA6	998940.846	437782.1504	3667
7	1	3	KLA7	999161.6876	436829.5183	3662
7	1	3	KLA8	999030.4518	437185.7059	3664
7	1	3	KLA8ABN	999049.8427	436330.879	3653
7	1	3	KLA9	999161.5908	436376.0565	3652
7	1	3	KLJ1	998802.1865	434954.3859	3640
7	1	3	KLJ10	998935.2116	437504.5784	3666
7	1	3	KLJ11	999053.014	434841.2903	3650
7	1	3	KLJ12	999126.4101	435398.6277	3644
7	1	3	KLJ2	998737.3817	435712.9663	3647
7	1	3	KLJ3	998898.2013	435097.3142	3644
7	1	3	KLJ4	999211.3069	435994.502	3652
7	1	3	KLJ5	999261.5441	436920.9661	3662
7	1	3	KLJ6	998624.8753	435112.2979	3637
7	1	3	KLJ7	998887.8328	434578.2585	3641
7	1	3	KLJ8	999126.1139	434500.763	3650
7	1	3	KLJ9	999109.3916	437415.1641	3665
7	1	3	KLT1	998144.5688	434637.4801	3633
7	1	3	KLT10	999010.2595	436436.7415	3654
7	1	3	KLT11	999041.526	437336.1368	3665
7	1	3	KLT12	999057.9015	437624.221	3667
7	1	3	KLT13	998928.8399	436172.041	3653
7	1	3	KLT14	999114.0062	435906.6727	3652
7	1	3	KLT15	998848.1433	437810.1092	3667
7	1	3	KLT15ABN	998800.1519	437782.166	3667
7	1	3	KLT16	999244.1306	435582.6669	3649
7	1	3	KLT17	999192.6735	435268.6036	3652
7	1	3	KLT18	998529.5345	437886.7573	3663
7	1	3	KLT19	999096.7449	435070.6091	3650
7	1	3	KLT2	998434.774	436069.5663	3645
7	1	3	KLT20	998662.282	438037.9422	3664

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	3	KLT21	998976.1845	434550.3662	3647
7	1	3	KLT21ABN	998965.9652	434882.1097	3645
7	1	3	KLT22	998634.434	434740.5	3636
7	1	3	KLT23	998873.6761	434351.4181	3644
7	1	3	KLT24	998735.4434	434182.737	3634
7	1	3	KLT25	999100.8371	435482.8272	3646
7	1	3	KLT26	998978.572	434997.6989	3643
7	1	3	KLT27	999023.0282	435663.4238	3649
7	1	3	KLT28	998870.4618	435179.6152	3641
7	1	3	KLT29	999157.8803	436555.4067	3653
7	1	3	KLT29	999081.1455	435831.0302	3652
7	1	3	KLT29ABN	998767.0094	435844.7563	3652
7	1	3	KLT3	998978.4311	436941.1154	3661
7	1	3	KLT30	998718.4375	435052.1362	3639
7	1	3	KLT31	999196.8801	436283.4258	3652
7	1	3	KLT32	999379.7736	436577.7059	3652
7	1	3	KLT33	998594.7863	434919.4119	3636
7	1	3	KLT34	998560.1476	434331.1532	3632
7	1	3	KLT35	998983.3593	435820.3021	3653
7	1	3	KLT36	998727.8447	435215.8802	3641
7	1	3	KLT37	998504.0036	434574.0366	3635
7	1	3	KLT38	998572.6044	435760.2146	3643
7	1	3	KLT39	999098.8082	436011.4391	3652
7	1	3	KLT-4	999151.7819	437127.5328	3663
7	1	3	KLT40	998752.1621	435418.0231	3643
7	1	3	KLT41	998752.4271	436121.7075	3650
7	1	3	KLT42	998692.32	435617.8316	3645
7	1	3	KLT43	998832.3662	436217.3077	3652
7	1	3	KLT44	999113.6868	436731.4999	3659
7	1	3	KLT45	998605.7233	435357.3753	3640
7	1	3	KLT46	998776.1792	434796.349	3641
7	1	3	KLT47	999001.9826	436313.9712	3653
7	1	3	KLT48	999242.8729	436615.7412	3655
7	1	3	KLT49	998663.136	436004.4981	3651
7	1	3	KLT-5	999073.2113	437041.9639	3664
7	1	3	KLT50	998618.3859	434549.0163	3632
7	1	3	KLT51	998709.2531	434343.1672	3638
7	1	3	KLT52	998925.1151	436039.0623	3653
7	1	3	KLT53	998642.4992	435460.8677	3643
7	1	3	KLT54	998720.0742	434434.7455	3638
7	1	3	KLT55	998741.4259	434703.7842	3639
7	1	3	KLT56	998623.5444	435688.9226	3642
7	1	3	KLT57	998711.1707	435924.3159	3649

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	3	KLT58	999119.6568	437086.9373	3664
7	1	3	KLT59	999093.7334	436260.9043	3653
7	1	3	KLT6	999029.5806	436986.8837	3664
7	1	3	KLT61	998707.4745	435772.3198	3647
7	1	3	KLT62	998686.7764	434638.1091	3639
7	1	3	KLT63	998736.027	434900.2172	3639
7	1	3	KLT64	998663.697	435286.7683	3641
7	1	3	KLT65	999276.6943	436304.9522	3652
7	1	3	KLT66	998781.3337	434608.9336	3641
7	1	3	KLT67	998897.4673	434258.2049	3644
7	1	3	KLT68	998972.7735	434356.7605	3646
7	1	3	KLT69	998826.6487	434479.7883	3644
7	1	3	KLT7	998793.3838	437222.8835	3663
7	1	3	KLT70	999060.7266	434592.7036	3652
7	1	3	KLT71	998912.933	434136.3349	3643
7	1	3	KLT72	998624.0004	435207.4145	3639
7	1	3	KLT73	998822.2165	436107.6399	3653
7	1	3	KLT74	999036.9751	437493.205	3666
7	1	3	KLT75	999100.6813	436892.2412	3662
7	1	3	KLT76	998989.6654	434474.0998	3647
7	1	3	KLT77	998639.9068	435887.3995	3649
7	1	3	KLT78	998600.1908	435559.8188	3642
7	1	3	KLT79	999158.2473	434825.6636	3652
7	1	3	KLT80	999281.5927	436537.9689	3652
7	1	3	KLT81	999359.4431	436944.732	3659
7	1	3	KLT82	998872.0364	434295.4366	3642
7	1	3	KLT9	998656.7554	437525.5402	3665
7	1	3	KT8	999259.5832	436760.1735	3657
7	1	3	LSJ13	999506.4657	434608.6516	3653
7	1	3	MSA 1	999515.8826	434876.0615	3652
7	1	3	MSA 10	999643.7554	434798.8724	3651
7	1	3	MSA11	1000165.967	434015.9539	3652
7	1	3	MSA11ABN	999710.8176	433648.711	3642
7	1	3	MSA2	999799.4393	433436.6191	3641
7	1	3	MSA2	1000167.125	433799.6128	3647
7	1	3	MSA3	999924.5829	433682.8801	3642
7	1	3	MSA4	999711.7808	433429.4222	3641
7	1	3	MSA 5	999564.0127	434962.8037	3652
7	1	3	MSA 6	999750.259	434710.7743	3651
7	1	3	MSA7	999914.8278	434227.099	3651
7	1	3	MSA8	1000080.012	434116.4832	3652
7	1	3	MSA9	999524.6691	436274.8554	3657
7	1	3	MSJ1	1000088.048	433706.558	3644

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	3	MSJ10	999924.7977	433542.001	3641
7	1	3	MSJ11	999925.1817	434342.7324	3649
7	1	3	MSJ12	999608.0392	434601.6802	3650
7	1	3	MSJ14	998720.9609	435530.4898	3643
7	1	3	MSJ15	999477.3064	433774.9303	3644
7	1	3	MSJ16	999794.7158	434243.2651	3645
7	1	3	MSJ17	1000003.282	433618.769	3642
7	1	3	MSJ 18	999562.9934	434706.7264	3651
7	1	3	MSJ19	999419.5588	434666.902	3653
7	1	3	MSJ3	999541.2304	433530.8095	3640
7	1	3	MSJ4	999610.1354	433651.9713	3642
7	1	3	MSJ5	999686.9161	434303.9756	3643
7	1	3	MSJ6	999707.9073	434311.9963	3643
7	1	3	MSJ7	999887.0203	433433.0601	3642
7	1	3	MSJ 8	999403.9693	434051.6338	3642
7	1	3	MSJ9	999706.205	434575.893	3651
7	1	3	MSM1	996878.0262	438419.5048	3673
7	1	3	MSM3	996779.251	438469.3371	3675
7	1	3	MST1	999414.4941	433950.4007	3642
7	1	3	MST10	999597.8132	434162.8079	3642
7	1	3	MST11	999413.8969	433729.1263	3644
7	1	3	MST12	999533.819	433724.9625	3642
7	1	3	MST13	999467.6077	433532.0992	3641
7	1	3	MST14	999599.5858	434310.8149	3642
7	1	3	MST15	999491.4131	434385.0065	3654
7	1	3	MST16	999561.8708	434236.7696	3642
7	1	3	MST17	999584.7371	433412.9969	3640
7	1	3	MST18	999530.0955	434032.7223	3642
7	1	3	MST19	999438.3942	434462.8256	3653
7	1	3	MST-2	1000322.874	437555.9647	3669
7	1	3	MST20	999491.2636	433624.0027	3643
7	1	3	MST21	999447.5203	433855.5627	3643
7	1	3	MST22	999294.8167	434602.4677	3652
7	1	3	MST23	999536.3912	434460.7843	3648
7	1	3	MST24	999633.0256	434455.8268	3648
7	1	3	MST25	999696.7219	434191.957	3643
7	1	3	MST26	999736.0601	434467.5623	3647
7	1	3	MST27	999982.3598	433453.0669	3641
7	1	3	MST28	1000243.682	433882.7766	3648
7	1	3	MST-3	999360.4125	437396.36	3663
7	1	3	MST-4	999954.8713	437842.9924	3665
7	1	3	MST8	999418.5476	434305.5797	3652
7	1	3	MST 9	999463.8259	434155.6259	3643

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	3	RONR34	1001313.064	434512.9924	3682
7	1	3	RONT70	1000589.527	433343.6477	3652
7	1	4	MSM2	996616.1013	438595.7122	3682
7	1	2	D1	1006017.759	438024.9826	3750
7	1	2	D10	1005968.824	437950.0686	3757
7	1	2	D103	1006545.271	437868.5715	3781
7	1	2	D104	1006593.135	438175.2426	3793
7	1	2	D105	1006615.234	438182.7463	3793
7	1	2	D106	1006629.588	438209.5484	3792
7	1	2	D11	1006061.907	438203.9916	3762
7	1	2	D14	1006049.657	438026.2724	3758
7	1	2	D2	1005948.164	438056.1038	3750
7	1	2	D20	1005950.377	438023.0955	3750
7	1	2	D21	1006000.956	438061.2241	3750
7	1	2	D28	1005921.984	437979.3934	3750
7	1	2	D4	1006025.524	437976.6743	3750
7	1	2	D43	1006759.314	438122.3078	3794
7	1	2	D44	1006758.772	438136.4981	3794
7	1	2	D45	1006783.759	438134.5958	3794
7	1	2	D46	1006761.858	438108.537	3794
7	1	2	D46A	1006786.92	438105.1303	3794
7	1	2	D46B	1006816.35	438109.2098	3800
7	1	2	D47	1006760.939	438089.4015	3794
7	1	2	D48	1006853.685	438152.2842	3800
7	1	2	D49	1006853.638	438140.6199	3800
7	1	2	D5	1006063.281	437950.8603	3766
7	1	2	D50	1006852.59	438127.6668	3800
7	1	2	D50A	1006856.327	438111.6583	3800
7	1	2	D6	1006035.229	437936.6384	3757
7	1	2	D69	1006319.358	438304.0293	3782
7	1	2	D7	1006025.645	437912.8492	3757
7	1	2	D70	1006321.528	438281.7194	3782
7	1	2	D71	1006319.793	438265.8228	3782
7	1	2	D72	1006312.955	438247.4898	3782
7	1	2	D8	1006024.021	437893.6171	3757
7	1	2	D9	1006019.897	437872.0154	3757
7	1	2	DK10	1005867.399	437484.8021	3750
7	1	2	DK11	1005828.678	437497.0966	3750
7	1	2	DK12	1005939.138	437503.3398	3751
7	1	2	DK122	1006384.318	437477.0088	3761
7	1	2	DK123	1006035.924	436696.0496	3744
7	1	2	DK13	1005890.508	437428.6324	3744
7	1	2	DK137	1006361.03	433275.5142	3800

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	2	DK14	1006418.981	437705.8188	3780
7	1	2	DK145	1007047.513	433218.0113	3808
7	1	2	DK15	1005240.14	436707.7755	3722
7	1	2	DK19	1005908.56	437408.6043	3744
7	1	2	DK20	1005936.327	437371.0747	3752
7	1	2	DK21	1005739.734	437104.6535	3739
7	1	2	DK22	1005559.947	436816.8314	3732
7	1	2	DK23	1006253.441	435624.7626	3753
7	1	2	DK24	1004797.725	436597.9878	3719
7	1	2	DK26	1003979.313	434758.7023	3725
7	1	2	DK28	1005551.452	436954.4644	3733
7	1	2	DK29	1005809.869	437050.4439	3741
7	1	2	DK3	1005372.866	437461.148	3735
7	1	2	DK30	1006072.578	437663.0353	3762
7	1	2	DK31	1005838.512	437420.8683	3744
7	1	2	DK32	1005692.19	437202.2057	3740
7	1	2	DK35	1006294.065	438403.5743	3777
7	1	2	DK37	1006125.341	437715.932	3768
7	1	2	DK4	1005387.827	437183.681	3728
7	1	2	DK45	1005954.522	437748.7246	3760
7	1	2	DK46	1005655.937	437690.9171	3744
7	1	2	DK47	1005728.1	437971.5837	3746
7	1	2	DK48	1005935.675	437762.6859	3760
7	1	2	DK49	1005782.356	437708.9002	3748
7	1	2	DK5	1005592.959	437255.3718	3739
7	1	2	DK50	1005964.07	437857.7912	3757
7	1	2	DK51	1005584.911	438001.7102	3743
7	1	2	DK52	1005642.667	437836.6875	3742
7	1	2	DK53	1005545.195	438167.692	3742
7	1	2	DK56	1005950.129	437591.768	3760
7	1	2	DK58	1005975.002	437580.8782	3760
7	1	2	DK59	1006019.077	437549.6636	3751
7	1	2	DK6	1005802.633	437466.6391	3750
7	1	2	DK60	1005963.373	437706.5182	3760
7	1	2	DK61	1006013.14	437762.0539	3760
7	1	2	DK62	1005926.613	437602.9469	3760
7	1	2	DK63	1005860.594	437340.0472	3744
7	1	2	DK64	1005758.413	437246.0818	3740
7	1	2	DK65	1005976.162	437749.9603	3760
7	1	2	DK66	1005957.801	437656.607	3760
7	1	2	DK67	1005647.622	437087.8314	3737
7	1	2	DK68	1004521.278	436569.8733	3733
7	1	2	DK69	1005974.386	437687.3848	3760

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	2	DK7	1005567.401	437662.1278	3744
7	1	2	DK70	1005887.961	437530.1034	3750
7	1	2	DK8	1005020.282	437576.4995	3721
7	1	2	DK9	1005124.693	437144.1904	3723
7	1	2	DM1113	1006080.04	436879.0947	3748
7	1	2	DM1114	1006081.149	437370.986	3752
7	1	2	DM1203	1006121.522	437287.4544	3750
7	1	2	DM1235	1006355.967	438213.9411	3782
7	1	2	DM1236	1006483.321	438153.7258	3784
7	1	2	DM1254	1006163.258	438290.015	3765
7	1	2	DP249	1005782.141	438415.2941	3746
7	1	2	DP250	1005971.864	438409.4635	3755
7	1	2	DP251	1006380.678	438401.1648	3777
7	1	2	DR924	1007317.214	437813.6006	3835
7	1	2	DR925	1007275.754	437821.9557	3824
7	1	2	DRA33	1005670.407	437543.1746	3746
7	1	2	DRA34	1004870.176	437181.0262	3716
7	1	2	DRA36	1006497.871	438001.1479	3781
7	1	2	DRA39	1004322.865	437018.5275	3711
7	1	2	DRA42	1002013.724	434903.3617	3677
7	1	2	DRJ10	1007054.573	435079.4112	3782
7	1	2	DRJ100	1007167.531	438228.2716	3822
7	1	2	DRJ102	1006624.543	438148.9036	3793
7	1	2	DRJ105	1006613.534	438198	3793
7	1	2	DRJ116	1007250.831	438161.7224	3833
7	1	2	DRJ13	1007224.584	434954.1346	3795
7	1	2	DRJ14	1007016.282	435544.0751	3779
7	1	2	DRJ16	1006952.942	435584.639	3783
7	1	2	DRJ17	1006894.047	435639.426	3779
7	1	2	DRJ18	1006914.196	435538.7442	3774
7	1	2	DRJ19	1006893.825	435678.3276	3779
7	1	2	DRJ38	1006760.506	435656.8861	3772
7	1	2	DRJ39	1006714.406	435610.3036	3772
7	1	2	DRJ40	1006683.3	435661.0576	3772
7	1	2	DRJ41	1006591.169	435697.1878	3768
7	1	2	DRJ42	1006587.592	435747.4379	3768
7	1	2	DRJ43	1006616.637	435765.0913	3768
7	1	2	DRJ44	1006652.454	435792.8077	3768
7	1	2	DRJ45	1006722.948	435737.1605	3774
7	1	2	DRJ46	1006704.447	435788.7494	3774
7	1	2	DRJ47	1006729.427	435818.171	3774
7	1	2	DRJ48	1006732.877	435676.77	3772
7	1	2	DRJ64	1006556.168	438290.3354	3792

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	2	DRJ7	1007210.855	435006.0778	3795
7	1	2	DRJ72	1006640.066	434315.2796	3768
7	1	2	DRJ73	1006363.661	434304.4908	3768
7	1	2	DRJ74	1006381.024	434672.0719	3759
7	1	2	DRJ75	1006718.139	434603.5575	3775
7	1	2	DRJ76	1006535.572	434914.3441	3760
7	1	2	DRJ77	1006460.321	435353.3238	3759
7	1	2	DRJ78	1006776.181	434857.5847	3768
7	1	2	DRJ79	1006651.608	435128.3051	3769
7	1	2	DRJ8	1007139.94	435156.7608	3782
7	1	2	DRJ80	1006663.403	435514.1894	3764
7	1	2	DRJ81	1006818.94	434722.9598	3773
7	1	2	DRJ82	1006783.907	435299.6034	3762
7	1	2	DRJ83	1006829.255	434607.3034	3778
7	1	2	DRJ84	1006687.482	434467.8527	3778
7	1	2	DRJ85	1006723.68	435009.2898	3766
7	1	2	DRJ86	1006719.765	435211.2771	3762
7	1	2	DRJ87	1006735.928	435400.3948	3764
7	1	2	DRJ88	1006772.892	435684.7217	3772
7	1	2	DRJ9	1007100.484	435185.8494	3782
7	1	2	DRJ94	1006307.882	438364.4511	3777
7	1	2	DRJ95	1006541.742	438129.6874	3784
7	1	2	DRJ96	1007325.689	438077.3742	3836
7	1	2	DRJ97	1006427.99	438313.4272	3792
7	1	2	DRJ99	1006588.037	438258.9578	3792
7	1	2	DRM2	1006380.667	438233.8659	3782
7	1	2	DRM3	1006279.25	433304.5168	3795
7	1	2	DRM4	1006713.038	434033.8079	3777
7	1	2	DRM7	1006542.264	434200.729	3769
7	1	2	DRR100	1007044.979	437446.0412	3798
7	1	2	DRR101	1007068.03	436587.6255	3814
7	1	2	DRR102	1007201.866	436516.1072	3798
7	1	2	DRR103	1007220.921	436573.4329	3821
7	1	2	DRR104	1007158.799	436465.5863	3801
7	1	2	DRR105	1007148.596	436541.2978	3801
7	1	2	DRR106	1007276.106	436556.6095	3798
7	1	2	DRR107	1007261.223	436511.2349	3798
7	1	2	DRR108	1007125.643	436584.0278	3814
7	1	2	DRR109	1007151.161	436653.243	3814
7	1	2	DRR110	1007263.88	436381.0005	3799
7	1	2	DRR112	1007209.635	435992.7676	3801
7	1	2	DRR113	1007098.966	436102.3506	3785
7	1	2	DRR114	1007198.771	436257.3079	3801

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	2	DRR115	1007039.645	437147.8926	3808
7	1	2	DRR116	1007106.229	436809.6305	3813
7	1	2	DRR117	1006977.754	437082.0726	3808
7	1	2	DRR118	1007001.247	436224.0299	3779
7	1	2	DRR119	1007034.266	436948.7523	3803
7	1	2	DRR120	1006984.129	436329.5465	3793
7	1	2	DRR121	1007021.908	436853.6549	3803
7	1	2	DRR122	1007070.665	437048.8352	3815
7	1	2	DRR123	1006889.238	436265.8435	3772
7	1	2	DRR124	1006967.846	436436.8277	3793
7	1	2	DRR125	1006914.112	436526.9988	3784
7	1	2	DRR126	1006846.568	436429.1612	3782
7	1	2	DRR127	1006807.474	436334.6451	3782
7	1	2	DRR128	1006735.199	436405.518	3773
7	1	2	DRR129	1006699.502	436303.5613	3772
7	1	2	DRR130	1006796.79	436181.4929	3783
7	1	2	DRR131	1006689.365	436177.2693	3783
7	1	2	DRR132	1006907.044	435474.7755	3774
7	1	2	DRR133	1007076.098	435458.5684	3788
7	1	2	DRR40	1006748.68	437767.6376	3802
7	1	2	DRR42	1006639.091	437770.492	3791
7	1	2	DRR45	1006511.923	437761.3279	3783
7	1	2	DRR46	1006841.819	437768.3888	3808
7	1	2	DRR48	1006923.006	437812.9731	3808
7	1	2	DRR50	1006941.889	437767.6711	3813
7	1	2	DRR51	1006978.082	437818.5796	3813
7	1	2	DRR52	1006903.327	437859.1675	3801
7	1	2	DRR53	1007063.707	437805.013	3823
7	1	2	DRR55	1006938.377	437710.2952	3813
7	1	2	DRR56	1007121.806	437788.7129	3823
7	1	2	DRR59	1006881.281	437687.3649	3802
7	1	2	DRR60	1007182.874	437797.0483	3824
7	1	2	DRR63	1007235.401	437804.1185	3824
7	1	2	DRR65	1007300.683	437730.7449	3835
7	1	2	DRR66	1007196.372	437704.2045	3824
7	1	2	DRR75	1006989.604	437714.6344	3813
7	1	2	DRR80	1006928.005	437643.8765	3812
7	1	2	DRR83	1006841.767	437563.4813	3801
7	1	2	DRR89	1006989.216	437514.5884	3814
7	1	2	DRR93	1006950.833	437380.6505	3798
7	1	2	DRR97	1007058.997	437294.6577	3803
7	1	2	DRR98	1006981.372	436626.5681	3803
7	1	2	DRR99	1007078.852	437243.6395	3803

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	2	DRT100	1007087.245	434081.8625	3791
7	1	2	DRT102	1006058.415	433807.8117	3792
7	1	2	DRT91	1001942.451	433919.089	3690
7	1	2	DRT92	1002903.067	434178.4628	3682
7	1	2	DRT93	1003835.068	434472.5074	3715
7	1	2	DRT95	1003947.768	433234.5495	3704
7	1	2	DRT97	1006145.77	434693.5065	3753
7	1	2	DS532	1006660.966	437999.6473	3792
7	1	2	DS702	1006833.556	437672.0311	3802
7	1	2	DS703	1006519.337	437700.2572	3779
7	1	2	DS704	1006148.088	437735.9045	3768
7	1	2	DS705	1005790.703	437629.3385	3748
7	1	2	DS706	1005637.669	437375.3076	3742
7	1	2	DS708	1005672.748	437479.463	3746
7	1	2	DS709	1005656.654	436655.5811	3734
7	1	2	DS710	1005723.761	436580.5542	3737
7	1	2	DS711	1005629.365	436550.876	3735
7	1	2	DS712	1004450.691	436502.8257	3733
7	1	2	DS729	1006064.165	433267.3829	3789
7	1	2	DW30	1005955.627	437782.0053	3760
7	1	2	DW34	1006971.564	438303.0386	3820
7	1	2	DW37	1006945.23	438371.4898	3801
7	1	2	EN82	1006189.865	437309.2259	3756
7	1	2	Oil Well	1006501.961	433753.945	3794
7	1	11	FBM 161	1004216.847	429778.2901	3712
7	1	11	FBM 68	1004196.908	429752.5434	3712
7	1	11	FBM 71	1004106.079	429736.2484	3712
7	1	11	FBM 74	1004056.382	429739.5571	3712
7	1	11	FBM 72	1004070.103	429689.8515	3712
7	1	11	FBT 50	1004109.836	429706.5092	3712
7	1	11	FBM 70	1004162.024	429714.3904	3712
7	1	11	FBM 162	1004188.735	429710.0257	3712
7	1	11	FBM 69	1004219.095	429689.4687	3712
7	1	11	FBR 2	1004174.218	429674.0356	3712
7	1	11	FBM 163	1004109.91	429650.8659	3710
7	1	11	FBS 89	1004083.134	429640.9556	3710
7	1	11	FBT 56	1004141.331	429607.966	3710
7	1	11	FBS 90	1004079.462	429588.4664	3710
7	1	11	B 4	1004027.443	429040.5015	3692
7	1	11	FBJ 135	1004463.004	430370.8505	3737
7	1	11	FBJ 130	1004598.41	430283.6006	3739
7	1	11	FBK 33	1004532.802	430278.6862	3739
7	1	11	FBT 207	1004440.961	430261.0404	3739

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT 9	1004580.019	430213.7075	3739
7	1	11	FBM 57	1004633.965	430189.5377	3739
7	1	11	FBM 54	1004504.794	430194.1696	3739
7	1	11	FBJ 26	1004381.362	430194.3001	3734
7	1	11	FBM 58	1004579.591	430168.6558	3732
7	1	11	FBJ 45	1004420.571	430148.4111	3731
7	1	11	FBT 187	1004360.654	430141.2804	3726
7	1	11	FBR 45	1004524.337	430133.532	3731
7	1	11	FBT 186	1004619.332	430127.7807	3732
7	1	11	FBT 20	1004393.829	430103.1574	3726
7	1	11	FBJ 20	1004497.573	430077.5045	3731
7	1	11	FBR 3	1004584.368	430091.0853	3732
7	1	11	FBM 59	1004543.154	430070.0932	3732
7	1	11	FBR 44	1004447.739	430065.0712	3731
7	1	11	FBM 180	1004618.168	430034.9219	3723
7	1	11	FBM 169	1004326.377	430009.0398	3718
7	1	11	FBT 64	1004412.154	430004.5216	3718
7	1	11	FBM 60	1004470.576	429990.4605	3721
7	1	11	FBS 78	1004524.92	429980.1457	3721
7	1	11	FBS 79	1004580.19	429979.2857	3723
7	1	11	FBM 61	1004422.828	429954.5795	3721
7	1	11	FBM 62	1004362.447	429953.1599	3718
7	1	11	FBM 96	1004344.064	429924.1757	3718
7	1	11	FBT 41	1004418.134	429929.7172	3721
7	1	11	FBS 77	1004492.985	429934.4766	3721
7	1	11	FBT 57	1004559.919	429943.1061	3723
7	1	11	FBS 80	1004617.892	429929.595	3723
7	1	11	FBS 87	1004531.205	429901.0598	3724
7	1	11	FBM 158	1004377.073	429889.7343	3716
7	1	11	FBS 88	1004447.686	429886.6741	3724
7	1	11	FBM 155	1004581.402	429876.0722	3727
7	1	11	FBM 183	1004462.395	429852.0818	3724
7	1	11	FBM 170	1004496.156	429814.3573	3724
7	1	11	FBT 89	1004460.377	429827.6116	3724
7	1	11	682.6	1004420.517	429811.7097	3724
7	1	11	FBM 166	1004357.26	429830.4388	3716
7	1	11	FBR 1	1004376.237	429792.4524	3715
7	1	11	FBM 171	1004334.411	429768.936	3715
7	1	11	FBJ 32	1004844.049	430353.4008	3760
7	1	11	FBT 8	1004719.446	430339.6296	3749
7	1	11	FBT 3	1004793.2	430331.4381	3760
7	1	11	FBT 198	1004894.412	430268.4032	3743
7	1	11	FBT 188	1004804.188	430277.6832	3743

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Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBT 22	1004748.331	430250.6374	3736
7	1	11	FBM 200	1004932.243	430227.9494	3743
7	1	11	FBK 37	1004842.574	430230.6859	3743
7	1	11	FBT 2	1004675.214	430223.7113	3736
7	1	11	FBT 63	1004756.263	430200.4779	3736
7	1	11	FBM 56	1004689.634	430190.6319	3736
7	1	11	FBM 186	1004799.657	430179.8783	3743
7	1	11	FBS 86	1004910.066	430170.3446	3743
7	1	11	FBM 155	1004746.247	430162.5229	3731
7	1	11	FBT 123	1004863.38	430143.9911	3739
7	1	11	FBM 202	1004667.771	430144.0706	3731
7	1	11	FBM 51	1004846.296	430137.0822	3739
7	1	11	FBM 185	1004706.565	430130.6317	3731
7	1	11	FBM 53	1004819.807	430117.2457	3739
7	1	11	FBK 32	1004896.323	430112.461	3739
7	1	11	FBM 54	1004758.662	430100.4222	3731
7	1	11	FBM 174	1004921.831	430099.5284	3745
7	1	11	FBM 173	1004668.226	430087.6769	3731
7	1	11	FBS 85	1004843.477	430072.5327	3739
7	1	11	FBS 84	1004761.202	430047.1344	3731
7	1	11	FBS 83	1004711.749	430033.8724	3735
7	1	11	FBS 82	1004666.823	430010.3564	3735
7	1	11	FBM 157	1004719.011	429994.3739	3735
7	1	11	FBT 91	1004912.401	429991.9603	3742
7	1	11	FBS 81	1004659.333	429951.2503	3723
7	1	11	FBM 156	1004700.238	429924.2304	3735
7	1	11	FBT 90	1004631.935	429868.9609	3727
7	1	11	FBM 153	1004965.342	430336.3739	3763
7	1	11	FBJ 98	1005159.259	430316.7058	3752
7	1	11	FBT 206	1005004.856	430294.6792	3743
7	1	11	FBJ 104	1005189.315	430226.1025	3741
7	1	11	FBJ 85	1005103.719	430227.9706	3754
7	1	11	FBK 4	1005042.809	430216.2668	3754
7	1	11	FBT 18	1005123.483	430184.5884	3754
7	1	11	FBT 61	1005015.746	430169.3685	3745
7	1	11	FBM 107	1005070.68	430152.0239	3752
7	1	11	FBK 31	1005134.79	430134.3236	3752
7	1	11	FBM 108	1004956.769	430138.8052	3745
7	1	11	FBK 40	1005031.401	430103.6494	3745
7	1	11	FBK 24	1005220.665	430087.907	3746
7	1	11	FBR 4	1005172.389	430077.6938	3746
7	1	11	FBM 176	1005083.209	430063.412	3752
7	1	11	FBM 177	1004944.855	430042.4406	3747

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBM 181	1004995.656	430036.46	3747
7	1	11	FBM 102	1005213.361	430029.7004	3741
7	1	11	FBT 40	1005066.032	430019.8668	3745
7	1	11	FBK 20	1004997.743	430003.0509	3747
7	1	11	FBT 28	1005125.937	429991.3431	3745
7	1	11	FBM 50	1005087.292	429976.4398	3745
7	1	11	FBK 7	1005168.898	429971.0426	3741
7	1	11	FBT 124	1005219.859	429943.8347	3741
7	1	11	FBM 105	1005187.723	429929.2309	3741
7	1	11	FBT 88	1005073.98	429931.4559	3745
7	1	11	FBK 21	1004997.069	429919.1485	3747
7	1	11	FBM 106	1005152.598	429900.2259	3741
7	1	11	FBK 22	1005210.953	429887.2467	3735
7	1	11	FBJ 87	1005355.521	430287.8258	3736
7	1	11	FBJ 75	1005487.985	430269.8778	3730
7	1	11	FBM 203	1005372.71	430211.2544	3736
7	1	11	FBA 7	1005515.405	430205.3872	3730
7	1	11	FBJ 81	1005387.447	430185.6059	3736
7	1	11	FBJ 62	1005505.948	430157.4951	3731
7	1	11	FBK 36	1005441.647	430130.2279	3731
7	1	11	FBK 30	1005308.667	430136.1868	3737
7	1	11	FBM 115	1005232.307	430137.7124	3746
7	1	11	FBM 188	1005429.7	430097.9495	3731
7	1	11	FBK 25	1005373.085	430079.113	3737
7	1	11	FBM 114	1005293.8	430076.7537	3737
7	1	11	FBR 26	1005502.083	430032.0307	3736
7	1	11	FBT 58	1005324.537	430032.9745	3742
7	1	11	FBK 35	1005434.74	430019.821	3736
7	1	11	FBR 5	1005402.237	429980.0861	3742
7	1	11	FBK 16	1005273.528	429982.7445	3741
7	1	11	FBB-1	1005246.958	429975.3437	3741
7	1	11	FBM 103	1005348.455	429968.5475	3742
7	1	11	FBM 52	1005462.364	429954.2276	3736
7	1	11	FBT 87	1005369.833	429932.3248	3742
7	1	11	FBT 65	1005301.991	429925.6555	3742
7	1	11	FBK 23	1005406.196	429921.8359	3742
7	1	11	FBS 94	1005439.017	429894.1422	3738
7	1	11	FBT 24	1005275.467	429876.2232	3735
7	1	11	FBM 104	1005330.51	429867.3813	3742
7	1	11	FBS 91	1005505.29	429869.5519	3738
7	1	11	FBS 92	1005462.654	429849.7902	3738
7	1	11	FBM 187	1005223.907	429812.9733	3735
7	1	11	FBM 109	1005287.063	429807.5563	3735

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983 East (ft)	SD State Plane 1983 North (ft)	Surface Elevation
7	1	11	FBT 29	1005362.207	429806.1424	3742
7	1	11	FBR 66	1005454.836	429784.192	3734
7	1	11	FBT 60	1005238.59	429763.9794	3731
7	1	11	FBT 21	1005355.294	429733.4861	3736
7	1	11	FBM 110	1005297.55	429716.2904	3736
7	1	11	FBJ 143	1005488.19	429712.8308	3734
7	1	11	FBR 56	1005411.517	429687.8782	3736
7	1	11	FBM 191	1005350.944	429666.5434	3732
7	1	11	FBR 67	1005505.179	429656.2999	3724
7	1	11	FBT 23	1005374.813	429622.5104	3732
7	1	11	FBR 8	1005417.475	429573.1976	3724
7	1	11	FBM 111	1005285.986	429549.4777	3722
7	1	11	FBT 27	1005358.018	429544.8118	3732
7	1	11	FBM 113	1005422.446	429521.1563	3720
7	1	11	FBM 112	1005471.755	429497.1272	3720
7	1	11	FBW 9	1005411.87	429472.2617	3723
7	1	11	FBM 190	1005420.751	429467.1484	3720
7	1	11	FBS 73	1005479.157	429427.0037	3720
7	1	11	FBS 72	1005432.936	429400.131	3717
7	1	11	FBT 66	1005488.015	429364.1344	3717
7	1	11	PM 192	1005375.664	428885.2912	3712
7	1	11	FBJ 83	1005585.96	430320.7566	3741
7	1	11	FBJ 70	1005768.094	430287.6997	3747
7	1	11	FBJ 82	1005801.894	430248.3004	3746
7	1	11	FBJ 69	1005606.106	430250.7117	3743
7	1	11	FBJ 67	1005720.203	430199.9474	3747
7	1	11	FBJ 61	1005627.721	430150.1287	3737
7	1	11	FBJ 68	1005723.889	430108.6126	3741
7	1	11	FBK 26	1005535.297	430090.0647	3731
7	1	11	FBJ 56	1005574.339	430056.9587	3737
7	1	11	FBK 27	1005622.536	429997.1791	3723
7	1	11	FBJ 50	1005645.133	429964.9731	3723
7	1	11	FBK 28	1005713.769	429901.995	3719
7	1	11	FBM 16	1005552.829	429889.6782	3729
7	1	11	FBS 66	1005590.351	429855.8987	3729
7	1	11	FBK 10	1005603.903	429786.1988	3726
7	1	11	FBS 67	1005642.841	429778.9312	3726
7	1	11	FBM 17	1005715.683	429793.1547	3719
7	1	11	FBS 68	1005775.967	429696.9966	3714
7	1	11	FBS 69	1005671.733	429673.1904	3714
7	1	11	FBS 70	1005696.795	429567.542	3709
7	1	11	FBS 71	1005615.607	429509.8226	3717
7	1	11	FBT 59	1005511.978	429460.924	3720

POWERTECH (USA) INC.

Historic TVA Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	11	FBS 74	1005552.706	429439.1813	3717
7	1	11	FBS 75	1005584.658	429385.8762	3715
7	1	11	FBS 76	1005659.155	429358.9929	3715
7	1	11	FBM 116	1005529.81	429351.356	3717
7	1	11	FBS 93	1005604.628	429344.5914	3715
7	1	11	FBT 67	1005525.535	429302.2221	3717
7	1	11	FBM 201	1005633.655	429295.7208	3715
7	1	11	FBT 26	1005575.496	429275.4925	3713
7	1	11	FBR 27	1005669.013	429254.116	3706
7	1	11	FBM 117	1005593.584	429245.1265	3713
7	1	11	FBT 68	1005553.171	429217.8624	3713
7	1	11	FBM 119	1005625.207	429177.3696	3713
7	1	11	FBM 118	1005559.451	429175.495	3713
7	1	11	FBR 33	1005578.639	429136.593	3705
7	1	11	FBW 7	1005734.11	429128.0352	3698
7	1	1	TP-1	1008136.033	435342.4501	3864
7	1	3	TP54A	999375.8258	435354.664	3652
7	1	3	TT11WDR	1000743.809	438538.9451	3677

POWERTECH (USA) INC.

Powertech Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
6	1	29	DB07-29-1C	989710.7	445311.54	3648
6	1	29	DB07-29-2	988763.5	445978.31	3668
6	1	29	DB07-29-3	988293.6	446511.27	3672
6	1	29	DB07-29-4	988484	446261.89	3673
6	1	29	DB07-29-5	988396.1	446394.73	3672
6	1	29	DB07-29-6	988350.1	446453.73	3672
6	1	29	DB07-29-7	988641.1	446124.73	3673
6	1	29	DB07-29-2	988801.3	445978	3668
6	1	29	DB07-29-7	988664.9	446110.89	3671
6	1	29	DB07-29-4	988522.5	446255.73	3673
6	1	29	DB07-29-5	988425	446384.2	3672
6	1	29	DB07-29-6	988324.8	446436.14	3670
6	1	29	DB07-29-3	988340	446508.2	3672
6	1	29	DB07-29-1C	989763.3	445309.65	3648
6	1	32	DB07-32-1C	988811.8	443727.69	3629
6	1	32	DB07-32-2C	988794.2	443098.67	3624
6	1	32	DB07-32-3C	988733.9	443715.57	3629
6	1	32	DB07-32-4C	989096.3	443417.7	3629
6	1	32	DB07-32-5	988490	443736.69	3628
6	1	32	DB 07-32-6	987200.6	440240.62	3600
6	1	32	DB 08-32-7	987359.6	440122.86	3593
6	1	32	DB07-32-2C	988830.9	443086.37	3624
6	1	32	DB 08-32-8	987425.9	440058.7	3590
6	1	32	DB07-32-9C	988796	443670.41	3629
6	1	32	DB07-32-10	988749.6	443787.95	3630
6	1	32	DB07-32-11	988738.5	443665.55	3629
6	1	32	DB 08-32-12	990771.8	439361.88	3592
6	1	32	DB 08-32-13	990753.8	439324.1	3595
6	1	32	DB 08-32-13	990796.3	439324.1	3595
6	1	32	DB 08-32-13	990728.1	439361.47	3592
6	1	32	DB 07-32-6	987228.5	440222.7	3596
6	1	32	DB 07-32-7	987384	440113.69	3593
6	1	32	DB 08-32-8	987451.1	440070.22	3590
6	1	32	DB07-32-3C	988757.6	443725.77	3629
6	1	32	DB07-32-1C	988840.5	443719.99	3629
6	1	32	DB07-32-9C	988838	443665.83	3629
6	1	32	DB07-32-11	988775.5	443663.22	3629
6	1	32	DB07-32-10	988726.9	443802.72	3630
6	1	32	DB07-32-5	988523.7	443737.46	3628
6	1	32	DB07-32-4C	989147.8	443410.78	3629
7	1	1	DB07-1-1	1007826	433940.25	3831
7	1	1	DB07-1-2	1007775	433841.45	3823
7	1	1	DB07-1-3	1007683	433796.91	3821

POWERTECH (USA) INC.

Powertech Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface
				East (ft)	North (ft)	Elevation
7	1	1	DB07-1-4	1007394	433185.26	3801
7	1	1	DB07-1-5	1007266	433268.37	3806
7	1	1	DB 08-1-6	1012133	433340.73	3823
7	1	3	DB 07-3-1	999438.8	434089.55	3643
7	1	3	DB 07-3-2	999495.4	434193.67	3652
7	1	3	DB 07-3-3	999524.4	434272.3	3642
7	1	3	DB 07-3-4	999886	435149.2	3654
7	1	3	DB 08-3-5	1000166	434885.67	3652
7	1	10	DB 07-10-2	1000202	428535.38	3644
7	1	10	DB 07-10-3	1000199	428617.32	3646
7	1	10	DB 07-10-5	1000209	428830.2	3641
7	1	10	DB 07-10-7	1000287	430922.8	3653
7	1	10	DB 07-10-9	1001177	430776.9	3665
7	1	10	DB 07-10-10	1001196	430915.23	3665
7	1	10	DB 07-10-11	1001197	431042.48	3664
7	1	10	DB 07-10-13	1000020	432148.32	3642
7	1	10	DB 07-10-14	1000118	432154.99	3642
7	1	10	DB 07-10-15	1000221	432147.19	3643
7	1	10	DB 07-10-17	999859.6	432684.95	3642
7	1	10	DB 07-10-19	999936.7	432687.28	3642
7	1	10	DB 07-10-20	999994.6	432687.52	3642
7	1	10	DB 07-10-21	1000052	432683.3	3642
7	1	10	DB07-10-23	1000358	429713.46	3662
7	1	10	DB07-10-24	1000264	429770.12	3662
7	1	10	DB07-10-25	1000192	429794.58	3670
7	1	10	DB07-10-26	1000093	429844.91	3675
7	1	10	DB 07-10-28	1000460	430081.05	3667
7	1	10	DB 07-10-40	1000338	432893.3	3646
7	1	10	DB 07-10-42	1000432	433032.36	3648
7	1	10	DB 07-10-43	1000467	433097.11	3646
7	1	10	DB 07-10-1	1000211	428442.73	3644
7	1	10	DB 07-10-4	1000473	430985.1	3649
7	1	10	DB 07-10-6	1000370	430919.99	3653
7	1	10	DB 07-10-8	1000232	430910.14	3657
7	1	10	DB 07-10-27	1001217	430832.69	3665
7	1	10	DB 07-10-12	999916.9	432155.95	3641
7	1	10	DB 07-10-22	1000122	432680.66	3642
7	1	10	DB 07-10-41	1000358	432962.61	3645
7	1	11	DB07-11-1	1003677	431258.2	3734
7	1	11	DB07-11-2	1003566	431276.05	3725
7	1	11	DB07-11-3	1003433	431282.7	3720
7	1	11	DB07-11-4C	1003491	429994.44	3703
7	1	11	DB07-11-5	1003280	431905.46	3711

POWERTECH (USA) INC.

Powertech Drill Holes within the One Mile Perimeter around the Dewey-Burdock Uranium ISR Project Boundary

Township	Range	Section	Hole ID	SD State Plane 1983		Surface Elevation
				East (ft)	North (ft)	
7	1	11	DB07-11-6	1003404	431895.76	3710
7	1	11	DB07-11-7	1003535	431893.21	3721
7	1	11	DB07-11-8	1004038	432703.58	3724
7	1	11	DB07-11-9	1004144	432698.15	3724
7	1	11	DB07-11-10	1004260	432694.31	3719
7	1	11	DB 07-11-28	1006437	429889.51	3730
7	1	11	DB 07-11-29	1006510	429916.21	3730
7	1	11	DB 07-11-30	1006614	429964.88	3734
7	1	11	DB 07-11-31	1006713	430000.05	3742
7	1	11	DB07-11-11C	1003491	429971.87	3703
7	1	11	DB 07-11-12	1006107	430210.56	3751
7	1	11	DB07-11-13	1006113	430395.42	3750
7	1	11	DB 07-11-14C	1003621	429769.16	3692
7	1	11	DB07-11-15	1003389	429772.53	3697
7	1	11	DB 07-11-16C	1003549	429991.2	3700
7	1	11	DB 07-11-13	1006118	430394.5	3750
7	1	11	DB07-11-17	1003441	429977.44	3703
7	1	12	DB 07-12-4	1009331	431846.37	3783
7	1	12	DB 07-12-3	1009543	431766.83	3763
7	1	12	DB 07-12-6	1007213	429793.83	3753
7	1	15	DB 07-15-1C	1000125	427802.64	3629
7	1	15	DB 08-15-2	996927.8	427262.9	3604
7	1	15	DB 08-15-3	996957.7	427152.75	3603

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APPENDIX 7.5-A

SOIL MAPPING UNIT DESCRIPTIONS

“Aa” – Alice clay, 0 to 6 percent slope

The Alice clay mapping unit consists of very deep, well drained soils on upland hillslopes and river valley terraces. It occurs on moderately coarse textured alluvium and windblown material at elevations from 3000 to 5500 feet.

The mean annual precipitation is estimated to be 14 to 18 inches. The mean annual air temperature is approximately 49 degrees Fahrenheit. The frost-free season ranges from 120 to 150 days.

Slopes range from 0 to 15 percent. Parent material consists of moderately coarse textured material that is mainly alluvium but may include some eolian sands and loess.

A typical profile contains a 9 inch grayish brown fine sandy loam surface layer. The transition subsoil is a grayish brown fine sandy loam that is approximately 4 inches thick. The substratum is a light brownish gray fine sandy loam that extends to approximately to 26 inches in depth.

Permeability within the Alice soil is moderately rapid. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is severe and the wind erosion hazard is severe.

Productivity and Reclamation Potential

There are twenty seven plant species that are common to this map unit: Needle and thread, Little bluestem, Prairie sandreed, Blue grama, Western wheatgrass, Big bluestem, Hairy grama, Sand bluestem, Sedge, Sideoats grama, Switchgrass, Blacksamson Echinacea, Breadroot scurfpea, Fringed sagewort, Louisiana sagewort, Prairie coneflower, Stiff sunflower, Heath aster, Leadplant, Plains pricklypear, Rose, Sand sagebrush, Silverleaf scurfpea, Slimflower scurfpea, Violet prairieclover, Wormwood, and Yucca .

In a favorable year (above average moisture), the production is approximately 2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a good source for roadfill. This map unit is a good source for topsoil.

"Ar" - Arvada fine sandy loam, 0 to 6 percent slope

The Arvada fine sandy loam mapping unit consists of very deep, well drained soils formed in alluvium and colluvium that was derived from sodic shale. It occurs on alluvial fans, fan remnants, fan terraces and hillslopes at elevations from 2,600 to 6,000 feet.

The mean annual precipitation is estimated to be 9 to 14 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 100 to 160 days.

Slopes range from 0 to 25 percent. Parent material consists of moderately fine textured alluvium and colluvium derived from sedimentary rocks.

A typical profile contains a 4 inch light gray fine sandy loam surface layer. The transition subsoil is a brown clay that is approximately 10 inches thick. The substratum is a brown clay loam that extends to approximately to 20 inches in depth.

Permeability within the Arvada soil is very slow. Runoff is high on the gentler slopes and very high on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty two plant species that are common to this map unit: Blue grama, Buffalograss, Thickspick wheatgrass,Western wheatgrass, Sideoats grama, Needle and thread, Alkali sacaton, Bluegrass, Inland saltgrass, Nuttall's alkaligrass, Prairie sandreed, Sand dropseed, Sedge, Tumblegrass, Big sagebrush, Broom snakeweed, Ericameria nauseosa ssp. nauseosa var nauseosa, Fringed sagewort, Greasewood, Nuttall's saltbush, Plains pricklypear, and Plains springparsley.

In a favorable year (above average moisture), the production is approximately 840 lbs/acres. In an unfavorable (drought) year, the production is approximately 420 lbs/acres.

According to NRCS information, this map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include sodium content, too clayey and rock fragments. This map unit is a fair source of overall reclamation material; limitations include sodium content, too alkaline, too clayey, low organic matter content and water erosion.

"As" - Ascalon fine sandy loam, 0 to 6 percent slope

The Ascalon fine sandy loam mapping unit consists of very deep, well drained soils that formed in moderate coarse textured calcareous material. It occurs on upland hillslopes and tableland plains at elevation ranges from 4,000 feet to 6,000 feet.

The mean annual precipitation is estimated to be 13 to 17 inches. The mean annual air temperature is approximately 49 degrees Fahrenheit. The frost-free season ranges from 130 to 160 days.

Slopes range from 0 to 25 percent. Parent material consists of thick, moderately coarse textured, calcareous material.

A typical profile contains a 4 inch grayish brown fine sandy loam surface layer. The transition subsoil is a grayish brown fine sandy loam that is approximately 3 inches thick. The substratum is a brown sandy clay loam that extends to approximately to 14 inches in depth.

Saturated hydraulic conductivity within the Ascalon soil is high. Runoff is low on the gentler slopes and high on the steeper slopes. The water erosion hazard is severe and the wind erosion hazard is severe.

Productivity and Reclamation Potential

There are twenty seven plant species that are common to this map unit: Needle and thread, Little bluestem, Prairie sandreed, Blue grama, Western wheatgrass, Big bluestem, Hairy grama, Sand bluestem, Sedge, Sideoats grama, Switchgrass, Blacksamson Echinacea, Breadroot scurfpea, Fringed sagewort, Louisiana sagewort, Prairie coneflower, Stiff sunflower, Heath aster, Leadplant, Plains pricklypear, Rose, Sand sagebrush, Silverleaf scurfpea, Slimflower scurfpea, Violet prairieclover, Wormwood, and Yucca.

In a favorable year (above average moisture), the production is approximately 2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a good source for roadfill. This map unit is a good source for topsoil.

"Bc" - Barnum very fine sandy loam, 0 to 6 percent slope

The Barnum very fine sandy loam mapping unit consists of very deep, well drained soils formed in calcareous alluvium from red bed sediments. It occurs on flood plains and alluvial terraces with an elevation range from 4,000 feet to 6,600 feet.

The mean annual precipitation is estimated to be 10 to 14 inches. The mean annual air temperature is approximately 47 degrees Fahrenheit. The frost-free season ranges from 110 to 135 days.

Slopes range from 0 to 8 percent. Parent material consists of calcareous alluvium from red bed sediments.

A typical profile contains a 4 inch reddish brown very fine sandy loam surface layer. The transition subsoil and substratum is a reddish brown loam stratified with thin lenses of fine sandy loam and light clay loam that extends to approximately to 60 inches in depth.

Permeability within the Barnum soil is moderate or moderately slow because of stratification. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty three plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Bluegrass, Big bluestem, Fringed sagewort, Wormwood, Sedge, Switchgrass, Yellow Indiangrass, Blue grama, Breadroot scurfpea, Broom snakeweed, Hairy grama, Heath aster, Louisiana sagewort, Prairie coneflower, Silverleaf scurfpea, Leadplant, Skunkbush sumac, and Slimflower scurfpea.

In a favorable year (above average moisture), the production is approximately 2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content and water erosion. This map unit is a fair source for roadfill; limitations include low strength and shrink-swell. This map unit is a fair source for topsoil; limitations include salinity.

"Bo" - Boneek silt loam, 0 to 6 percent slope

The Boneek silt loam mapping unit consists of deep and very deep, well drained soils formed in silty sediments underlain by sandstone or siltstone. It occurs on nearly level to moderately sloping high terraces and uplands at elevations from 2950 to 3940 feet.

The mean annual precipitation is estimated to be 15 to 18 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 0 to 15 percent. Parent material consists of silty mantle overlying sandstone or siltstones, or in loess or silty alluvium.

A typical profile contains a 3 inch brown silt loam surface layer. The transition subsoil is a brown silt loam that is approximately 3 inches thick. The substratum is a brown silty clay that extends to approximately to 10 inches in depth.

Permeability within the Boneek soil is moderately slow in the solum and moderate in the underlying material. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty three plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Bluegrass, Big bluestem, Fringed sagewort, Wormwood, Sedge, Switchgrass, Yellow Indiangrass, Blue grama, Breadroot scurfpea, Broom snakeweed, Hairy grama, Heath aster, Louisiana sagewort, Prairie coneflower, Silverleaf scurfpea, Leadplant, Skunkbush sumac, and Slimflower scurfpea.

In a favorable year (above average moisture), the production is approximately 2,200 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content and water erosion. This map unit is a fair source for roadfill; limitations include low strength. This map unit is a good source for topsoil.

“Br” - Broadhurst clay, 6 to 15 percent slope

The Broadhurst clay mapping unit consists of very deep, well drained soils formed in clayey material derived from acid shales. It occurs on fans and terraces at elevations from 2950 to 3940 feet.

The mean annual precipitation is estimated to be 15 to 18 inches. The mean annual air temperature is approximately 47 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 0 to 15 percent. Parent material consists of clayey material derived from acid shales.

A typical profile contains a 3 inch light brownish gray clay surface layer. The transition subsoil is a grayish brown clay that is approximately 13 inches thick. The substratum is a grayish brown and light brownish gray clay that extends to approximately to 41 inches in depth.

Permeability within the Broadhurst soil is very slow except after dry periods when the initial intake in cracks is rapid. Runoff is medium on the gentler slopes and very high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are nine plant species that are common to this map unit: Western wheatgrass, Thickspick wheatgrass, Green needlegrass, American vetch, Onion, Plains springparsley, Big sagebrush, Nuttall's saltbush, and Plains pricklypear.

In a favorable year (above average moisture), the production is approximately 1,700 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, water erosion, too clayey, too acid and salinity. This map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include too clayey, salinity, too acid and slope.

"Bw" – Butche cobbly loam, 6 to 40 percent slope

The Butche cobbly loam mapping unit consists of shallow, well drained to excessively drained soils formed in loamy materials weathered from sandstone. It occurs on sloping to very steep uplands at elevations from 3000 to 5500 feet.

The mean annual precipitation is estimated to be 13 to 18 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 1 to 60 percent. Parent material consists of loamy materials weathered from noncalcareous sandstone.

A typical profile contains a 4 inch dark grayish brown cobbly loam surface layer. The transition subsoil is a pale brown cobbly loam that is approximately 6 inches thick. The substratum is very pale brown indurated sandstone that extends to approximately to 60 inches in depth.

Permeability within the Butche soil is moderate or moderately rapid. Runoff is low on the gentler slopes and high on the steeper slopes. The water erosion hazard is negligible and the wind erosion hazard is negligible.

Productivity and Reclamation Potential

There are twenty seven plant species that are common to this map unit: Little bluestem, Sideoats grama, Big bluestem, Needle and thread, Switchgrass, Yellow Indiangrass, Bluegrass, Prairie dropseed, Prairie sandreed, Sedge, Western wheatgrass, Dropseed, Blacksamson Echinacea, Breadroot scurfpea, Broom snakeweed, Dotted gayfeather, Louisiana sagewort, Blue grama, Fringed sagewort, Hairy grama, Leadplant, Ponderosa pine, Silverleaf scurfpea, Skunkbush sumac, Slimflower scurfpea, True mountain mahogany, and Wormwood.

In a favorable year (above average moisture), the production is approximately 1,600 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,000 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty and depth to bedrock. This map unit is a poor source for roadfill; limitations include depth to bedrock and cobble content. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and rock fragments.

"Cn" – Colby silt loam, 6 to 15 percent slope

The Colby silt loam mapping unit consists of very deep, well drained and somewhat excessively drained soils formed in calcareous loess. It occurs on nearly level to steep hills and plains at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 13 to 20 inches. The mean annual air temperature is approximately 45 to 55 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 60 percent. Parent material consists of calcareous silty loess.

A typical profile contains a 4 inch grayish brown silt loam surface layer. The transition subsoil is a light brownish gray silt loam that is approximately 4 inches thick. The substratum is a pale brown silt loam that extends to approximately to 20 inches in depth.

Permeability within the Colby soil is moderate. Runoff is low on the gentler slopes and very high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty three plant species that are common to this map unit: Needle and thread, Little bluestem, Western wheatgrass, Sedge, Prairie sandreed, Sideoats grama, Blue grama, Green needlegrass, Hairy grama, Inland saltgrass, Plains muhly, Big sagebrush, Blacksamson Echinacea, Broom snakeweed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Plains pricklypear, Prairie coneflower, Violet prairieclover, Wormwood, and Yucca.

In a favorable year (above average moisture), the production is approximately 1,600 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content, water erosion and carbonate content. This map unit is a poor source for roadfill; limitations include low strength and slope. This map unit is a poor source for topsoil; limitations include slope and carbonate content.

"Cy" - Cushman very fine sandy loam, 6 to 15 percent slope

The Cushman very fine sandy loam mapping unit consists of well drained soils that are moderately deep to bedrock and formed in slopewash alluvium and residuum from interbedded shales and siltstone and fine-grained argillaceous sandstone. It occurs on buttes, fan remnants, hills, piedmonts, ridges and terraces at elevations from 3,500 to 6,000 feet.

The mean annual precipitation is estimated to be 10 to 14 inches. The mean annual air temperature is approximately 45 degrees Fahrenheit. The frost-free season ranges from 105 to 130 days.

Slopes range from 0 to 20 percent. Parent material consists of moderately fine textured slopewash alluvium and residuum.

A typical profile contains a 2 inch light brownish gray very fine sandy loam surface layer. The transition subsoil is a brown clay loam that is approximately 6 inches thick. The substratum is a yellowish brown clay loam that extends to approximately to 14 inches in depth.

Permeability within the Cushman soil is moderate. Runoff is medium. The water erosion hazard is slight and the wind erosion hazard is slight.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Prairie sandreed, Sand dropseed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silverleaf scurfpea, American vetch, Big sagebrush, Blue grama, Bluegrass, Breadroot scurfpea, Buffalograss, Heath aster, Leadplant, Prairie coneflower, Rose, Sedge, Skunkbush sumac, Slimflower scurfpea, and Western yarrow.

In a favorable year (above average moisture), the production is approximately 2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content, droughty and depth to bedrock. This map unit is a poor source for roadfill; limitations include depth to bedrock, low strength and shrink-swell. This map unit is a fair source for topsoil; limitations include depth to bedrock.

“Dg” – Demar loam, 0 to 6 percent slope

The Demar loam mapping unit consists of deep or very deep, moderately well drained soils formed in clayey alluvium from acid clay shales. It occurs on micro-highs on nearly level to gently sloping alluvial terraces having pronounced micro-relief at elevations from 2950 to 3940 feet.

The mean annual precipitation is estimated to be 12 to 18 inches. The mean annual air temperature is approximately 47 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 0 to 6 percent. Parent material consists of clayey alluvium derived from acid clay shales.

A typical profile contains a 5 inch pale brown loam surface layer. The transition subsoil is a brown silty clay loam that is approximately 7 inches thick. The substratum is a grayish brown silty clay that extends to approximately to 24 inches in depth.

Permeability within the Demar soil is very slow. Runoff is medium. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are fifteen plant species that are common to this map unit: Western wheatgrass, Blue grama, Needle and thread, Buffalograss, Green needlegrass, Prairie sandreed, Sedge, American vetch, Broom snakeweed, Fringed sagewort, Louisiana sagewort, Scarlet globemallow, Big sagebrush, Ericameria nauseosa ssp. nauseosa var.nauseosa, and Plains pricklypear.

In a favorable year (above average moisture), the production is approximately 1,600 lbs/acres. In an unfavorable (drought) year, the production is approximately 900 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content, water erosion, too clayey, too acid and salinity. This map unit is a poor source for roadfill; limitations include depth to bedrock, low strength and shrink-swell. This map unit is a fair source for topsoil; limitations include too clayey and sodium content.

"Gr" – Grummit clay, 0 to 6, 6 to 15 and 15 to 60 percent slope

The Grummit clay mapping unit consists of shallow, well drained soils formed in clayey residuum from acid shale on uplands. It occurs on gently sloping to very steep uplands at elevations from 2950 to 3940 feet.

The mean annual precipitation is estimated to be 12 to 18 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 2 to 60 percent. Parent material consists of clayey residuum weathered from acid shales.

A typical profile contains a 3 inch light brownish gray clay surface layer. The transition subsoil is a grayish brown clay that is approximately 4 inches thick. The substratum is a grayish brown and gray clay that extends to approximately to 17 inches in depth.

Permeability within the Grummit soil is moderate or moderately slow in the upper part and moderate in the underlying material. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Little bluestem, Western wheatgrass, Sideoats grama, Green needlegrass, Blue grama, Big bluestem, Hairy grama, Needle and thread, Prairie sandreed, Rocky Mountain juniper, Sedge, Big sagebrush, Blacksamson Echinacea, Broom snakeweed, Rose, Silver buffaloberry, Skunkbush sumac, Breadroot scurfpea, Fringed sagewort, Leadplant, Louisiana sagewort, Prairie coneflower, Silverleaf scurfpea, Slimflower scurfpea, Violet prairieclover, and Yucca.

In a favorable year (above average moisture), the production is approximately 1,400 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty, too clayey, depth to bedrock and too acid. This map unit is a poor source for roadfill; limitations include depth to bedrock and slope. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope, too clayey and too acid.

"Ha" - Haverson loam, 0 to 6 percent slope

The Haverson loam mapping unit consists of very deep, well drained soils that formed in alluvium from mixed sources. It occurs on floodplains and low terraces at elevations from 2950 to 3940 feet.

The mean annual precipitation is estimated to be 14 to 18 inches. The mean annual air temperature is approximately 49 degrees Fahrenheit. The frost-free season ranges from 125 to 180 days.

Slopes range from 0 to 9 percent. Parent material consists of highly stratified, calcareous, recent alluvium derived from mixed sources.

A typical profile contains a 3 inch pale brown loam surface layer. The transition subsoil is a pale brown loam that is approximately 3 inches thick. The substratum is a light brownish gray loam that extends to approximately to 12 inches in depth.

Permeability within the Haverson soil is moderate. Runoff is negligble on the gentler slopes and medium on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty four plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Prairie sandreed, Needle and thread, Blue grama, Buffalograss, Bluegrass, Fringed sagewort, Sedge, Heath aster, Western yarrow, Wormwood, Big bluestem, Big sagebrush, Boxelder, Common chokecherry, Green ash, Leadplant, Little bluestem, Louisiana sagewort, Plains cottonwood, Silver buffaloberry, Skunkbush sumac, and Western snowberry.

In a favorable year (above average moisture), the production is approximately 2,800 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,600 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a fair source for roadfill; limitations include shrink-swell. This map unit is a good source for topsoil.

"He" - Hisle silt loam, 0 to 6 percent slope

The Hisle silt loam mapping unit consists of moderately deep, well drained and moderately well drained soils formed in clayey sediments weathered from clay shale on uplands. It occurs on nearly level to moderately sloping on uplands at elevations around 3,020 feet.

The mean annual precipitation is estimated to be 12 to 16 inches. The mean annual air temperature is approximately 45 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 15 percent. Parent material consists of clays transported locally or weathered in place from clay shales.

A typical profile contains a 1 inch light gray silt loam surface layer. The transition subsoil is a light brownish gray clay that is approximately 1 inch thick. The substratum is a light brownish gray clay that extends to approximately to 9 inches in depth.

Permeability within the Hisle soil is very slow, but after dry periods initial intake commonly is rapid because of cracks. Runoff is medium on the gentler slopes and very high on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty two plant species that are common to this map unit: Blue grama, Buffalograss, Thickspick wheatgrass, Western wheatgrass, Sideoats grama, Needle and thread, Alkali sacaton, Bluegrass, Inland saltgrass, Nuttall's alkaligrass, Prairie sandreed, Sand dropseed, Sedge, Tumblegrass, Big sagebrush, Broom snakeweed, Ericameria nauseosa ssp. nauseosa var. nauseosa, Fringed sagewort, Greasewood, Nuttall's saltbush, Plains pricklypear, and Plains springparsley.

In a favorable year (above average moisture), the production is approximately 1,100 lbs/acres. In an unfavorable (drought) year, the production is approximately 500 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include sodium content, droughty, too clayey, depth to bedrock and salinity. This map unit is a poor source for roadfill; limitations include low strength, depth to bedrock and shrink-swell. This map unit is a poor source for topsoil; limitations include too clayey, salinity, depth to bedrock and sodium content.

“Ky” – Kyle clay, 0 to 6 percent slope

The Kyle clay mapping unit consists of very deep and well drained soils formed in sediments weathered from clay shale on uplands. It occurs on nearly level to strongly sloping on uplands and colluvial fans at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 12 to 19 inches. The mean annual air temperature is approximately 47 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 15 percent. Parent material consists of clayey sediments weathered from calcareous clay shale.

A typical profile contains a 4 inch grayish brown clay surface layer. The transition subsoil is a grayish brown clay that is approximately 4 inches thick. The substratum is a grayish brown clay that extends to approximately to 16 inches in depth.

Permeability within the Kyle soil is very slow, except after dry periods when the initial intake into cracks is rapid. Runoff is medium on the gentler slopes and very high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are nineteen plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Sideoats grama, Needle and thread, Blue grama, Bluegrass, Buffalograss, Sedge, Big sagebrush, Fringed sagewort, Heath aster, Louisiana sagewort, Plains pricklypear, Silverleaf scurfpea, Western yarrow, American vetch, Breadroot scurfpea, Scarlet globemallow, and Slimflower scurfpea.

In a favorable year (above average moisture), the production is approximately 2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, water erosion, too clayey and sodium content. This map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include too clayey and sodium content.

“Lo” – Lohmiller silty clay loam, 0 to 6 percent slope

The Lohmiller silty clay loam mapping unit consists of very deep, well drained soils formed in alluvium on bottom lands. It occurs on flood plains and high bottom lands of rivers and streams and on alluvial fans of foot slopes at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 10 to 19 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 8 percent. Parent material consists of calcareous alluvium from sedimentary rock.

A typical profile contains a 4 inch grayish brown silty clay loam surface layer. The transition subsoil is a grayish brown clay loam that is approximately 4 inches thick. The substratum is a grayish brown clay loam that extends to approximately to 60 inches in depth.

Permeability within the Lohmiller soil is slow or moderately slow. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty four plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Prairie sandreed, Needle and thread, Blue grama, Buffalograss, Bluegrass, Fringed sagewort, Sedge, Heath aster, Western yarrow, Wormwood, Big bluestem, Big sagebrush, Boxelder, Common chokecherry, Green ash, Leadplant, Little bluestem, Louisiana sagewort, Plains cottonwood, Silver buffaloberry, Skunkbush sumac, and Western snowberry.

In a favorable year (above average moisture), the production is approximately 2,600 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,500 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, water erosion and too clayey. This map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include too clayey.

“Mm” – Mathias extremely stony very fine sandy loam, 15 to 40 percent slope

The Mathias extremely stony very fine sandy loam mapping unit consists of very deep, well drained soils formed in colluvial sediments weathered from interbedded sandstone and shale on uplands. It occurs below sandstone outcrops on mountain side slopes at elevations from 2,950 to 5,600 feet.

The mean annual precipitation is estimated to be 15 to 18 inches. The mean annual air temperature is approximately 45degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 15 to 70 percent. Parent material consists of material weathered from interbedded fine grain sandstone and shale.

A typical profile contains a 2 inch dark grayish brown extremely stony very fine sandy loam surface layer. The transition subsoil is a light brownish gray very fine sandy loam that is approximately 7 inches thick. The substratum is a brown very fine sandy loam that extends to approximately to 13 inches in depth.

Permeability within the Mathias soil is moderate. Runoff is high on the gentler slopes and very high on the steeper slopes. The water erosion hazard is negligible and the wind erosion hazard negligible.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Sedge, Little bluestem, Sideoats grama, Achnatherum richardsonii, Big bluestem, Dropseed, Green needlegrass, Leadplant, Prairie dropseed, Prairie junegrass, Rose, Switchgrass, Yellow Indiangrass, Bearded wheatgrass, Ponderosa pine, Slender wheatgrass, Western wheatgrass, Rocky Mountain juniper, Breadroot scurfpea, Dotted gayfeather, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Prairie coneflower, Silverleaf scurfpea, Slimflower scurfpea, and Columbia needlegrass.

In a favorable year (above average moisture), the production is approximately 2,900 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,700 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content, cobble content and stone content. This map unit is a poor source for roadfill; limitations include slope, cobble content and stone content. This map unit is a poor source for topsoil; limitations include slope, rock fragments and hard to reclaim (rock fragments).

"Ne" – Nevee silt loam, 6 to 15 percent slope

The Nevee silt loam mapping unit consists of deep and very deep, well drained soils formed in reddish silty alluvial-colluvial sediments on terraces and uplands. It occurs on nearly level to steep on terraces, uplands, and alluvial fans at elevations from 2950 to 3510 feet.

The mean annual precipitation is estimated to be 15 to 18 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 1 to 30 percent. Parent material consists of silty alluvium weathered from reddish colored silty shale, siltstone, or sandstone.

A typical profile contains a 4 inch reddish brown silt loam surface layer. The transition subsoil is a yellowish red silt loam that is approximately 4 inches thick. The substratum is a reddish yellow silt loam that extends to approximately to 24 inches in depth.

Permeability within the Nevee soil is moderate. Runoff is very low on the gentler slopes and high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are nineteen plant species that are common to this map unit:Little bluestem, Sideoats grama, Needle and thread, Sedge, Blue grama, Hairy grama, Western wheatgrass, Buffalograss, Green needlegrass, Blacksamson Echinacea, Breadroot scurfpea, Fringed sagewort, Heath aster, Louisiana sagewort, Plains pricklypear, Rose, Silverleaf scurfpea, Slimflower scurfpea, and Wormwood.

In a favorable year (above average moisture), the production is approximately 2,000 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,200 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; water erosion and carbonate content. This map unit is a poor source for roadfill; limitations include depth to bedrock and low strength. This map unit is a poor source for topsoil; limitations include slope and carbonate content.

“Nf” – Nihill gravelly loam, 15 to 50 percent slope

The Nihill gravelly loam mapping unit consists of very deep, well drained soils formed in gravelly alluvium from mixed sources. It occurs on Pleistocene terraces and terrace remnants at elevations from 2,600 to 6,800 feet.

The mean annual precipitation is estimated to be 10 to 19 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 105 to 130 days.

Slopes range from 0 to 80 percent. Parent material consists of calcareous gravelly alluvium from mixed sources.

A typical profile contains a 5 inch dark brown gravelly loam surface layer. The transition subsoil is a light yellowish brown very gravelly clay loam that is approximately 25 inches thick. The substratum is a very pale brown very gravelly sandy clay loam that extends to approximately to 60 inches in depth.

Permeability within the Nihill soil is moderate. Runoff is medium on the gentler slopes and high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are eighteen plant species that are common to this map unit: Sedge, Needle and thread, Sideoats grama, Blue grama, Hairy grama, Bluegrass, Little bluestem, Sand dropseed, Western wheatgrass, Blacksamson Echinacea, Broom snakeweed, Fringed sagewort, Hairy goldenaster, Louisiana sagewort, Plains pricklypear, Skunkbush sumac, Violet prairieclover, and Wormwood.

In a favorable year (above average moisture), the production is approximately 1,100 lbs/acres. In an unfavorable (drought) year, the production is approximately 600 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content and droughty. This map unit is a fair source for roadfill; limitations include slope. This map unit is a poor source for topsoil; limitations include slope, hard to reclaim (rock fragments) and rock fragments.

"No" – Norka loam, 0 to 6 percent slope

The Norka loam mapping unit consists of very deep well drained soils that formed in thick, calcareous, eolian or alluvial materials high in very fine sand. It occurs on hills, ridges, slope breaks and valley sideslopes at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 13 to 18 inches. The mean annual air temperature is approximately 48 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 12 percent. Parent material consists of thick, calcareous, eolian or alluvial materials often containing a large proportion of very fine sand.

A typical profile contains a 4 inch grayish brown loam surface layer. The transition subsoil is a grayish brown silt loam that is approximately 3 inches thick. The substratum is a grayish brown light silty clay loam that extends to approximately to 13 inches in depth.

Permeability within the Norka soil is moderate. Runoff is low on the gentler slopes and high on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Prairie sandreed, Sand dropseed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silverleaf scurfpea, American vetch, Big sagebrush, Blue grama, Bluegrass, Breadroot scurfpea, Buffalograss, Heath aster, Leadplant, Prairie coneflower, Rose, Sedge, Skunkbush sumac, Slimflower scurfpea, and Western yarrow.

In a favorable year (above average moisture), the production is approximately2,300 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a good source for roadfill. This map unit is a good source for topsoil.

"Nu" – Nunn clay loam, 0 to 6 and 6 to 15 percent slope

The Nunn clay loam mapping unit consists of very deep, well drained soils that formed in loess and mixed alluvium. It occurs on terraces or alluvial fans, and in drainageways at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 14 inches. The mean annual air temperature is approximately 48 degrees Fahrenheit. The frost-free season ranges from 120 to 210 days.

Slopes range from 0 to 25 percent. Parent material consists mixed alluvium.

A typical profile contains a 6 inch grayish brown clay loam surface layer. The transition subsoil is a grayish brown clay loam that is approximately 4 inches thick. The substratum is a pale brown clay loam that extends to approximately to 24 inches in depth.

Permeability within the Nunn soil is moderately slow to slow. Runoff is negligible on the gentler slopes and very high on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Prairie sandreed, Sand dropseed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silverleaf scurfpea, American vetch, Big sagebrush, Blue grama, Bluegrass, Breadroot scurfpea, Buffalograss, Heath aster, Leadplant, Prairie coneflower, Rose, Sedge, Skunkbush sumac, Slimflower scurfpea, and Western yarrow.

In a favorable year (above average moisture), the production is approximately 1,900 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,100 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, too clayey and water erosion. This map unit is a fair source for roadfill; limitations include shrink-swell. This map unit is a poor source for topsoil; limitations include too clayey.

“Pa” – Paunsaugunt gravelly loam, 6 to 15 percent slope

The Paunsaugunt gravelly loam mapping unit consists of well drained soils that are shallow to limestone and formed in residuum from limestone and calcareous sandstone. It occurs on mesas and hillsides at elevations from 6,000 to 8,400 feet.

The mean annual precipitation is estimated to be 16 to 22 inches. The mean annual air temperature is approximately 43 degrees Fahrenheit. The frost-free season ranges from 70 to 100 days.

Slopes range from 2 to 70 percent. Parent material consists of residuum on limestone and calcareous sandstone.

A typical profile contains a 3 inch brown gravelly loam surface layer. The transition subsoil is a grayish brown cobbly sandy loam that is approximately 5 inches thick. The substratum is a light brownish gray very cobbly sandy loam that extends to approximately to 15 inches in depth.

Permeability within the Paunsaugunt soil is moderate. Runoff is medium on the gentler slopes and rapid on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty nine plant species that are common to this map unit:

Little bluestem, Sideoats grama, Needle and thread, Blue grama, Bluegrass, Dropseed, Hairy grama, Idaho fescue, Prairie dropseed, Sedge, Prairie junegrass, Bearded wheatgrass, Skunkbush sumac, Achnatherum richardsonii, Blacksamson Echinacea, Breadroot scurfpea, Broom snakeweed, Columbia needlegrass, Dotted gayfeather, Fringed sagewort, Green needlegrass, Heath aster, Louisiana sagewort, Prairie coneflower, Silverleaf scurfpea, Slender wheatgrass, Slimflower scurfpea, True mountain mahogany, and Western wheatgrass.

In a favorable year (above average moisture), the production is approximately 1,600 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,000 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include droughty and depth to bedrock. This map unit is a poor source for roadfill; limitations include depth to bedrock. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and rock fragments.

“Pg” – Penrose channery loam, 15 to 40 percent slope

The Penrose channery loam mapping unit consists of shallow, well and somewhat excessively drained soils formed in thin, calcareous, loamy materials weathered in place from limestone and interbedded limy materials. It occurs on hills, plains, ridges, hogbacks, cuestas, and mesa tops at elevations from 3,000 to 6,500 feet.

The mean annual precipitation is estimated to be 11 to 15 inches. The mean annual air temperature is approximately 51 degrees Fahrenheit. The frost-free season ranges from 125 to 165 days.

Slopes range from 1 to 65 percent. Parent material consists of residuum and slope alluvium derived from limestone and interbedded limy materials.

A typical profile contains a 4 inch light brownish gray channery loam surface layer. The transition subsoil is a light gray channery loam that is approximately 11 inches thick. The substratum is limestone bedrock that extends to approximately to 15 inches in depth.

Permeability within the Penrose soil is moderate to moderately slow. Runoff is low on the gentler slopes and very rapid on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are six plant species that are common to this map unit: Sideoats grama, Blue grama, Achnatherum scribneri, Indian ricegrass, Juniper, and Little bluestem.

In a favorable year (above average moisture), the production is approximately 800 lbs/acres. In an unfavorable (drought) year, the production is approximately 300 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty and depth to bedrock. This map unit is a poor source for roadfill; limitations include depth to bedrock. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and rock fragments.

“Pe” – Pierre clay, 0 to 6 and 6 to 15 percent slope

The Pierre clay mapping unit consists of moderately deep, well drained soils formed in clayey residuum weathered from shale bedrock on uplands. It occurs on nearly nearly level to steep uplands at elevations from 1300 to 3600 feet.

The mean annual precipitation is estimated to be 10 to 13 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 30 percent. Parent material consists of residuum weathered from clay shale.

A typical profile contains a 2 inch grayish brown clay surface layer. The transition subsoil is a light brownish gray clay that is approximately 5 inches thick. The substratum is a light brownish gray clay that extends to approximately to 20 inches in depth.

Permeability within the Pierre soil is very slow, except after dry periods when the initial intake may be rapid due to cracks. Runoff is low on the gentler slopes and medium to very high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are nineteen plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Sideoats grama, Needle and thread, Blue grama, Bluegrass, Buffalograss, Sedge, Big sagebrush, Fringed sagewort, Heath aster, Louisiana sagewort, Plains pricklypear, Silverleaf scurfpea, Western yarrow, American vetch, Breadroot scurfpea, Scarlet globemallow, and Slimflower scurfpea.

In a favorable year (above average moisture), the production is approximately 2,200 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,200 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, depth to bedrock, droughty, too clayey and sodium content. This map unit is a poor source for roadfill; limitations include depth to bedrock, low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include depth to bedrock, too clayey and sodium content.

"Sa" – Samsil clay, 15 to 40 percent slope

The Samsil clay mapping unit consists of shallow, well drained soils formed in alluvium or residuum weathered from shale. It occurs on gently sloping to very steep hills, ridges and breaks of dissected shale plains at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 14 to 19 inches. The mean annual air temperature is approximately 47 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 2 to 60 percent. Parent material consists of alluvium or residuum weathered from shale.

A typical profile contains a 2 inch light brownish gray clay surface layer. The transition subsoil is a light grayish brown clay that is approximately 5 inches thick. The substratum is a light grayish brown clay that extends to approximately to 11 inches in depth.

Permeability within the Samsil soil is slow. Runoff is medium on the gentler slopes and very high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Little bluestem, Western wheatgrass, Sideoats grama, Green needlegrass, Blue grama, Big bluestem, Hairy grama, Needle and thread, Prairie sandreed, Rocky Mountain juniper, Sedge, Big sagebrush, Blacksamson echinacea, Broom snakeweed, Rose, Silver buffaloberry, Skunkbush sumac, Breadroot scurfpea, Fringed sagewort, Leadplant, Louisiana sagewort, Prairie coneflower, Silverleaf scurfpea, Slimflower scurfpea, Violet prairieclover, and Yucca.

In a favorable year (above average moisture), the production is approximately 1,400 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty, too clayey, depth to bedrock and water erosion. This map unit is a poor source for roadfill; limitations include depth to bedrock, slope, low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and too clayey.

"Sc" – Satanta loam, 0 to 6 percent slope

The Satanta loam mapping unit consists of very deep well drained soils that formed in eolian deposits. It occurs on plains or high stream terraces in the Central High Tablelands at elevations from 2000 to 4500 feet.

The mean annual precipitation is estimated to be 14 to 22 inches. The mean annual air temperature is approximately 56 degrees Fahrenheit. The frost-free season ranges from 140 to 200 days.

Slopes range from 0 to 15 percent. Parent material consists of eolian deposits.

A typical profile contains a 4 inch dark grayish brown loam surface layer. The transition subsoil is a dark grayish brown loam that is approximately 4 inches thick. The substratum is a very dark grayish brown loam that extends to approximately to 19 inches in depth.

Saturated hydraulic conductivity within the Satanta soil is moderately high. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Prairie sandreed, Sand dropseed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silverleaf scurfpea, American vetch, Big sagebrush, Blue grama, Bluegrass, Breadroot scurfpea, Buffalograss, Heath aster, Leadplant, Prairie coneflower, Rose, Sedge, Skunkbush sumac, Slimflower scurfpea, and Western yarrow.

In a favorable year (above average moisture), the production is approximately 2,200 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a good source for roadfill. This map unit is a good source for topsoil.

"Sn" – Shingle clay loam, 15 to 40 percent slope

The Shingle clay loam mapping unit consists of well drained soils that are very shallow or shallow to bedrock and formed in residuum and colluvium derived from interbedded shale and sandstone or in alluvium from mudstone. It occurs on bedrock controlled hillslopes and ridges at elevations from 3,200 to 6,500 feet.

The mean annual precipitation is estimated to be 10 to 14 inches. The mean annual air temperature is approximately 45 degrees Fahrenheit. The frost-free season ranges from 105 to 130 days.

Slopes range from 0 to 80 percent. Parent material consists of colluvium and residuum weathered from soft, interbedded sandstone and shale or in alluvium from mudstone.

A typical profile contains a 4 inch light brownish gray clay surface layer. The transition subsoil is a light yellowish brown clay loam that is approximately 4 inches thick. The substratum is a light yellowish brown clay loam that extends to approximately to 15 inches in depth.

Permeability within the Shingle soil is moderate. Runoff is medium on the gentler slopes and high on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are twenty nine plant species that are common to this map unit: Little bluestem, Sideoats grama, Needle and thread, Western wheatgrass, Big bluestem, Blue grama, Green needlegrass, Hairy grama, Prairie sandreed, Sedge, Plains muhly, Rocky Mountain juniper, American vetch, Blacksamson echinacea, Breadroot scurfpea, Broom snakeweed, Fringed sagewort, Leadplant, Louisiana sagewort, Missouri goldenrod, Nineanther prairieclover, Oligoneuron rigidum var. rigidum, Prairie coneflower, Rose, Silver buffaloberry, Silverleaf scurfpea, Skunkbush sumac, Slimflower scurfpea, and Violet prairieclover.

In a favorable year (above average moisture), the production is approximately 1,400 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty and depth to bedrock. This map unit is a poor source for roadfill; limitations include depth to bedrock, slope, low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and rock fragments.

“Gs” – Snomo clay, 6 to 15 percent slope

The Snomo clay mapping unit consists of deep or very deep, well drained soils formed in clayey materials weathered from acid shale on the uplands. It occurs on gently sloping to moderately steep uplands at elevations from 2620 to 3610 feet.

The mean annual precipitation is estimated to be 14 to 18 inches. The mean annual air temperature is approximately 45 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 2 to 20 percent. Parent material consists of clayey materials weathered from acid shale.

A typical profile contains a 2 inch light gray silty clay surface layer. The transition subsoil is a light gray clay that is approximately 3 inches thick. The substratum is a light brownish gray clay that extends to approximately to 14 inches in depth.

Permeability within the Snomo soil is moderate. Runoff is very low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is moderate and the wind erosion hazard is moderate.

Productivity and Reclamation Potential

There are nineteen plant species that are common to this map unit: Little bluestem, Sedge, Western wheatgrass, Sideoats grama, Blue grama, Bur oak, Ponderosa pine, Prairie sandreed, Big bluestem, Switchgrass, Yellow Indiangrass, Fringed sagewort, Louisiana sagewort, Blacksamson Echinacea, Breadroot scurfpea, Heath aster, Silverleaf scurfpea, Slimflower scurfpea, and Wormwood.

In a favorable year (above average moisture), the production is approximately 1,700 lbs/acres. In an unfavorable (drought) year, the production is approximately 800 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty, too clayey, too acid and water erosion. This map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a poor source for topsoil; limitations slope, too clayey and too acid.

"Ta" – Tilford silt loam, 0 to 6 percent slope

The Tilford silt loam mapping unit consists of very deep or deep, well drained soils formed in local alluvium and residuum from weathered reddish shales on uplands and terraces. It occurs on nearly level to rolling on uplands, stream terraces and fans at elevations from 2950 to 3510 feet.

The mean annual precipitation is estimated to be 14 to 18 inches. The mean annual air temperature is approximately 45 degrees Fahrenheit. The frost-free season ranges from 110 to 140 days.

Slopes range from 0 to 15 percent. Parent material consists of silty local alluvium and residuum derived from reddish colored silty shales.

A typical profile contains a 5 inch dark brown silt loam surface layer. The transition subsoil is a dark reddish gray silt loam that is approximately 4 inches thick. The substratum is a reddish brown silt loam that extends to approximately to 16 inches in depth.

Permeability within the Tilford soil is moderate. Runoff is low on the gentler slopes and medium on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty six plant species that are common to this map unit: Western wheatgrass, Green needlegrass, Needle and thread, Sideoats grama, Little bluestem, Prairie sandreed, Sand dropseed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silverleaf scurfpea, American vetch, Big sagebrush, Blue grama, Bluegrass, Breadroot scurfpea, Buffalograss, Heath aster, Leadplant, Prairie coneflower, Rose, Sedge, Skunkbush sumac, Slimflower scurfpea, and Western yarrow.

In a favorable year (above average moisture), the production is approximately 2,500 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content and water erosion. This map unit is a fair source for roadfill; limitations include low strength. This map unit is a good source for topsoil.

"Wt" – Winetti gravelly sandy loam, 0 to 6 percent slope

The Winetti gravelly sandy loam mapping unit consists of very deep, somewhat excessively drained, moderately rapidly permeable soils that formed in mixed alluvium from sedimentary rocks. It occurs on long, narrow, gently sloping bottoms or valleys and strongly sloping toeslopes at elevations from 7,100 to 8,000 feet.

The mean annual precipitation is estimated to be 12 to 18 inches. The mean annual air temperature is approximately 44 degrees Fahrenheit. The frost-free season ranges from 80 to 100 days.

Slopes range from 0 to 8 percent. Parent material consists of mixed alluvium from sandstone, limestone and shale.

A typical profile contains a 4 inch brown gravelly sandy loam surface layer. The transition subsoil is a light yellowish brown gravelly loamy sand that is approximately 3 inches thick. The substratum is a light yellowish brown very gravelly sandy loam that extends to approximately to 17 inches in depth.

Permeability within the Winetti soil is moderately rapid. Runoff is medium. The water erosion hazard is negligible and the wind erosion hazard is negligible.

Productivity and Reclamation Potential

There are twenty eight plant species that are common to this map unit: Western wheatgrass, Big bluestem, Switchgrass, Yellow Indiangrass, Green needlegrass, Little bluestem, Prairie sandreed, Sideoats grama, Bluegrass, Sedge, Blue grama, American elm, Common chokecherry, Eastern cottonwood, Fringed sagewort, Green ash, Hairy grama, Heath aster, Leadplant, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Silver buffaloberry, Violet prairieclover, Western snowberry, Western yarrow, Woods' rose, and Wormwood.

In a favorable year (above average moisture), the production is approximately 3,800 lbs/acres. In an unfavorable (drought) year, the production is approximately 2,300 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content and droughty. This map unit is a good source for roadfill. This map unit is a poor source for topsoil; limitations include hard to reclaim (rock fragments), rock fragments.

"202" – Worfka clay loam, 15 to 40 percent slope

The Worfka clay loam mapping unit consists of well drained soils that are very shallow or shallow to bedrock and formed in slopewash alluvium and residuum derived from interbedded calcareous shale and argillaceous sandstone. It occurs on ridge crests, shoulders, footslopes and toeslopes as well as uplands, ridges and hills at elevations from 3,500 to 6,500 feet.

The mean annual precipitation is estimated to be 10 to 14 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 130 to 150 days.

Slopes range from 0 to 30 percent. Parent material consists of alluvium and residuum weathered from calcareous shales and argillaceous sandstone.

A typical profile contains a 2 inch light brownish gray light clay loam surface layer. The transition subsoil is a grayish brown clay loam that is approximately 5 inches thick. The substratum is a pale brown clay loam that extends to approximately to 13 inches in depth.

Permeability within the Worfka soil is slow. Runoff is medium on the gentler slopes and rapid on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are five plant species that are common to this map unit: Green needlegrass, Western wheatgrass, Bluebunch wheatgrass, Big sagebrush, and Blue grama.

In a favorable year (above average moisture), the production is approximately 1,000 lbs/acres. In an unfavorable (drought) year, the production is approximately 450 lbs/acres.

According to NRCS information, this map unit is a poor source of overall reclamation material; limitations include low organic matter content, droughty, too clayey, depth to bedrock and water erosion. This map unit is a poor source for roadfill; limitations include depth to bedrock, low strength and shrink-swell. This map unit is a poor source for topsoil; limitations include depth to bedrock, slope and too clayey.

“Zn” – Zigweid loam, 6 to 15 and 6 to 40 percent slope

The Zigweid loam mapping unit consists of very deep, well drained soils formed in alluvium from mixed sedimentary sources. It occurs on fan aprons, alluvial fans, fan piedmonts, fan remnants, terraces, ridges and hills at elevations from 3,500 to 6,600 feet.

The mean annual precipitation is estimated to be 10 to 14 inches. The mean annual air temperature is approximately 46 degrees Fahrenheit. The frost-free season ranges from 105 to 130 days.

Slopes range from 0 to 20 percent. Parent material consists of calcareous, moderately fine textured sediments derived from interbedded shale and soft sandstone.

A typical profile contains a 4 inch light brownish gray loam surface layer. The transition subsoil is a brown clay loam that is approximately 13 inches thick. The substratum is a brown clay loam that extends to approximately to 34 inches in depth.

Permeability within the Zigweid soil is moderate. Runoff is medium on the gentler slopes and rapid on the steeper slopes. The water erosion hazard is very slight and the wind erosion hazard is very slight.

Productivity and Reclamation Potential

There are twenty three plant species that are common to this map unit: Needle and thread, Little bluestem, Western wheatgrass, Sedge, Prairie sandreed, Sideoats grama, Blue grama, Green needlegrass, Hairy grama, Inland saltgrass, Plains muhly, Big sagebrush, Blacksamson Echinacea, Broom snakeweed, Fringed sagewort, Louisiana sagewort, Missouri goldenrod, Oligoneuron rigidum var. rigidum, Plains pricklypear, Prairie coneflower, Violet prairieclover, Wormwood, and Yucca.

In a favorable year (above average moisture), the production is approximately 1,800 lbs/acres. In an unfavorable (drought) year, the production is approximately 1,000 lbs/acres.

According to NRCS information, this map unit is a fair source of overall reclamation material; limitations include low organic matter content. This map unit is a poor source for roadfill; limitations include low strength and shrink-swell. This map unit is a fair source for topsoil; limitations include slope.

POWERTECH (USA) INC.

APPENDIX 7.5-B

SOIL SERIES DESCRIPTIONS

POWERTECH (USA) INC.

BROADHURST
SILTY CLAY

Soil Mapping Unit "Br"
Lab/BKS Sample ID: G08020803-001_006SDF

Typical Pedon: Broadhurst silty clay- native grass. When described the soil was dry below 20 inches. (Colors are for dry soil unless otherwise stated.)

The Broadhurst series consists of very deep, well drained soils formed in clayey material derived from acid shales on colluvial fans and terraces. These soils have very slow permeability. Slopes range from 0 to 15 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

A - 0-3 inches. Light brownish gray (10YR 6/2) silty clay, moist; weak thick platy structure; very hard, very firm, sticky and plastic; few roots; moderately acid (pH 5.8); abrupt smooth boundary, noneffervescent.

C1 – 3-8 inches. Dark gray (10YR 4/1D, 10YR 3/1W) silty clay, moist; weak coarse blocky and subangular blocky structure; very hard, very firm, sticky and plastic; few roots; moderately acid (pH 5.7); gradual smooth boundary, noneffervescent.

C2 – 8-24 inches. Dark gray (10YR 4/1D, 10YR 3/1W) silty clay, moist; massive; extremely hard, very firm, sticky and plastic; moderately acid (pH 5.7); clear smooth boundary, noneffervescent.

C4 – 24-40 inches. Dark gray (10YR 4/1D, 10YR 3/1W) silty clay, moist; massive; extremely hard, very firm, sticky and plastic; moderately acid (pH 5.8); clear smooth boundary, noneffervescent.

C5n – 40-54 inches. Very dark grayish brown (2.5Y 3/2 DW) silty clay, moist; massive; hard, very firm, sticky and plastic; common fine fragments of shale; common fine nests of gypsum and other salts; very strongly acid (pH 5.0). noneffervescent.

C6n – 54-60 inches. Dark gray (10YR 4/1D, 10YR 3/1W) silty clay, moist; massive; hard, very firm, sticky and plastic; common fine fragments of shale; common fine nests of gypsum and other salts; very strongly acid (pH 4.5). noneffervescent.

Type Location - Butte County, South Dakota; refer to waypoint 17 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Colors throughout the soil are largely inherited from the parent rock. The control section averages between 60 and 70 percent clay. The soil has an Ustic moisture regime that borders on Aridic. Consistence is hard to extremely hard when dry and very firm when moist. When the soil is dry, cracks 1/2 to 1 inch wide and several feet long extend downward for 20 inches or more. The soil typically is very strongly acid but ranges from extremely acid to moderately acid.

A and AC horizons have hue of 10YR or 2.5Y, value of 5 or 6 and 3 or 4 moist, and chroma of 1 or 2.

The C horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 or 6 and 3 or 4 moist; and chroma of 1 or 2. Few or common partially weathered very fine fragments of shale are in the C horizon in most pedons. Nests of gypsum and other salts are few or common in the lower part of the C horizon.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Very-fine, smectitic, acid, mesic Torrertic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 0-60 inches. Saturation percentage was marginal at 8-24 inches. pH was unsuitable (acidic) at 54-60 inches. Estimated stripping depth is 8 inches.

Geographic Setting (According to Official Series Description) - Broadhurst soils are on colluvial fans and terraces. Slope gradients range from 0 to 15 percent. These soils formed in clayey material derived from acid shales. Mean annual air temperature ranges from 43 to 48 degrees F, and mean annual precipitation ranges from 15 to 18 inches.

KYLE
NONCALCAREOUS VARIANT

Soil Mapping Unit "Ky"
Lab/BKS Sample ID: G08020803-007_011

Typical Pedon: Kyle silty clay loam - on a west-facing plane slope of 2 percent in native grass. (Colors are for dry soil unless otherwise stated.)

The Kyle series consists of very deep and well drained soils formed in sediments weathered from clay shale on uplands. Permeability is very slow. Slopes range from 0 to 15 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 47 degrees F.

A - 0-2 inches. Grayish brown (2.5YR 5/2) silty clay loam, moist; moderate medium and fine granular structure; hard, firm, sticky and plastic; thin crust in upper 1/4 inch of light brownish gray (2.5Y 6/2); common fine roots; neutral; clear wavy boundary, slightly alkaline (pH 7.4); noneffervescent.

Bt - 2-17 inches. Olive brown (2.5Y 4/3DW) silty clay, moist; weak coarse blocky structure parting to weak medium blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; gradual wavy boundary; moderately alkaline (pH 7.9); very slightly effervescent.

C1n – 17-24 inches. Dark grayish brown (2.5Y 4/2D, 2.5Y 3/2W) silty clay, moist; weak coarse subangular blocky structure parting to weak medium and fine blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; clear wavy boundary; moderately alkaline (pH 8.0); noneffervescent.

C2 – 24-39 inches. Dark grayish brown (2.5Y 4/2D, 2.5Y 3/2W) silty clay, moist; weak medium subangular blocky structure in upper part becoming massive in lower part; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; common fine and medium nests of gypsum; strong effervescence; slightly alkaline; gradual wavy boundary. moderately alkaline (pH 7.9); noneffervescent.

C3n – 39-60 inches. Dark grayish brown (2.5Y 4/2DW) silty clay, moist; massive; very hard, firm, sticky and plastic; few fine accumulations of carbonate and gypsum; moderately alkaline (pH 7.9). noneffervescent.

Type Location - Fall River County, South Dakota; refer to waypoint 27 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The soil typically does not have carbonates to depths of 4 to 6 inches, but some pedons contain carbonates to the surface. When the soil is dry, cracks 1/2 inch to 2 inches wide and several feet long extend downward through the solum. The control section averages 60 to 65 percent clay. The soil does not have a mollic epipedon but the upper 10 inches of the solum has an average organic carbon content between 0.6 and 1.7 percent. When the soil is dry, a porous surface crust 1/8 inch to 1/2 inch thick with dry color value of 6 or 7 is typical. Gypsum and other salts are below depths of 20 inches.

The A horizon has hue of 10YR, 2.5Y or 5Y, value of 5 or 6 and 3 to 5 moist, and chroma of 1 to 3. It typically is clay but some is silty clay. It is neutral or slightly alkaline.

The Bw and Bss horizons have hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. Both dry and moist colors of the surface of peds range from 1/2 to 1 value darker than the crushed peds. They are extremely hard or very hard when dry and extremely firm or very firm when moist. They are slightly alkaline or moderately alkaline.

The BCss horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It has few to common accumulations of gypsum and other salts in most pedons. It is slightly alkaline or moderately alkaline.

Some pedons have a Bk horizon that has colors similar to the BC horizon. It has few to common accumulations of carbonate. It is slightly alkaline or moderately alkaline.

The Cy horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It is clay and some pedons contain up to 35 percent fragments of shale below 40 inches. It has few to many accumulations of gypsum or other salts. Unweathered shale typically is at depths greater than 5 feet but is as shallow as 40 inches in some pedons. It is slightly alkaline or moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Very-fine, smectitic, mesic Aridic Haplusterts

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-60 inches. Saturation percentage was marginal at 24-39 inches. Sodium absorption ratio was marginal at 17-60 inches. Estimated stripping depth is 17 inches.

Geographic Setting (According to Official Series Description) - Kyle soils are nearly level to strongly sloping on uplands and colluvial fans. Slopes are plane to convex, and slope gradients range from 0 to 15 percent. Gilgai microrelief is in most areas. The soil formed in clayey sediments weathered from calcareous clay shale. Mean annual air temperature ranges from 45 to 53 degrees F, and mean annual precipitation ranges from about 12 to 19 inches.

KYLE
NONCALCAREOUS VARIANT

Soil Mapping Unit "Ky"
Lab/BKS Sample ID: G08020803-012_016

Typical Pedon: Kyle silty clay loam- on a west-facing plane slope of 2 percent in native grass. (Colors are for dry soil unless otherwise stated.)

The Kyle series consists of very deep and well drained soils formed in sediments weathered from clay shale on uplands. Permeability is very slow. Slopes range from 0 to 15 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 47 degrees F.

A - 0-2 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay loam, moist; moderate medium and fine granular structure; hard, firm, sticky and plastic; thin crust in upper 1/4 inch of light brownish gray (2.5Y 6/2); common fine roots; neutral; clear wavy boundary, moderately alkaline (pH 8.0); noneffervescent.

Bt1 - 2-15 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay, moist; weak coarse blocky structure parting to weak medium blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; gradual wavy boundary; moderately alkaline (pH 8.0); very slightly effervescent.

Bt2n – 15-26 inches. Dark grayish brown (2.5Y 4/2DW) silty clay, moist; weak coarse subangular blocky structure parting to weak medium and fine blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; clear wavy boundary; moderately alkaline (pH 8.0); very slightly effervescent.

C1 – 26-36 inches. Dark grayish brown (2.5Y 4/2DW) silty clay, moist; weak medium subangular blocky structure in upper part becoming massive in lower part; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; common fine and medium nests of gypsum; strong effervescence; slightly alkaline; gradual wavy boundary. moderately alkaline (pH 8.0); very slightly effervescent.

C2 – 36-60 inches. Olive brown (2.5Y 4/3DW) clay, moist; massive; very hard, firm, sticky and plastic; few fine accumulations of carbonate and gypsum; moderately alkaline (pH 8.0); slightly effervescent.

<u>Type Location</u> - Fall River County, South Dakota; refer to waypoint 36 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The soil typically does not have carbonates to depths of 4 to 6 inches, but some pedons contain carbonates to the surface. When the soil is dry, cracks 1/2 inch to 2 inches wide and several feet long extend downward through the solum. The control section averages 60 to 65 percent clay. The soil does not have a mollic epipedon but the upper 10 inches of the solum has an average organic carbon content between 0.6 and 1.7 percent. When the soil is dry, a porous surface crust 1/8 inch to 1/2 inch thick with dry color value of 6 or 7 is typical. Gypsum and other salts are below depths of 20 inches.

The A horizon has hue of 10YR, 2.5Y or 5Y, value of 5 or 6 and 3 to 5 moist, and chroma of 1 to 3. It typically is clay but some is silty clay. It is neutral or slightly alkaline.

The Bw and Bss horizons have hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. Both dry and moist colors of the surface of peds range from 1/2 to 1 value darker than the crushed peds. They are extremely hard or very hard when dry and extremely firm or very firm when moist. They are slightly alkaline or moderately alkaline.

The BCss horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It has few to common accumulations of gypsum and other salts in most pedons. It is slightly alkaline or moderately alkaline.

Some pedons have a Bk horizon that has colors similar to the BC horizon. It has few to common accumulations of carbonate. It is slightly alkaline or moderately alkaline.

The Cy horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It is clay and some pedons contain up to 35 percent fragments of shale below 40 inches. It has few to many accumulations of gypsum or other salts. Unweathered shale typically is at depths greater than 5 feet but is as shallow as 40 inches in some pedons. It is slightly alkaline or moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Very-fine, smectitic, mesic Aridic Haplusterts

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-60 inches. Saturation percentage was marginal at 2-16 and 26-36 inches. Sodium absorption ratio was marginal at 15-36 inches. Estimated stripping depth is 2 inches.

Geographic Setting (According to Official Series Description) - Kyle soils are nearly level to strongly sloping on uplands and colluvial fans. Slopes are plane to convex, and slope gradients range from 0 to 15 percent. Gilgai microrelief is in most areas. The soil formed in clayey sediments weathered from calcareous clay shale. Mean annual air temperature ranges from 45 to 53 degrees F, and mean annual precipitation ranges from about 12 to 19 inches.

HISLE
SILT LOAM

Soil Mapping Unit "He"
Lab/BKS Sample ID: G08020803-017_021

Typical Pedon: Hisle silt loam - on an east-facing plane slope of 3 percent in native grass at 3,020 feet elevation. When described the soil was moist below a depth of 2 inches. (Colors are for dry soil unless otherwise stated.)

The Hisle series consists of moderately deep, well drained and moderately well drained soils formed in clayey sediments weathered from clay shale on uplands. Permeability is very slow. Slopes range from 0 to 15 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 45 degrees F.

A - 0-2 inches. Light gray (10YR 7/2) silt loam, moist; weak very thin platy structure parting to weak fine granular; soft, very friable; surface crust about 1/8 inch thick; abrupt smooth boundary; neutral (pH 6.8); noneffervescent.

Bt – 2-15 inches. Grayish brown (10YR 5/2D, 10YR 4/2W) silty clay loam, moist; weak medium prismatic structure parting to strong medium and fine blocky; very hard, firm, sticky and plastic; gradual wavy boundary; neutral (pH 7.3); noneffervescent.

C1k – 15-32 inches. Light yellowish brown (2.5Y 6/3D, 2.5Y 4/3W) clay loam, moist; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; fine earth is massive; hard, firm, sticky; 50 to 70 percent by volume of fragments of shale; few fine accumulations of carbonate and salt; clear wavy boundary; moderately alkaline (pH 8.0); strongly effervescent.

C2k – 32-52 inches. Brown (10YR 5/3D, 10YR 4/3W) clay loam, fractured soft shale; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) iron stains and mottles in the seams; moderately alkaline (pH 8.0); strongly effervescent.

C3 – 52-60 inches. Light brownish gray (10YR 6/2D, 10YR 4/2W) silt loam, fractured soft shale; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) iron stains and mottles in the seams; moderately alkaline (pH 8.1). slightly effervescent.

<u>Type Location</u> - Shannon County, South Dakota; refer to waypoint 39 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The depth to bedded shale typically is about 20 to 26 inches and ranges from 20 to 40 inches. Colors of the soil commonly are inherited from the underlying shale. A few small pebbles are on the surface and mixed throughout the solum in some pedons.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 3. It is silt loam or loam and ranges from slightly acid to slightly alkaline. When dry, the surface is crusted up to 1/8 inch thick.

The Btn horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7 and 4 to 6 moist, and chroma of 1 to 4. It is clay or silty clay averaging between 50 and 60 percent clay. It ranges from slightly to strongly alkaline. The Btn horizon has weak or moderate, fine to coarse columnar structure parting to moderate or strong, fine to coarse blocky structure in the upper part. Accumulations of salts and carbonates are in the lower Btn horizon of some pedons.

The Bkz horizon has hue of 10R to 5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 4. It is silty clay or clay. It has few to many accumulations of carbonate and typically has accumulations of gypsum and salts. It ranges from slightly to strongly alkaline. It contains up to 15 percent fragments of shale by volume.

The C horizon has hue of 10R to 5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 4. It is clay, or silty clay. Fragments of shale increase with depth and range up to 80 percent by volume. It ranges from slightly to strongly alkaline. Most pedons contain accumulations of carbonate and salts.

The Cr horizon is shale and hue of 10R to 5Y. It ranges from slightly acid to moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer or have slightly less clay than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Leptic Torrertic Natrustalfs

Suitability for Topsoil (According to WDEQ Guideline 1) - No unsuitable or marginal values were present. Strongly calcareous at 15 inches. Estimated stripping depth is 60 inches.

Geographic Setting (According to Official Series Description) - Hisle soils are nearly level to moderately sloping on uplands. Slope gradients range from 0 to 15 percent. Hisle soils formed in clays transported locally or weathered in place from clay shales. The mean annual soil temperature ranges from 45 to 53 degrees F, and mean annual precipitation ranges from 12 to 16 inches.

POWERTECH (USA) INC.

HISLE
NONCALCAREOUS VARIANT

Soil Mapping Unit "He"
Lab/BKS Sample ID: G08020803-022_026

Typical Pedon: Hisle silty clay loam - on an east-facing plane slope of 3 percent in native grass at 3,020 feet elevation. When described the soil was moist below a depth of 2 inches. (Colors are for dry soil unless otherwise stated.)

The Hisle series consists of moderately deep, well drained and moderately well drained soils formed in clayey sediments weathered from clay shale on uplands. Permeability is very slow. Slopes range from 0 to 15 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 45 degrees F.

A - 0-4 inches. Light gray (10YR 7/2) silty clay loam, moist; weak very thin platy structure parting to weak fine granular; soft, very friable; surface crust about 1/8 inch thick; abrupt smooth boundary; neutral (pH 6.6); noneffervescent.

Bt1 – 4-14 inches. Light olive brown (2.5Y 5/3D, 2.5Y 4/3W) silty clay loam, moist; weak medium prismatic structure parting to strong medium and fine blocky; very hard, firm, sticky and plastic; gradual wavy boundary; neutral (pH 7.1); noneffervescent.

Bt2 – 14-27 inches. Light olive brown (2.5Y 5/3D, 2.5Y 4/3W) silty clay loam, moist; few faint yellowish brown (10YR 5/6) mottles; weak medium and fine subangular blocky structure; very hard, firm, sticky and plastic; many small pebbles and fragments of shale; few fine dark concretions (Fe and Mn oxides); common fine threads and accumulations of carbonate and salt; clear wavy boundary; slightly alkaline (pH 7.8); noneffervescent.

Bt3n – 27-38 inches. Olive brown (2.5Y 4/3D, 2.5Y 4/2W) silty clay, fractured soft shale; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) iron stains and mottles in the seams; moderately alkaline (pH 8.1); noneffervescent.

Cn – 38-60 inches. Olive brown (2.5Y 4/3D, 2.5Y 4/2W) silty clay, fractured soft shale; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) iron stains and mottles in the seams; moderately alkaline (pH 7.9); noneffervescent.

<u>Type Location</u> - Shannon County, South Dakota; refer to waypoint 40 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The depth to bedded shale typically is about 20 to 26 inches and ranges from 20 to 40 inches. Colors of the soil commonly are inherited from the underlying shale. A few small pebbles are on the surface and mixed throughout the solum in some pedons.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 3. It is silt loam or loam and ranges from slightly acid to slightly alkaline. When dry, the surface is crusted up to 1/8 inch thick.

The Btn horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7 and 4 to 6 moist, and chroma of 1 to 4. It is clay or silty clay averaging between 50 and 60 percent clay. It ranges from slightly to strongly alkaline. The Btn horizon has weak or moderate, fine to coarse columnar structure parting to moderate or strong, fine to coarse blocky structure in the upper part. Accumulations of salts and carbonates are in the lower Btn horizon of some pedons.

The Bkz horizon has hue of 10R to 5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 4. It is silty clay or clay. It has few to many accumulations of carbonate and typically has accumulations of gypsum and salts. It ranges from slightly to strongly alkaline. It contains up to 15 percent fragments of shale by volume.

The C horizon has hue of 10R to 5Y, value of 5 to 8 and 3 to 5 moist, and chroma of 1 to 4. It is clay, or silty clay. Fragments of shale increase with depth and range up to 80 percent by volume. It ranges from slightly to strongly alkaline. Most pedons contain accumulations of carbonate and salts.

The Cr horizon is shale and hue of 10R to 5Y. It ranges from slightly acid to moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Leptic Torrertic Natrustalfs

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 27-60 inches. Estimated stripping depth is 60 inches.

Geographic Setting (According to Official Series Description) - Hisle soils are nearly level to moderately sloping on uplands. Slope gradients range from 0 to 15 percent. Hisle soils formed in clays transported locally or weathered in place from clay shales. The mean annual soil temperature ranges from 45 to 53 degrees F, and mean annual precipitation ranges from 12 to 16 inches.

NEVEE
SILT LOAM

Soil Mapping Unit "Ne"
Lab/BKS Sample ID: G08020803-027_031

Typical Pedon: Nevee silt loam- on a southwest-facing slope of 8 percent in native grass. When described, the soil was dry throughout. (Colors are for dry soil unless otherwise stated.)

The Nevee series consists of deep and very deep, well drained soils formed in reddish silty alluvial-colluvial sediments on terraces and uplands. Permeability is moderate. Slopes range from 1 to 30 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 46 degrees F.

A - 0-4 inches. Reddish brown (5YR 4/4) silt loam, moist; weak fine granular structure; soft, very friable; many fine roots; clear smooth boundary; slightly alkaline (pH 7.7); noneffervescent.

AC - 4-21 inches. Brown (7.5YR 5/4D, 7.5YR 4/4W) silty clay loam, moist; massive; slightly hard, very friable; common fine roots; few fine accumulations of carbonate; gradual wavy boundary; slightly alkaline (pH 7.7); strongly effervescent.

C1k – 21-36 inches. Reddish brown (5YR 5/4D, 5YR 4/4W) silt, moist; massive; hard, very friable; few fine roots; gradual wavy boundary; strongly alkaline (pH 8.6); strongly effervescent.

C2k – 36-45 inches. Yellowish red (5YR 5/6D, 5YR 4/4W) silt loam, moist; massive; hard, very friable; many coarse fragments of siltstone; gradual wavy boundary; strongly alkaline (pH 8.7); strongly effervescent.

C3k – 45-60 inches. Yellowish red (5YR 5/6D, 5YR 4/4W) loam, moist; extremely hard, friable; strongly alkaline (pH 8.7); strongly effervescent.

Type Location - Butte County, South Dakota; refer to waypoint 41 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to bedrock typically ranges from 40 to 60 inches or more. Depth to free carbonates is less than 10 inches. The control section is silt loam, loam, or very fine sandy loam averaging between 10 and 18 percent clay. Some pedons have up to 35 percent coarse fragments greater than 3 inches in the surface.

The A horizon has hue of 5YR to 10YR, value of 4 to 6 and 3 or 4 moist, and chroma of 2 to 6. Where the color value is as dark or darker than 5.5 and 3.5 moist, the horizon has chroma of 4 or more or is too thin for a mollic epipedon. It is typically silt loam, but some pedons are loam or very fine sandy loam. It ranges from neutral to moderately alkaline. Some pedons have an AC horizon. It has colors an textures of the A horizon.

The C horizon has hue of 2.5YR to 7.5YR, value of 5 to 7 and 4 to 6 moist, and chroma of 3 to 6. It is loam, silt loam, or very fine sandy loam, but some pedons are silty clay loam in the lower part. It typically has few to many, fine or medium accumulations of carbonate in the upper part. It ranges from slightly to strongly alkaline.

The Cr horizon is reddish colored silty shale, siltstone, or sandstone and is below depths of 40 inches. It ranges from slightly to strongly alkaline.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Coarse-silty, mixed, superactive, calcareous, mesic Aridic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) – Electrical conductivity was unsuitable at 21-60 inches. Sodium absorption ratio was unsuitable at 21-60 inches. Boron was unsuitable at 21-36 inches. Selenium was marginal at 21-60 inches. Strongly effervescent at 4 inches. Estimated stripping depth is 21 inches.

Geographic Setting (According to Official Series Description) - Nevee soils are nearly level to steep on terraces, uplands, and alluvial fans. Surfaces are dominantly smooth plane, and slope gradients range from 1 to 30 percent. The Nevee soils formed in silty alluvium weathered from reddish colored silty shale, siltstone, or sandstone. Mean annual air temperature is 43 to 48 degrees F, and mean annual precipitation ranges from 15 to 18 inches.

BARNUM
SILT LOAM

Soil Mapping Unit "Bc"
Lab/BKS Sample ID: G08020803-032_035

Typical Pedon: Barnum silt loam-rangeland. (Colors are for dry soil unless otherwise stated.)

The Barnum series consists of very deep, well drained soils formed in calcareous alluvium from red bed sediments. Barnum soils are on flood plains and alluvial terraces. Slopes are simple and range from 0 to 8 percent. The mean annual precipitation is about 12 inches, and the mean annual temperature is about 47 degrees F.

A - 0-6 inches. Reddish brown (5YR 4/4) silt loam, moist; moderate very fine granular structure; soft, very friable; calcium carbonate disseminated; clear smooth boundary; slightly alkaline (pH 7.8); noneffervescent.

C1k - 6-17 inches. Reddish brown (5YR 5/4D, 5YR 4/4W) silt loam, moist; massive with lenses of unaltered parent sediment; slightly hard, very friable; calcium carbonate disseminated and as soft masses in some lenses; moderately alkaline (pH 8.3); strongly effervescent.

C2k – 17-39 inches. Reddish brown (5YR 5/4D, 5YR 4/4W) silt loam, moist; massive with lenses of unaltered parent sediment; slightly hard, very friable; calcium carbonate disseminated and as soft masses in some lenses; strongly alkaline (pH 8.6); strongly effervescent.

C3kn – 39-60 inches. Yellowish red (5YR 4/6D, 5YR 4/4W) silt loam, moist; massive with lenses of unaltered parent sediment; slightly hard, very friable; calcium carbonate disseminated and as soft masses in some lenses; strongly alkaline (pH 8.5); strongly effervescent.

Type Location - Johnson County, Wyoming; refer to waypoint 42 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - These soils typically contain free carbonates throughout but may be leached a few inches in some pedons. Organic carbon ranges from .6 to 3 percent in the upper 10 inches and decreases irregularly with depth. The mean annual soil temperature is about 47 to 53 degrees F. The particle size control section is highly stratified and typically averages loam or light clay loam with 18 to 35 percent clay and more than 15 percent fine or coarser sand. Strata of sandy loam, silt loam, silty clay loam, and fine sandy loam are common. Rock fragments are variable between strata but average from 0 to 10 percent pebbles. Exchangeable sodium ranges from 4 to 15 percent throughout the soil. EC typically ranges from 2 to 8 mmhos throughout under natural conditions but may range to 16 mmhos where poorly irrigated.

The A horizon has hue of 7.5YR through 2.5YR, value of 4 through 6 dry, 3 through 5 moist, and chroma of 2 through 6. Reaction is slightly through strongly alkaline.

The C horizon has hue of 5YR through 10R, value of 4 through 7 dry, 3 through 5 moist, and chroma of 2 through 6. Some strata have visual accumulations of salts and carbonates which are typically discontinuous throughout the extent of the pedon. Reaction is slightly through strongly alkaline. Some pedons may have buried horizons below 40 inches.

Range in Characteristics (according to field observations, lab analysis): Textures are finer than typical for the series.

Taxonomic Class - Fine-loamy, mixed, superactive, calcareous, mesic Ustic Torrifluvents

Suitability for Topsoil (According to WDEQ Guideline 1) - Electrical conductivity was unsuitable at 6-39 inches. Sodium absorption ratio was unsuitable at 6-39 inches. Selenium was unsuitable at 6-17 inches. Strongly effervescent at 6 inches. Estimated stripping depth is 6 inches.

Geographic Setting (According to Official Series Description) - Barnum soils are on flood plains and alluvial terraces. These soils formed in calcareous alluvium derived from red beds containing siltstone, shale, and sandstone. Slopes are 0 to 8 percent. Elevations are 4,000 to 6,600 feet. The mean annual precipitation is about 12 inches and ranges from 10 to 14 inches with about half falling as snow or rain in April, May, and early June. The mean annual temperature is about 43 to 49 degrees F. The frost-free season is estimated to range from 110 to 135 days depending upon elevation, aspect, and air drainage

Ascalon
CLAY LOAM

Soil Mapping Unit "As"
Lab/BKS Sample ID: G08020803-036_039

Typical Pedon: Ascalon clay loam- grassland. (Colors are for dry soil unless otherwise stated.)

The Ascalon series consists of very deep, well drained soils that formed in moderate coarse textured calcareous material. Ascalon soils are on upland hillslopes and tableland plains. Slopes range from 0 to 25 percent. The mean annual precipitation is about 41 centimeters (16 inches) and the mean annual air temperature is about 10 degrees C (49 degrees F) at the type location.

A - 0-2 inches. Grayish brown (10YR 5/2) clay loam, moist; moderate very fine granular structure; soft, very friable; 3 percent pebbles; clear smooth boundary; slightly acid (pH 6.2); noneffervescent.

Bt - 2-14 inches. Dark grayish brown (10YR 4/2DW) clay, moist; moderate medium prismatic structure parting to moderate medium subangular blocks; very hard, very friable; many distinct clay films on faces of peds; 3 percent pebbles; gradual smooth boundary; slightly alkaline (pH 7.4); noneffervescent.

C1k – 14-38 inches. Light yellowish brown (2.5Y 6/3D. 2.5Y 5/2W) clay loam, moist; weak medium subangular blocky structure; hard, very friable; concretions, thin seams and streaks of calcium carbonate; few faint clay films on faces of some peds; 5 percent pebbles, gradual smooth boundary; strongly alkaline (pH 8.5); violently effervescent.

C2k – 38-60 inches. Pale yellow (2.5Y 7/3) loam, moist; massive; slightly hard, very friable; 5 percent pebbles; concretions, thin seams and streaks of calcium carbonate; strongly alkaline (pH 8.8); strongly effervescent.

<u>Type Location</u> - Washington County, Colorado; refer to waypoint 43 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - Depth to bedrock typically ranges from 40 to 60 inches or more. Depth to free carbonates is less than 10 inches. The control section is silt loam, loam, or very fine sandy loam averaging between 10 and 18 percent clay. Some pedons have up to 35 percent coarse fragments greater than 3 inches in the surface.

The A horizon has hue of 5YR to 10YR, value of 4 to 6 and 3 or 4 moist, and chroma of 2 to 6. Where the color value is as dark or darker than 5.5 and 3.5 moist, the horizon has chroma of 4 or more or is too thin for a mollic epipedon. It is typically silt loam, but some pedons are loam or very fine sandy loam. It ranges from neutral to moderately alkaline. Some pedons have an AC horizon. It has colors an textures of the A horizon.

The C horizon has hue of 2.5YR to 7.5YR, value of 5 to 7 and 4 to 6 moist, and chroma of 3 to 6. It is loam, silt loam, or very fine sandy loam, but some pedons are silty clay loam in the lower part. It typically has few to many, fine or medium accumulations of carbonate in the upper part. It ranges from slightly to strongly alkaline.

The Cr horizon is reddish colored silty shale, siltstone, or sandstone and is below depths of 40 inches. It ranges from slightly to strongly alkaline.

Mean annual soil temperature: 8 to 15 degrees C (47 to 58 degrees F).
Mean summer soil temperature: 15 to 26 degrees C (59 to 78 degrees F).
Mollic epipedon: thickness ranges from 18 to 51 centimeters (7 to 20 inches)
Depth to secondary calcium carbonate: 20 to 76 centimeters (8 to 30 inches)
Depth to the base of the Bt horizon: 38 to 76 centimeters (15 to 30 inches)
Organic carbon: ranges from .6 to 2 percent in the mollic epipedon and decreases uniformly with depth.
Rock fragments: range from 0 to 15 percent but are usually less than 5 percent.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Fine-loamy, mixed, superactive, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-14 inches. Sodium absorption ratio was unsuitable at 38-60 inches. Violently effervescent at 14 inches. Estimated stripping depth is 14 inches.

Geographic Setting (According to Official Series Description) –
Parent material: thick, moderately coarse textured, calcareous material.
Landform: hills and plains
Slope: 0 to 25 percent
Elevation: 1219 to 1829 meters (4000 to 6000 feet).
Mean annual precipitation: 33 to 43 centimeters (13 to 17 inches), with peak periods of precipitation occurring during the spring and summer.
Mean annual temperature: 10 to 12 degrees C (49 to 53 degrees F).
Average summer temperature: 20 to 23 Degree C (68 to 73 degrees F).
Frost-free season: about 130 to 160 days.

CUSHMAN
LOAM

Soil Mapping Unit "Cy"
Lab/BKS Sample ID: G08020803-040_043

Typical Pedon: Cushman loam - on south facing slope of about 3 percent under native grass vegetation. (Colors are for dry soil unless otherwise stated.)

The Cushman series consists of well drained soils that are moderately deep to bedrock. These soils formed in slopewash alluvium and residuum from interbedded shales and siltstone and fine-grained argillaceous sandstone. Cushman soils are on buttes, fan remnants, hills, piedmonts, ridges and terraces. Slopes are 0 to 20 percent. The mean annual precipitation is about 13 inches, and the mean annual air temperature is about 45 degrees F

A - 0-2 inches. Light brownish gray (10YR 6/2) loam, moist; moderate medium granular structure; soft, friable, slightly sticky and slightly plastic; common very fine, fine, and few medium roots; clear smooth boundary; neutral (pH 6.6); noneffervescent.

Bt - 2-7 inches. Brown (10YR 5/3) clay loam, moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, moderately sticky and moderately plastic; common very fine, fine and few medium roots; few faint clay films on faces of peds and lining pores; clear smooth boundary; slightly alkaline (pH 7.4); noneffervescent.

Btk – 7-13 inches. Brown (10YR 4/3DW) clay loam, moist; moderate coarse prismatic structure parting to strong medium angular blocky; hard, firm, moderately sticky and moderately plastic; few fine, medium and coarse roots; common distinct clay films on faces of peds, lining pores and root channels; clear wavy boundary; moderately alkaline (pH 8.1); strongly effervescent.

Ck – 13-25 inches. Dark grayish brown (10YR 4/2D, 10YR 3/2W) clay loam, moist; moderate coarse prismatic structure parting to moderate fine and very fine subangular blocky; hard, firm, moderately sticky and moderately plastic; few fine roots; few faint clay films on faces of peds; calcium carbonate on faces of peds and in pores as common distinct irregularly shaped filaments and masses; clear smooth boundary; moderately alkaline (pH 8.3); strongly effervescent.

<u>Type Location</u> - Sheridan County, Wyoming; refer to waypoint 50 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - Depth to a paralithic contact and bedrock is typically about 28 to 32 inches but ranges from 20 to 40 inches. Depth to continuous horizons of carbonate accumulation is 7 to 26 inches. Depth to the base of the argillic horizon ranges from 10 to 26 inches. Rock fragments range from 0 to 15 percent and are soft shale channers or semirounded sandstone pebbles. The soil is dry in the moisture control section more than half the time cumulative that the soil temperature at a depth of 20 inches is 41 degrees F., which occurs about April 21-27, and is dry in all parts of the moisture control section for at least 60 consecutive days from July 15 to October 25 and for at least 90 cumulative days during this period. The mean annual soil temperature is 47 to 53 degrees F., and the soil temperature at a depth of 20 inches is 41 degrees F. or more for 175 to 192 days. EC ranges from 0 to 2 mmhos throughout.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6 dry, 3 to 5 moist, and chroma of 2 to 4. Reaction is neutral or slightly alkaline.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6 dry, 3 to 5 moist, and chroma of 2 to 4. Texture of the Bt is clay loam or loam with 20 to 35 percent clay and more than 15 percent but less than 35 percent fine sand or coarser. Reaction is neutral to moderately alkaline.

The Btk horizon has hue of 10YR or 2.5Y, value of 5 to 7 dry, 4 to 6 moist, and chroma of 2 to 4. Texture is loam or clay loam with 20 to 35 percent clay. Reaction is moderately alkaline or strongly alkaline. Calcium carbonate ranges from 3 to 12 percent.

The Bk horizon has hue of 10YR and 2.5Y, value of 6 to 8 dry, 4 to 6 moist, and chroma of 2 to 4. Texture is loam or clay loam with 20 to 30 percent total clay of which about 2 to 4 percent is carbonate clay. Reaction is typically moderately alkaline but may be strongly alkaline when sodic shales are present. Calcium carbonate equivalent is 5 to 15 percent, but some horizons may exceed 15 percent but are discontinuous or too thin to be considered as a calcic.

The Cr is weakly consolidated sedimentary rock. It is primarily calcareous shale; but siltstone or thinly interbedded fine grained argillaceous sandstone is common. The rock is typically moderately alkaline or strongly alkaline when crushed, but slightly alkaline or neutral shales are not uncommon.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Fine-loamy, mixed, superactive, mesic Ustic Haplargids

Suitability for Topsoil (According to WDEQ Guideline 1) - No marginal or unsuitable parameters were found. Strongly effervescent at 7 inches. Estimated stripping depth is 25 inches.

Geographic Setting (According to Official Series Description) - Cushman soils are on buttes, fan remnants fan piedmonts, hills and ridges. Slopes range from 0 to 20 percent. The soils formed in moderately fine textured slopewash alluvium and residuum. Surface erosion is common in overgrazed areas, and some thin eolian deposits overlie these soils in some areas. Elevations are 3,500 to 6,000 feet. The mean annual precipitation is 13 inches and ranges from 10 to 14 inches with over half of the annual precipitation falling in April, May, and June and less than one inch falling in each month of July, August, September and October. The mean annual temperature is 43 to 51 degrees F. The frost-free season is about 105 to 130 days depending upon elevation, aspect, and air drainage.

ZIGWEID
SILTY CLAY LOAM

Soil Mapping Unit "Zn"
Lab/BKS Sample ID: G08020803-044_048

Typical Pedon: Zigweid silty clay loam - on a 3 percent southwest facing slope utilized as rangeland. (Colors are for dry soil unless otherwise stated.)

The Zigweid series consists of very deep, well drained soils formed in alluvium from mixed sedimentary sources on fan aprons, alluvial fans, fan piedmonts, fan remnants, terraces, ridges and hills. Slopes range from 0 to 20 percent. Permeability is moderate. The mean annual precipitation is about 13 inches, and the mean annual air temperature is about 46 degrees F.

A - 0-3 inches. Light brownish gray (10YR 6/2) silty clay loam, moist; moderate fine and medium granular structure; slight hard, friable, nonsticky and nonplastic; many very fine and fine roots throughout; clear smooth boundary; slightly alkaline (pH 7.4); noneffervescent.

B1 - 3-14 inches. Brown (10YR 5/3D, 10YR 4/2W) silty clay loam, moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout and few medium throughout; carbonates are disseminated throughout; gradual wavy boundary; slightly alkaline (pH 7.7); very slightly effervescent.

B2 – 14-26 inches. Dark grayish brown (10YR 4/2DW) silty clay loam, moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout; common fine irregular light gray (10YR 7/2) carbonate threads throughout; gradual wavy boundary; slightly alkaline (pH 7.6); very slightly effervescent.

C1 – 26-36 inches. Yellowish brown (10YR 5/4D, 10YR 4/3W) silt loam, moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots throughout; common fine irregular light gray (10YR 7/2) carbonate threads throughout; gradual wavy boundary; slightly alkaline (pH 7.5); very slightly effervescent.

C2 – 36-60 inches. Brown (10YR 5/3D, 10YR 4/2W) loam, moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots throughout; common fine irregular light gray (10YR 7/2) carbonate threads throughout; slightly alkaline (pH 7.7); strongly effervescent.

Type Location - Campbell County, Wyoming; refer to waypoint 56 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to carbonates ranges from 0 to 8 inches. Depth to the Bk horizon and the base of the cambic horizon ranges from 10 to 22 inches. The particle-size control section and soil profile are clay loam or loam. Clay ranges from 18 to 35 percent, silt from 20 to 55 percent, and sand from 15 to 50 percent with more than 15 percent but less than 35 percent fine sand or coarser. Rock fragments range from

0 to 15 but are typically less than 5 percent and are mostly soft shale chips. The moisture control section is usually dry in all parts for 90 cumulative days following the summer solstice and for 60 consecutive days during this period. The mean annual soil temperature is 47 to 53 degrees F. The soil temperature at a depth of 20 inches is 41 degrees F. or warmer for 175 to 192 days.

The A horizon has hue of 5Y, 2.5Y or 10YR, value of 4 to 6 dry, 3 to 5 moist, and chroma of 2 or 3. It is loam or clay loam. Reaction is neutral to moderately alkaline.

The Bw horizon has hue of 5Y, 2.5Y or 10YR, value of 5 or 6 dry, 4 or 5 moist, and chroma of 2 to 4. It is loam or clay loam. Reaction is slightly alkaline or moderately alkaline.

The Bk horizon has hue of 5Y, 2.5Y or 10YR, value of 5 to 7 dry, 4 to 6 moist, and chroma of 2 to 4. It is loam or clay loam. It has 5 to 14 percent calcium carbonate equivalent and may have a few scattered crystals of calcium sulfate. Reaction is moderately alkaline or strongly alkaline.

Some pedons have a C horizon with similar properties as the Bk horizon. Some pedons may have sandy clay loam textures below 40 inches. It typically has 3 to 5 percent less calcium carbonate than the overlying Bk horizon.

<u>Range in Characteristics (according to field observations, lab analysis)</u>: Textures are slightly finer than typical for the series.

<u>Taxonomic Class</u> - Fine-loamy, mixed, superactive, mesic Ustic Haplocambids

<u>Suitability for Topsoil (According to WDEQ Guideline 1)</u> - No marginal or unsuitable parameters were found. Strongly effervescent at 36 inches. Estimated stripping depth is 60 inches.

<u>Geographic Setting (According to Official Series Description)</u> - These soils are on fan aprons, alluvial fans, terraces, fan piedmonts, fan remnants, ridges and hills. In many areas they are dissected. Slopes range from 0 to 20 percent. These soils formed in calcareous, moderately fine textured sediments derived from interbedded shale and soft sandstone. Elevations are 3,500 to 6,600 feet. The mean annual precipitation is 13 inches with over half of the annual precipitation falling in April, May, and June and less than one inch falling in each month of July, August, September, and October. Precipitation ranges from 10 to 14 inches. The mean annual temperature is about 46 degrees F., and ranges from 43 to 51 degrees F. The frost-free season is about 105 to 130 days.

BUTCHE
CLAY LOAM

Soil Mapping Unit "Bw"
Lab/BKS Sample ID: G08020803-049_050

Typical Pedon: Butche clay loam - on a west-facing convex slope of 25 percent under native grass. When described the soil was moist to 10 inches. (Colors are for dry soil unless otherwise stated.)

The Butche series consists of shallow, well drained to excessively drained soils formed in loamy materials weathered from sandstone. Permeability is moderate or moderately rapid. Slopes range from 1 to 60 percent. Mean annual precipitation is about 17 inches, and mean annual temperature is about 46 degrees F.

A - 0-2 inches. Dark grayish brown (2.5Y 4/2DW) loam, moist; weak fine granular structure; soft, very friable; coarse fragments make up about 20 percent by volume; clear wavy boundary; slightly alkaline (pH 7.6); noneffervescent.

C - 2-8 inches. Grayish brown (2.5Y 5/2DW) sandy loam, moist; weak medium and coarse subangular blocky structure; slightly hard, very friable; coarse fragments make up about 30 percent by volume; abrupt wavy boundary; slightly alkaline (pH 7.6); very slightly effervescent.

Type Location - Custer County, South Dakota; refer to waypoint 57 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The soil has an Ustic moisture regime that borders on Aridic. Depth to sandstone ranges from 7 to 20 inches. Coarse fragments ranging in size from channery sandstone fragments up to massive slabs of sandstone about 3 feet in diameter are on the surface and mixed throughout the A and C horizons. Some pedons also have rounded cobble and stones of igneous and metamorphic rocks unrelated to the underlying sedimentary sandstone. The coarse fragments and flagstones make up 10 to 35 percent by volume of the soil mass. The control section typically is loam averaging between 15 and 25 percent clay and more than 15 percent fine sand or coarser.

The A horizon has hue of 10YR or 7.5YR, value of 4 to 6 and 2 to 4 moist, and chroma of 1.5 to 3 dry or moist. Where the color value is as dark or darker than 5.5 and 3.5 moist, the A horizon is too thin for a mollic epipedon. The A horizon is cobbly loam, cobbly fine sandy loam, stony loam, stony fine sandy loam, channery loam, loam, sandy loam, or fine sandy loam. It is slightly acid or neutral.

The C horizon typically has 10YR hue, but some pedons have hue of 7.5YR or 5YR due to variations in color of the underlying sandstone, value of 5 to 7 and 4 to 6 moist, and chroma of 2 to 6. The C horizon is cobbly loam, channery loam, stony loam, stony fine sandy loam, channery fine sandy loam, loam, sandy loam and fine sandy loam. It ranges from slightly acid to slightly alkaline. In some pedons there is an incipient cambic horizon 1 to 2 inches thick that is intermediate in color between the A and C horizon and has more pronounced structure than the C horizon. It is not continuous and is irregular in its shape and occurrence.

The R horizon is very hard sandstone and is hard and difficult to penetrate. It lacks free carbonates.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Loamy, mixed, superactive, nonacid, mesic Aridic Lithic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - No marginal or unsuitable parameters were found. Estimated stripping depth is 8 inches.

Geographic Setting (According to Official Series Description) - Butche soils are sloping to very steep on uplands with gradients ranging from 1 to 60 percent. The Butche soils are formed in loamy materials weathered from noncalcareous sandstone. The mean annual temperature ranges from 45 to 49 degrees F, and mean annual precipitation from 13 to 18 inches. Elevations range from 3000 to 5500 feet.

SAMSIL
CLAY LOAM

Soil Mapping Unit "Sa"
Lab/BKS Sample ID: G08020805-001_002

Typical Pedon: Samsil clay loam - on a convex, southwest-facing slope of 15 percent in native grass. When described the soil was moist to 12 inches, dry from 12 to 21 inches, and moist below 21 inches. (Colors are for dry soil unless otherwise stated.)

The Samsil series consists of shallow, well drained soils formed in alluvium or residuum weathered from shale. Permeability is slow. Slope ranges from 2 to 60 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

A - 0-3 inches. Light brownish gray (2.5Y 6/2) clay loam, moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; common fine roots; few very fine fragments of shale; clear wavy boundary; slightly alkaline (pH 7.5); noneffervescent.

AC - 3-10 inches. Gray (10YR 5/1D) clay, moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable, sticky and plastic; common fine roots; common fine fragments of soft shale; clear wavy boundary; moderately alkaline (pH 8.4); strongly effervescent.

Ck – 10-18 inches. Very dark gray (10YR 3/1D) silt loam, moist; massive; hard, friable, sticky and plastic; common fine roots; about 50 percent by volume of fragments of soft shale; common distinct olive yellow (2.5Y 6/6) stains on faces of shale fragments; few fine and medium accumulations of carbonate; gradual wavy boundary; moderately alkaline (pH 8.2); strongly effervescent.

<u>Type Location</u> - Pennington County, South Dakota; refer to waypoint 60 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The control section is clay and contains 50 to 65 percent clay. The depth to bedded shale ranges from 6 to 20 inches. Horizons above the shale range from loose to hard when dry, and friable or firm when moist. These horizons contain free carbonates. Effervescence ranges from slight to strong and reaction is slightly alkaline or moderately alkaline. The C1 and C2 horizons and upper part of the Cr horizons commonly have accumulations of carbonate, gypsum, and other salts. Colors throughout, including mottles and stains, are inherited from the shale.

The A horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 2 to 4. It is clay, silty clay, silty clay loam or clay loam and commonly contains few to common fragments of shale ranging from 2 to 25 mm in diameter. It has fine or medium subangular blocky or fine or very fine granular structure. The upper 1/4 to 1/2 inch commonly is a fragile crust or mulch or very fine granules when dry.

The AC horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It contains up to 35 percent fragments of shales by volume that range from less than 2 mm to 30 mm in diameter.

The C horizon has hue of 5Y, 2.5Y or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It is clay. The C horizon contains from 35 to more than 50 percent fragments of shale by volume that range from less than 2 mm to 35 mm in diameter.

The Cr horizon has the same range in color as the overlying C horizons. It ranges from medium acid to moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer and have less clay than typical for the series.

Taxonomic Class - Clayey, smectitic, calcareous, mesic, shallow Aridic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 3-10 inches. Electrical conductivity was marginal at 10-18 inches. Sodium absorption ratio was marginal at 3-18 inches. Selenium was marginal at 10-18 inches. Strongly effervescent at 3 inches. Estimated stripping depth is 3 inches.

Geographic Setting (According to Official Series Description) - Samsil soils are on gently sloping to very steep hills, ridges and breaks of dissected shale plains. Surfaces mainly are convex, and slope gradients range from 2 to 60 percent or more. The soil formed in alluvium or residuum weathered from shale. Mean annual air temperature ranges from 45 to 48 degrees F, and mean annual precipitation ranges from 14 to 19 inches.

PAUNsAUGUNT
LOAM

Soil Mapping Unit "Pa"
Lab/BKS Sample ID: G08020805-004_006

Typical Pedon: Paunsaugunt loam-rangeland. (Colors are for dry soil unless otherwise stated.)

The Paunsaugunt series consists of well drained, moderately permeable soils that are shallow to limestone. They formed in residuum from limestone and calcareous sandstone. Paunsaugunt soils are on mesas and hillsides with slopes ranging from 2 to 70 percent. The average annual precipitation is about 15 inches. The mean annual temperature is about 43 degrees F.

A - 0-2 inches. Brown (10YR 5/3) loam, moist, crushed; weak medium subangular blocky structure that parts to weak fine granular structure; soft, friable, common fine and medium roots; common fine and very fine interstitial pores; 30 percent cobbles; strongly calcareous; carbonates are disseminated; clear smooth boundary; slightly acid (pH 6.4); noneffervescent.

Bo - 2-6 inches. Dark yellowish brown (10YR 4/4D) loam, moist, crushed; weak medium subangular blocky structure that parts to weak fine granular structure; soft, friable, common fine and medium roots; common fine and very fine interstitial pores; 30 percent cobbles; strongly calcareous; carbonates are disseminated; clear smooth boundary; neutral (pH 7.3); noneffervescent.

Ck – 6-18 inches. Very pale brown (10YR 7/4D) clay loam, moist; crushed; weak fine subangular blocky structure parting to weak fine granular structure; soft, friable; many medium and coarse roots; few fine and very fine pores; 45 percent cobbles; strongly calcareous; carbonates are disseminated; abrupt wavy boundary; moderately alkaline (pH 7.4); strongly effervescent.

<u>Type Location</u> - Garfield County, Utah; refer to waypoint 63 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The mean annual soil temperature is 41 to 47 degrees F., and a mean summer soil temperature immediately above bedrock of about 59 to 64 degrees F. The soil moisture regime is typic ustic.

The mollic epipedon is 4 to 12 inches thick and constitutes over one-third the thickness of soil above bedrock. The depth to bedrock ranges from 10 to 20 inches. Rock fragments average 35 to 60 percent in the particle-size control section. Clay content ranges from 15 to 27 percent.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5 dry, and chroma of 1 to 3 dry and moist. Reaction is mildly to moderately alkaline.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7 dry, 3 to 5 moist and chroma of 2 or 3. It is very channery, very gravelly or very cobbly loam, or very cobbly sandy loam.

<u>Range in Characteristics (according to field observations, lab analysis)</u>: Textures are slightly finer than typical for the series.

Taxonomic Class - Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - No marginal or unsuitable parameters were found. Strongly effervescent at 6 inches. Estimated stripping depth is 18 inches.

Geographic Setting (According to Official Series Description) - The Paunsaugunt soils are on undulating mesas, gently sloping to very steep hills, and mountainsides. Elevations range from 6,000 to 8,400 feet. The soils formed in residuum on limestone and calcareous sandstone. Slope gradients are 2 to 70 percent. The average annual precipitation is 16 to 22 inches and the freeze free period ranges from 70 to 100 days. The mean annual temperature is 39 to 45 degrees F., and the average summer temperature is 59 to 64 degrees F.

BOnEEk
SILTY CLAY LOAM

Soil Mapping Unit "Bo"
Lab/BKS Sample ID: G08020805-007_011

Typical Pedon: Boneek silty clay loam - on a northeast-facing plane slope of 4 percent under native grass at 3500 feet elevation. (Colors are for dry soil unless otherwise stated.)

The Boneek series consists of deep and very deep, well drained soils formed in silty sediments underlain by sandstone or siltstone. Permeability is moderately slow in the solum and moderate in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is about 17 inches, and mean annual temperature is about 46 degrees F.

A - 0-6 inches. Dark yellowish brown (10YR 4/4D) silty clay loam, moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable; many fine roots; clear wavy boundary; neutral (pH 7.1); noneffervescent.

Btk - 6-17 inches. Brown (10YR 5/3D) silty clay loam, moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable, slightly sticky and slightly plastic; common fine roots; shiny films on faces of peds; clear wavy boundary; moderately alkaline (pH 8.1); noneffervescent.

C1k – 17-33 inches. Light yellowish brown (10YR 6/2D) silty clay loam, moist; weak medium and coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and medium accumulations of carbonate; gradual wavy boundary; strongly alkaline (pH 8.5); strongly effervescent.

C2k – 33-42 inches. Grayish brown (10YR 5/2D) silty clay loam, moist; few fine and medium prominent mottles of strong brown (7.5YR 5/8) moist; weak coarse subangular blocky structure; very hard, friable; few fine roots; clear wavy boundary; moderately alkaline (pH 8.0); strongly effervescent.

C3k – 42-60 inches. Light olive brown (2.5Y 5/3D) silty clay loam, moist; thin platy rock structure; faces of fractures stained strong brown (7.5YR 5/6) moist; few coatings of carbonates on faces of fractures, but matrix is noncalcareous; moderately alkaline (pH 8.1); strongly effervescent.

Type Location - Butte County, South Dakota; refer to waypoint 64 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to bedrock is 40 to 60 inches or more. Depth to carbonates ranges from 11 to 24 inches. Thickness of the mollic epipedon ranges from 7 to 15 inches and extends into the Bt horizon of some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 and 2 or 3 moist, and chroma of 2 or 3. It typically is silt loam, but some pedons are loam. It is slightly acid or neutral.

The Bt1 horizon has hue of 7.5YR or 5YR, value of 4 or 6 and 3 or 4 moist, and chroma of 2 to 4. It is silty clay loam or silty clay. Average clay content ranges from 35 to 45 percent with less than

15 percent fine sand or coarser. It is slightly acid or neutral.

The Bt2 horizon has hue of 10YR or 7.5Y, value of 5 or 6 and 3 or 5 moist, and chroma of 2 to 4. It is silty clay loam averaging between 30 and 40 percent clay and less than 15 percent fine sand or coarser. It is neutral or slightly alkaline.

The Bk and C horizons have hue of 10YR or 2.5Y, value of 5 through 7 and 4 or 5 moist, and chroma of 1 to 3. They typically are silt loam or silty clay loam, but some pedons are loam. They are slightly alkaline to strongly alkaline. Few to many, fine or medium accumulations of carbonate are in the Bk horizon.

The Cr horizon has hue of 10YR or 7.5YR.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Fine, smectitic, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - Electrical conductivity was marginal at 33-42 inches. pH was marginal (Alkaline) at 17-33 inches. Selenium was marginal at 33-42 inches. Strongly effervescent at 17 inches. Estimated stripping depth is 17 inches.

Geographic Setting (According to Official Series Description) - Boneek soils are nearly level to moderately sloping on high terraces and uplands. Surfaces are plane to slightly convex and slope gradients range from 0 to 15 percent. The soils formed in a silty mantle overlying sandstone or siltstones, or in loess or silty alluvium. Mean annual temperature ranges from 43 to 48 degrees, and mean annual precipitation ranges from 15 to 18 inches. Most of the precipitation comes in the spring and summer.

ARVADA
SILTY CLAY LOAM

Soil Mapping Unit "Ar"
Lab/BKS Sample ID: G08020805-012_016

Typical Pedon: Arvada silty clay loam - rangeland. (Colors are for dry soil unless otherwise stated.)

The Arvada series consists of very deep, well drained soils formed in alluvium and colluvium derived from sodic shale. Arvada soils are on alluvial fans, fan remnants, fan terraces and hillslopes. Slopes are 0 to 25 percent. The mean annual precipitation is about 12 inches, and the mean annual air temperature is about 46 degrees F.

A - 0-3 inches. Light gray (10YR 7/2) silty clay loam, moist; moderate very thin platy structure parting to moderate very fine granular; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; abrupt smooth boundary; slightly acid (pH 6.3); noneffervescent.

Bt - 3-18 inches. Dark grayish brown (2.5Y 4/2DW) clay loam, moist; moderate medium columnar structure parting to moderate medium angular blocky; extremely hard, firm, sticky and very plastic; common medium roots; many prominent clay films on faces of peds and in root channels; ESP is 20 percent; clear smooth boundary; slightly alkaline (pH 7.6); noneffervescent.

Btn– 18-28 inches. Dark grayish brown (2.5Y 4/2D, 2.5Y 5/2W) silty clay, moist; massive; hard, friable, sticky and plastic; common medium soft masses of calcium carbonate and gypsum as crystals in thin seams and as filaments or threads; 20 percent exchangeable sodium; moderately alkaline (pH 7.9); very slightly effervescent.

C1n – 28-43 inches. Grayish brown (2.5Y 5/2D, 2.5Y 4/2W) silt loam, moist; massive; hard, friable, sticky and plastic; common medium soft masses of calcium carbonate and gypsum as crystals in thin seams and as filaments or threads; 20 percent exchangeable sodium; moderately alkaline (pH 8.2); very slightly effervescent.

C2nsa – 43-60 inches. Very dark grayish brown (10 YR 3/2DW) silt loam, moist; massive; hard, friable, sticky and plastic; common medium soft masses of calcium carbonate and gypsum as crystals in thin seams and as filaments or threads; 20 percent exchangeable sodium; moderately alkaline (pH 8.3); slightly effervescent.

Type Location - Sheridan County, Wyoming; refer to waypoint 72 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to effervescent material ranges from 0 to 19 inches. Depth to layers with greater than 15 percent exchangeable sodium is 4 to 10 inches. The depth to the base of the Bt horizon is 15 inches or more. A thin A horizon occurs in some pedons. A light colored platy E horizon is generally present but is absent in some pedons. Gravel is typically less than 5 percent but ranges from 0 to 15 percent. The moisture control section is usually dry for 60 consecutive days during the 90 day period following the summer solstice. The mean annual soil temperature is 47 to 53 degrees F., and the soil temperature at a depth of 20 inches is 41 degrees F. or more for 175 to 195 days. The soil has an aridic moisture regime that borders on ustic.

The E and A horizons have hue of 10YR, 2.5Y or 5Y, value of 4 to 7, 4 or 5 moist, and chroma of 2 to 4. Texture is fine sandy loam, loam, silt loam, clay loam or very fine sandy loam. Reaction ranges from neutral through strongly alkaline. EC ranges from 0 to 4 mmhos/cm.

The Btn horizon has hue of 7.5YR, 10YR, 2.5Y or 5Y, value of 4 to 6 dry, 4 or 5 moist, and chroma of 2 to 4. Texture is clay, clay loam, silty clay or silty clay loam and has 35 to 60 percent clay, 10 to 50 percent silt, and 5 to 45 percent sand. This horizon is strongly alkaline or very strongly alkaline (pH 8.8 to 10.0), has 15 to 34 percent exchangeable sodium, and an EC of 4 to 16 mmhos/cm. Some pedons when buffered by gypsum are moderately alkaline. The Btkn horizon, when present, has a calcium carbonate equivalent of 3 to 12 percent and an exchangeable sodium percent of 10 to 30. A thin Bt horizon is present above the Btn in some pedons. Some pedons have a Btkny horizon.

The Bkny horizon has hue of 7.5YR, 10YR or 2.5Y, value of 5 or 6 dry, 4 or 5 moist. Textures are clay, clay loam, silty clay or silty clay loam. Reaction ranges from strongly alkaline or very strongly alkaline (pH 8.6 to 10.0). This horizon contains 4 to 15 percent calcium carbonate equivalent. Some pedons when buffered by gypsum are moderately alkaline. Exchangeable sodium typically ranges from 10 to 30 percent but decreases with increasing depth. Electrical conductivity is 4 to 16 mmhos/cm. Some pedons have a C horizon.

Some pedons have a C horizon below 40 inches. It has properties similar to those of the Bkny horizon.

<u>Range in Characteristics (according to field observations, lab analysis)</u>: Textures are slightly finer than typical for the series.

<u>Taxonomic Class</u> - Fine, smectitic, mesic Ustertic Natrargids

<u>Suitability for Topsoil (According to WDEQ Guideline 1)</u> - Marginal texture (clay) was found from 18-28 inches. Electrical conductivity was marginal at 28-60 inches. Sodium absorption ratio was marginal at 28-43 inches and was unsuitable at 43-60 inches. Selenium was marginal at 18-60 inches. Strongly effervescent at 3 inches. Estimated stripping depth is 18 inches.

<u>Geographic Setting (According to Official Series Description)</u> - The Arvada soils are on alluvial fans, fan remnants, terraces and hillslopes. The soils formed in moderately fine textured alluvium and colluvium derived from sedimentary rocks. Slopes range from 0 to 25 percent. Elevations range from 2,600 to 6,000 feet. The average annual precipitation is about 12 inches but ranges from 9 to 14 inches with about half the precipitation occurring during April, May, and early June. The mean annual air temperature is about 43 to 53 degrees F., and the mean summer temperature is 63 degrees F. The frost-free season is estimated to range from 100 to 160 day

LOHMILLER
LOAM

Soil Mapping Unit "Lo"
Lab/BKS Sample ID: G08020805-017_022

Typical Pedon: Lohmiller loam - on a plane slope of less than 1 percent in a cultivated field. When described the soil was moist throughout. (Colors are for dry soil unless otherwise stated.)

The Lohmiller series consists of very deep, well drained soils formed in alluvium on bottom lands. Permeability is slow or moderately slow. Slopes range from 0 to 8 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 46 degrees F.

A - 0-3 inches. Light gray (10YR 6/1) loam, moist; moderate medium granular structure; hard, friable; many fine roots; neutral; clear smooth boundary; slightly alkaline (pH 7.4); noneffervescent.

AC - 3-15 inches. Dark grayish brown (2.5Y 4/2W) silty clay, moist; weak thin platy structure parting to weak fine granular; very hard, firm; common fine roots, clear smooth boundary; moderately alkaline (pH 7.9); noneffervescent.

C1 – 15-23 inches. Dark grayish brown (2.5Y 4/2W) silty clay, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; slighty alkaline (pH 7.8); noneffervescent.

C2n – 22-34 inches. Dark grayish brown (2.5Y 4/2W) silty clay, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.0); very slightly effervescent.

C3k – 34-38 inches. Grayish brown (2.5Y 5/2W) silty clay, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.0); very slightly effervescent.

C4n – 38-60 inches. Dark grayish brown (2.5Y 4/2W) clay, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.0); very slightly effervescent.

Type Location - Fall River County, South Dakota; refer to waypoint 73 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Carbonates are within 10 inches of the surface. The control section averages from 35 to 50 percent clay.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. Some pedons have value of 4 dry and 3 moist in the upper 4 inches. It typically is silty clay loam or clay loam but is silty clay in some pedons. It ranges from neutral to moderately alkaline.

The C horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 to 7 and 4 to 6 moist; and chroma of 2 to 4. It typically is clay loam or silty clay loam but is silty clay or clay in some pedons. It is stratified with thin layers of loamy sand, fine sandy loam, loam, sandy clay or silt loam. It is slightly alkaline or moderately alkaline. Some pedons have accumulations of carbonates.

Range in Characteristics (according to field observations, lab analysis): Textures have slightly more clay than typical for the series.

Taxonomic Class - Fine, smectitic, calcareous, mesic Torrertic Ustifluvents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 3-60 inches. Saturation percentage was marginal at 15-34 inches and 38-60 inches. Sodium absorption ratio was unsuitable at 3-60 inches. Electrical conductivity was marginal at 15-23 inches and was unsuitable at 23-60 inches. Selenium was marginal at 15-60 inches. Estimated stripping depth is 3 inches.

Geographic Setting (According to Official Series Description) - Lohmiller soils are on flood plains and high bottom lands of rivers and streams and on alluvial fans of foot slopes. Slopes are typically less than 2 percent but range from 0 to 8 percent. The soils formed in calcareous alluvium from sedimentary rock. Mean annual air temperature ranges from 45 to 48 degrees F, and mean annual precipitation ranges from 10 to 19 inches.

PIERRE
SANDY CLAY LOAM

Soil Mapping Unit "Pe"
Lab/BKS Sample ID: G08020805-023_028

Typical Pedon: Pierre sandy clay loam - on a convex slope of 7 percent in native grass. (Colors are for dry soil unless otherwise stated.)

The Pierre series consists of moderately deep, well drained soils formed in clayey residuum weathered from shale bedrock on uplands. Permeability is very slow. Slopes range from 0 to 30 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 46 degrees F.

A - 0-3 inches. Grayish brown (2.5Y 5/2) sandy clay loam, moist; moderate fine subangular blocky structure parting to weak very fine granular; hard, firm, sticky and plastic; 1 percent pebbles; clear smooth boundary; slightly alkaline (pH 7.8); noneffervescent.

AC- 3-15 inches. Dark grayish brown (2.5Y 4/2W) sandy clay loam, moist; moderate medium and coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; common distinct intersecting slickensides; few fine accumulations of iron; 1 percent pebbles; gradual wavy boundary; moderately alkaline (pH 8.3); strongly effervescent.

C1k – 15-27 inches. Grayish brown (2.5Y 5/2W) clay loam, moist; moderate coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; common distinct intersecting slickensides; few fine nests of iron and common fine accumulations of gypsum; 1 percent pebbles; gradual wavy boundary; strongly alkaline (pH 8.5); violently effervescent.

C2n – 27-38 inches. Dark grayish brown (2.5Y 4/2W) loam, moist; common distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) iron stains; many fine accumulations of gypsum and carbonate; 1 percent pebbles; gradual wavy boundary; strongly alkaline (pH 8.5); slightly effervescent.

C3k – 38-51 inches. Dark grayish brown (2.5Y 4/2W) loam, moist; common distinct strong brown (7.5YR 5/6) iron stains; 1 percent pebbles; moderately alkaline (pH 8.4); strongly effervescent.

C4n – 51-60 inches. Dark grayish brown (2.5Y 4/2W) sand loam, moist; common distinct strong brown (7.5YR 5/6) iron stains; 1 percent pebbles; moderately alkaline (pH 8.4); very slightly effervescent.

<u>Type Location</u> - Haakon County, South Dakota; refer to waypoint 74 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - The soil contains carbonates at or within 6 inches of the surface. The depth to soft shale bedrock ranges from 20 to 40 inches but commonly is at depths of 25 to 35 inches. The horizon above the shale has 0 to 60 percent, by volume soft shale fragments. The control section is 50 to 60 percent clay. When the soil is dry, cracks 1/2 inch to 2 inches wide and several feet long extend downward through the

solum. The soil does not have a mollic epipedon, but the upper 10 inches of the solum has an average organic carbon content between 0.6 and 1.7 percent. The soil has a SAR of 1 to 7.

The A horizon has hue of 10YR to 5Y, value of 4 to 6 and 3 to 5 moist, and chroma of 1 to 3. It typically is clay but is silty clay in some pedons. It ranges from slightly acid to moderately alkaline. When the soil is dry it has a light gray (2.5Y 7/2) smooth, porous, platy surface crust ranging from 1/4 to 1 inch in thickness. Where the horizon has mollic colors, it is too thin to be a mollic epipedon. Some pedons do not have an AB horizon.

The Bss horizons have hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 1 to 3. They are extremely hard or very hard when dry and extremely firm to firm when moist. They range from neutral to moderately alkaline.

Bk and C horizons are present in some pedons.

The Cr horizon is soft shale bedrock and ranges from slightly acid to moderately alkaline. Bedding planes are evident in the partially weathered shale in some pedons. Gypsum and other salts are concentrated in very thin seams within the shale in some pedons.

Range in Characteristics (according to field observations, lab analysis): Textures are coarser and have less clay than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Aridic Leptic Haplusterts

Suitability for Topsoil (According to WDEQ Guideline 1) - pH was marginal (alkaline) at 15-38 inches. Sodium absorption ratio was unsuitable at 15-60 inches. Electrical conductivity was unsuitable at 27-60 inches. Selenium was marginal at 15-60 inches. Strongly effervescent at 3 inches. Estimated stripping depth is 15 inches.

Geographic Setting (According to Official Series Description) - Pierre soils are on nearly level to steep uplands. Slope gradient typically is 3 to 15 percent, but ranges from 0 to 30 percent. The soils formed in residuum weathered from clay shale. Gilgai microrelief is in most areas. Mean annual air temperature is 44 to 53 degrees F, and mean annual precipitation ranges from 12 to 16 inches. Growing season is 125 to 140 days; average growing season precipitation is 10 to 13 inches; and growing degree days are 2600 to 3100. Elevation is 1300 to 3600 feet.

HAVERSON
CLAY LOAM

Soil Mapping Unit "Ha"
Lab/BKS Sample ID: G08020805-029_033

Typical Pedon: Haverson clay loam - grassland. (Colors are for dry soil unless otherwise stated.)

The Haverson series consists of very deep, well drained soils that formed in alluvium from mixed sources. Haverson soils are on floodplains and low terraces and have slopes of 0 to 9 percent. The mean annual precipitation is about 15 inches and the mean annual air temperature is about 49 degrees F.

A - 0-4 inches. Brown (10YR 4/3D, 10YR 4/2W) clay loam, moist; strong fine granular structure; slightly hard, very friable; clear smooth boundary; slightly alkaline (pH 7.8); noneffervescent.

AC - 4-15 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay loam, moist; weak coarse subangular blocky structure; very hard, friable; clear smooth boundary; slightly alkaline (pH 7.7); very slightly effervescent.

C1 – 15-35 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay loam, moist; massive; hard, friable; gradual smooth boundary; slightly alkaline (pH 7.6); slightly effervescent.

C2n – 35-46 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay loam, moist; massive; slightly hard, very friable; few fine irregularly shaped masses and seams of lime; slightly alkaline (pH 7.8); slightly effervescent.

C3 – 46-60 inches. Brown (10YR 4/3D, 10YR 4/2W) silty clay loam, moist; massive; slightly hard, very friable; few fine irregularly shaped masses and seams of lime; slightly alkaline (pH 7.8); slightly effervescent.

Type Location - Weld County, Colorado; refer to waypoint 75 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Mean annual soil temperature ranges from 47 to 55 degrees F. and mean summer soil temperature ranges from 59 to 78 degrees F. Organic carbon ranges from 0.5 to 2.0 percent in the surface horizon but decreases irregularly with depth. The particle-size control section is stratified with strata ranging from sandy loam to clay loam, but averaging approximately loam. On a weighted average basis, clay ranges from 18 to 35 percent, silt from 10 to 50 percent, and sand from 20 to 60 percent with more than 15 percent but less than 35 percent being fine or coarser sand. Rock fragments are generally less that 5 percent and range from 0 to 20 percent. Some visible calcium carbonate may occur at any depth in these soils, but it is not concentrated into any consistent horizon of accumulation. This soil is not dry in all parts of the moisture control section for more than one-half the time the soil temperature is above 41 degrees F. (195 to 210 days) and is not dry for 45 consecutive days following July 15.

The A horizon has hue of 2.5Y or 10YR, value of 4 to 6 dry, 3 to 5 moist and chroma of 2 or 3. When the value of the surface horizon is as dark as 5 dry and 3 moist, the horizon is thin enough so that if mixed to 7 inches it is too light colored or contains too little organic carbon to qualify as a mollic epipedon or are finely stratified. The A horizon usually has granular primary structure but it has subangular blocky structure in some pedons. It is soft or slightly hard. It is neutral through moderately alkaline.

The C horizon has hue of 2.5Y, 10YR or 7.5YR, value of 5 or 6 dry, 4 or 5 moist and chroma of 2 or 3. It is slightly alkaline to very strongly alkaline. It has from less-than-one to about 15 percent calcium carbonate equivalent, which differs erratically from stratum to stratum.

Range in Characteristics (according to field observations, lab analysis): Textures are finer and have more clay than typical for the series.

Taxonomic Class - Fine-loamy, mixed, superactive, calcareous, mesic Aridic Ustifluvents

Suitability for Topsoil (According to WDEQ Guideline 1) - Sodium absorption ratio was marginal at 15-35 inches and unsuitable at 35-60 inches. Estimated stripping depth is 35 inches.

Geographic Setting (According to Official Series Description) - The Haverson soils are on floodplains and low terraces of major rivers. Slope is 0 to 9 percent. The soils formed in highly stratified, calcareous, recent alluvium derived from mixed sources. At the type location the average annual precipitation is 14 to 18 inches with peak periods of precipitation occurring during the early spring and summer. The mean annual air temperature ranges from 47 to 52 degrees F. and the mean summer temperature is 77 degrees F. The frost-free season is 125 to 180 days.

DEMAR
LOAM

Soil Mapping Unit "Dg"
Lab/BKS Sample ID: G08020805-034_038

Typical Pedon: Demar loam - on a plane slope of less than 1 percent. When described the soil was moist to 5 inches and dry below. (Colors are for dry soil unless otherwise stated.)

The Demar series consists of deep or very deep, moderately well drained soils formed in clayey alluvium from acid clay shales. These soils are on terraces. They have very slow permeability. Slopes range from 0 to 6 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

A - 0-2 inches. Pale brown (10YR 6/3) loam, moist; weak thin platy structure parting to weak fine granular; slightly hard, friable, slightly sticky; many roots; abrupt wavy boundary; strongly acid (pH 5.3); noneffervescent.

Bt - 2-21 inches. Grayish brown (2.5Y 5/2D) silty clay, moist; moderate medium blocky structure; very hard, very firm, sticky and plastic; very few roots; clear smooth boundary; slightly alkaline (pH 7.7); noneffervescent.

Btn – 21-29 inches. Very dark grayish brown (2.5Y 3/2D) clay, moist; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky and plastic; very few roots; common fine nests of gypsum and other salts; gradual boundary; neutral (pH 6.9); very slightly effervescent.

C1 – 29-46 inches. Dark grayish brown (2.5Y 4/2D) silty clay loam, moist; many coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; very hard, very firm; partially weathered shale fragments make up about 40 percent by volume; common bands of crystals of gypsum; gradual boundary; slightly alkaline (pH 7.6); very slightly effervescent.

C2 – 46-60 inches. Grayish brown (2.5Y 5/2D) silty clay loam, moist; many coarse prominent brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) iron stains along fractures; neutral (pH 7.3); very slightly effervescent.

Type Location - Butte County, South Dakota; refer to waypoint 76 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The depth to bedded shale ranges from 40 to 60 inches or more. These soils range from neutral to strongly acid in the upper 12 inches and from very strongly acid to extremely acid below this depth.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. It typically is loam but is clay loam in some pedons.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. The clay content of the Bt horizon is between 35 and 60 percent. Structure of the Bt horizon ranges from weak or moderate, medium or coarse columnar in the Bt1 horizon and moderate or strong, medium or coarse blocky in the Bt2 horizon.

The Bz horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 to 5 moist, and chroma of 2 to 3. It has common or many accumulations of gypsum and other salts.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. It contains 20 to 50 percent fragments of shale.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Fine, smectitic, mesic Torrertic Haplustalfs

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-29 inches. Sodium absorption ratio was marginal at 2-29 inches and unsuitable at 29-60 inches. Selenium was marginal at 46-60 inches. Estimated stripping depth is 2 inches.

Geographic Setting (According to Official Series Description) - Demar soils are on micro-highs on nearly level to gently sloping alluvial terraces having pronounced micro-relief. Slope gradients range from 0 to 6 percent. These soils formed in clayey alluvium derived from acid clay shales. The mean annual air temperature ranges from 45 to 49 degrees F, and mean annual precipitation ranges from 12 to 18 inches.

PENROSE
CLAY LOAM

Soil Mapping Unit "Pg"
Lab/BKS Sample ID: G08020805-039_042

Typical Pedon: Penrose clay loam-grassland. (Colors are for dry soil unless otherwise stated.)

The Penrose series consists of shallow, well and somewhat excessively drained, moderate to slowly permeable soils formed in thin, calcareous, loamy materials weathered in place from limestone and interbedded limy materials. Penrose soils are on hills, plains, ridges, hogbacks, cuestas, and mesa tops. Slopes are 1 to 65 percent. Mean annual precipitation is about 13 inches and mean annual temperature is about 51 degrees F.

A - 0-4 inches. Light brownish gray (2.5Y 6/2) clay loam, moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; 25 percent channers; calcareous; clear smooth boundary; slightly alkaline (pH 7.6); slightly effervescent.

C1k - 4-17 inches. Dark grayish brown (10YR 4/2D) clay loam, moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 20 percent limestone channels; calcareous; abrupt smooth boundary; slightly alkaline (pH 7.7); strongly effervescent.

C2k – 17-36 inches. Grayish brown (10YR 5/2D) silt loam, limestone bedrock; moderately alkaline (pH 8.0); very slightly effervescent.

Cr – 36-48 inches. Grayish brown (10YR 5/2D) silt loam, limestone bedrock; slightly alkaline (pH 7.8); very slightly effervescent.

Type Location - Fremont County, Colorado; refer to waypoint 77 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) –

Soil moisture: The soil moisture control section is moist intermittently April through August; aridic moisture regime bordering on ustic.
Mean annual soil temperature: 52 to 59 degrees F.
Mean summer soil temperature: 68 to 76 degrees F.
Depth to lithic contact: 10 to 20 inches to limestone
Depth to secondary calcium carbonate: 0 to about 5 inches and is not more than 1/4 the thickness of the control section
Gypsum content: 0 to 1.5 percent by weight
Calcium carbonate equivalent: 40 to 75 percent
Electrical conductivity: 0 to 14 millimhos/cm in a major part of the control section
Continuous subhorizons of secondary calcium carbonate and/or sulfate do not occur within the control section although some visible accumulation occurs in some pedons

Particle-size control section (weighted average):
Clay content: 18 to 35 percent
Sand content: 15 to 70 percent
Rock fragments: 0 to 35 percent, dominantly to 10 inches in diameter.

A horizon:
Hue: 7.5YR through 2.5Y
Value: 5 through 8, 3 through 6 moist
Chroma: 1 through 4.
Calcium carbonate equivalent: 35 to 70 percent
Reaction: mildly alkaline or moderately alkaline.
Rock fragments: 0 to 35 percent

C horizon:
Hue: 7.5YR through 2.5Y
Textures of the fine earth fraction: loam, silt loam, clay loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 35
Calcium carbonate equivalent: 40 to 75 percent
Reaction: moderately alkaline or strongly alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Loamy, carbonatic, mesic Lithic Ustic Torriorthents

Suitability for Topsoil (According to WDEQ Guideline 1) – Boron was unsuitable at 36-48 inches. Strongly effervescent at 4 inches. Estimated stripping depth is 36 inches.

Geographic Setting (According to Official Series Description) –
Parent material: residuum and slope alluvium derived from limestone and interbedded limy materials.
Landform: hills, mesas, and ridges
Slopes: 1 to 65 percent
Elevation: 3,000 to 6,500 feet
Mean annual temperature: 50 to 53 degrees F
Mean annual precipitation: 11 to 15 inches
Precipitation pattern: peak periods between April and August, dries between November and February
Frost-free period: 125 to 165 days.

Powertech (USA) Inc.

DEMAR
SILTY CLAY LOAM

Soil Mapping Unit "Dg"
Lab/BKS Sample ID: G08020805-043_047

Typical Pedon: Demar silty clay loam - on a plane slope of less than 1 percent. When described the soil was moist to 5 inches and dry below. (Colors are for dry soil unless otherwise stated.)

The Demar series consists of deep or very deep, moderately well drained soils formed in clayey alluvium from acid clay shales. These soils are on terraces. They have very slow permeability. Slopes range from 0 to 6 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

A - 0-3 inches. Pale brown (10YR 6/3) silty clay loam, moist; weak thin platy structure parting to weak fine granular; slightly hard, friable, slightly sticky; many roots; abrupt wavy boundary; slightly acid (pH 6.1); noneffervescent.

Bt - 3-17 inches. Very dark grayish brown (10YR 3/2D) silty clay, moist; moderate medium blocky structure; very hard, very firm, sticky and plastic; very few roots; clear smooth boundary; extremely acid (pH 4.1); noneffervescent.

C1 – 17-30 inches. Dark grayish brown (10YR 4/2D) clay, moist; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky and plastic; very few roots; common fine nests of gypsum and other salts; gradual boundary; extremely acid (pH 3.6); noneffervescent.

C2 – 30-42 inches. Dark grayish brown (10YR 4/2D) clay, moist; many coarse prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; very hard, very firm; partially weathered shale fragments make up about 40 percent by volume; common bands of crystals of gypsum; gradual boundary; extremely acid (pH 3.7); noneffervescent.

Cr – 42-60 inches. Dark grayish brown (10YR 4/2D) clay, moist; many coarse prominent brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) iron stains along fractures; extremely acid (pH 3.6); noneffervescent.

Type Location - Butte County, South Dakota; refer to waypoint 79 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The depth to bedded shale ranges from 40 to 60 inches or more. These soils range from neutral to strongly acid in the upper 12 inches and from very strongly acid to extremely acid below this depth.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. It typically is loam but is clay loam in some pedons.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. The clay content of the Bt horizon is between 35 and 60 percent. Structure of the Bt horizon ranges from weak or moderate, medium or coarse columnar in the Bt1 horizon and moderate or strong, medium or coarse blocky in the Bt2 horizon.

The Bz horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 to 5 moist, and chroma of 2 to 3. It has common or many accumulations of gypsum and other salts.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 or 3. It contains 20 to 50 percent fragments of shale.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Fine, smectitic, mesic Torrertic Haplustalfs

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 3-60 inches. pH was unsuitable (acidic) at 3-60 inches. Estimated stripping depth is 3 inches.

Geographic Setting (According to Official Series Description) - Demar soils are on micro-highs on nearly level to gently sloping alluvial terraces having pronounced micro-relief. Slope gradients range from 0 to 6 percent. These soils formed in clayey alluvium derived from acid clay shales. The mean annual air temperature ranges form 45 to 49 degrees F, and mean annual precipitation ranges from 12 to 18 inches.

SATANTA
LOAM

Soil Mapping Unit "Sc"
Lab/BKS Sample ID: G08020806-001_005

Typical Pedon: Satanta loam - in a cultivated field. (Colors are for dry soil unless otherwise stated.)

The Satanta series consists of very deep well drained soils that formed in eolian deposits. These soils are on plains or high stream terraces in the Central High Tablelands (MLRA 72). Slopes range from 0 to 15 percent. Mean annual temperature is 13 degrees C. (56 degrees F.) and mean annual precipitation is 48 centimeters (19 inches) at the type location.

A - 0-4 inches. Dark grayish brown (10YR 4/2) loam, moist; weak fine granular and weak medium platy structure; friable, slightly hard; many fine and medium roots throughout; clear smooth boundary; strongly acid (pH 5.3); noneffervescent.

Bt - 4-12 inches. Dark yellowish brown (10YR 3/4D) clay loam, moist; weak medium platy structure; friable, slightly hard; many fine and medium roots throughout; abrupt smooth boundary; neutral (pH 7.1); noneffervescent.

BC – 12-17 inches. Brown (10YR 4/3D) sandy clay loam, moist; moderate medium subangular blocky and weak medium platy structure; friable, slightly hard; common fine roots throughout; 10 percent continuous distinct clay films on faces of peds; gradual smooth boundary; slightly alkaline (pH 7.6); strongly effervescent.

C1k – 17-28 inches. Brown (10YR 5/3D) sandy clay loam, moist; moderate medium subangular blocky and moderate medium prismatic structure; friable, hard; common fine roots throughout; common fine moderate continuity tubular pores; 10 percent continuous distinct clay films on faces of peds; gradual smooth boundary; moderately alkaline (pH 7.9); strongly effervescent.

C2k – 28-43 inches. Grayish brown (10YR 5/2D) sandy clay loam, moist; moderate medium prismatic and moderate medium subangular blocky structure; friable, hard; common fine roots throughout; common fine and medium moderate continuity tubular pores; 10 percent continuous distinct clay films on faces of peds; clear smooth boundary; moderately alkaline (pH 7.9); strongly effervescent.

<u>Type Location</u> - Haskell County, Kansas; refer to waypoint 82 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> –

Calcium carbonate equivalent in the series control section: less than 15 percent
Coarse fragments: 0 to 10 percent gravel by volume
Depth to carbonates: 30 to 91 centimeters (12 to 36 inches)
Mollic epipedon thickness: 20 to 51 centimeters (8 to 20 inches)
Phases recognized: Sandy substratum, gravelly substratum, dry, elevation greater than
1219 meters (4,000 feet)

A horizon:
Hue: 10YR
Value: 4 to 5, 2 to 3 moist
Chroma: 2 to 3
Reaction: slightly acid to slightly alkaline
Texture: loam, very fine sandy loam, clay loam, fine sandy loam
Comments: Some pedons have a BA horizon that is intermediate in color and texture between the A and Bt horizons.

Bt horizon:
Hue: 7.5YR to 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 4
Reaction: neutral to moderately alkaline
Texture: loam, sandy clay loam, clay loam with 15 to 35 percent fine and coarser sand and less than 50 percent sand

Bk or 2Bkb horizons:
Hue: 7.5YR to 2.5Y
Value: 4 to 6, 3 to 5 moist
Chroma: 2 to 6
Reaction: slightly to strongly alkaline
Texture: loam, sandy clay loam, clay loam with 15 to 35 percent fine and coarser sand and less than 50 percent sand

C or 3Ck horizons:
Hue: 10YR, 2.5Y
Value: 5 to 7, 4 to 6 moist
Chroma: 2 to 6
Reaction: slightly or moderately alkaline
Texture: loam, silt loam, clay loam, sandy clay loam, very fine sandy loam, loamy fine sand, fine sandy loam
Comments: Some pedons have a BCk horizon that has few carbonates that occur as seams, threads or concretions.

Range in Characteristics (according to field observations, lab analysis): Textures are coarser than typical for the series.

Taxonomic Class - Fine-loamy, mixed, superactive, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - pH was marginal (acidic) at 0-4 inches. Strongly effervescent at 12 inches. Estimated stripping depth is 43 inches.

Geographic Setting (According to Official Series Description) –
Landscape: terraces on nearly level to undulating plains
Landform: plains, high stream terraces
Slopes: 0 to 15 percent
Elevation: 610 to 1372 meters (2000 to 4500 feet)

Parent material: eolian deposits
Mean annual air temperature: 7 to 14 degrees C. (45 to 57 degrees F.)
Mean annual precipitation: 35 to 56 centimeters (14 to 22 inches)
Frost-free period: 140 to 200 days
Thornthwaite Annual PE Index: 25 to 40

SNOMO
SILTY CLAY LOAM

Soil Mapping Unit "Gs"
Lab/BKS Sample ID: G08020806-006_011

Typical Pedon: Snomo silty clay loam- on an 8 percent north-facing slope in scattered trees with native grass understory. (Colors are for dry soil unless otherwise stated.)

The Snomo series consists of deep or very deep, well drained soils formed in clayey materials weathered from acid shale on the uplands. These soils have moderate permeability. Slopes range from 2 to 20 percent. Mean annual precipitation is about 17 inches and mean annual air temperature is about 45 degrees F.

A - 0-3 inches. Light gray (10YR 6/1) silty clay loam, moist; weak thick platy structure parting to weak fine granular; hard, friable, slightly sticky and slightly plastic; many fine and medium roots; clear smooth boundary; very strongly acid (pH 4.8); noneffervescent.

Bt1 - 3-17 inches. Grayish brown (10YR 5/2D) silty clay, moist, rubbed dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to weak medium and fine subangular blocky; very hard, friable, sticky and plastic; common fine roots; clear smooth boundary; very strongly acid (pH 4.8); noneffervescent.

BtC – 17-33 inches. Dark grayish brown (10YR 4/2D) silty clay, moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; few fine roots; few fine fragments of shale; clear wavy boundary; moderately acid (pH 5.7); noneffervescent.

C1n – 33-42 inches. Grayish brown (10YR 5/2D) silt loam, moist; few fine distinct mottles of yellow (2.5Y 8/6) massive; slightly hard, friable, sticky and plastic; few fine roots; many fine fragments of shale, abrupt wavy boundary; slightly acid (pH 7.6); noneffervescent.

C2n – 42-52 inches. Brown (10YR 5/3D) silt loam, moist; massive; slightly hard, friable, sticky and plastic; many coarse fragments of brittle shale; extremely acid; clear wavy boundary; moderately acid (pH 7.9); noneffervescent.

C3n – 52-60 inches. Pale brown (10YR 6/3D) silt loam, moist; yellow (5Y 8/6) and yellowish red (5YR 5/8) coatings on fracture faces of shale; moderately acid (pH 7.9); noneffervescent.

Type Location - Butte County, South Dakota; refer to waypoint 83 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Bedded shale typically is between a depth of 40 and 60 inches but is below 60 inches in some pedons. Colors throughout the soil are inherent to the shale.

The A horizon has hue of 10YR, value of 5 to 7 and 3 or 4 moist, and chroma of 1 or 2. It is silty clay or clay and contains 0 to 15 percent by volume of fine fragments of shale less than 3 mm in size. It is extremely acid to slightly acid. Some pedons have a thin distinct E horizon as evidenced by prominent clean silt and sand grains.

The Bw horizon has hue of 10YR, 2.5Y, and 7.5YR, value of 5 or 6 and 3 or 4 moist, and chroma of 2 to 4. Moist value typically is one unit higher when rubbed. It has 0 to 20 percent by volume of fine fragments of shale less than 3 mm in size. It is strongly acid to extremely acid.

The BC and C horizons have hue of 10YR or 2.5Y, value of 5 or 6 and 3 to 5 moist, and chroma of 1 to 3. Moist value typically is one unit higher when rubbed. They have 15 to 50 percent by volume of fine to coarse fragments of shale ranging from 1 to 25 mm in size. They are very strongly acid or extremely acid.

The Cr horizon is multicolored in hue of 10YR, 2.5Y, or 5Y; and is very hard and brittle but has a hardness of less than 3 on the Moh's scale of hardness. It is very strongly acid or extremely acid.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer and have less clay than typical for the series.

Taxonomic Class - Very-fine, smectitic, mesic Torrertic Dystrustepts

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 3-33 inches. pH was unsuitable (acidic) at 0-17 inches. Saturation percentage was marginal at 45-52 inches. Boron was unsuitable at 33-60 inches. Estimated stripping depth is 0 inches.

Geographic Setting (According to Official Series Description) - Snomo soils are on gently sloping to moderately steep uplands. Slope gradients range from 2 to 20 percent. The soil formed in clayey materials weathered from acid shale. Mean annual temperature ranges from 43 to 48 degrees F, and precipitation from 14 to 18 inches.

LOHMILLER
SILTY CLAY LOAM

Soil Mapping Unit "Lo"
Lab/BKS Sample ID: G08020806-012_016

Typical Pedon: Lohmiller silty clay loam- on a plane slope of less than 1 percent in a cultivated field. (Colors are for dry soil unless otherwise stated.)

The Lohmiller series consists of very deep, well drained soils formed in alluvium on bottom lands. Permeability is slow or moderately slow. Slopes range from 0 to 8 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 46 degrees F.

A - 0-5 inches. Light gray (10YR 6/1) silty clay loam, moist; moderate medium granular structure; hard, friable; many fine roots; neutral; clear smooth boundary; slightly alkaline (pH 7.4); noneffervescent.

C1n - 5-18 inches. Very dark grayish brown (10YR 3/2D) silty clay loam, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.2); noneffervescent.

C2n – 18-37 inches. Brown (10YR 4/3D) silty clay, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.4); noneffervescent.

C3n – 37-47 inches. Brown (10YR 5/3D) silty clay loam, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.3); very slightly effervescent.

C4n – 47-60 inches. Dark grayish brown (10YR 4/2D) clay loam, moist; massive; very hard, firm; thin bedding planes evident; common very fine roots; moderately alkaline (pH 8.1); very slightly effervescent.

Type Location - Fall River County, South Dakota; refer to waypoint 84 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Carbonates are within 10 inches of the surface. The control section averages from 35 to 50 percent clay.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. Some pedons have value of 4 dry and 3 moist in the upper 4 inches. It typically is silty clay loam or clay loam but is silty clay in some pedons. It ranges from neutral to moderately alkaline.

The C horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 to 7 and 4 to 6 moist; and chroma of 2 to 4. It typically is clay loam or silty clay loam but is silty clay or clay in some pedons. It is stratified with thin layers of loamy sand, fine sandy loam, loam, sandy clay or silt loam. It is slightly alkaline or moderately alkaline. Some pedons have accumulations of carbonates.

Range in Characteristics (according to field observations, lab analysis): No significant range in characteristics was found.

Taxonomic Class - Fine, smectitic, calcareous, mesic Torrertic Ustifluvents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 18-37 inches. Saturation percentage was marginal at 0-18 inches. Sodium absorption ratio was marginal at 5-18 inches and 37-47 inches and was unsuitable at 18-37 inches. Electrical conductivity was marginal at 5-18 inches and 37-60 inches and was unsuitable at 18-37 inches. Estimated stripping depth is 5 inches.

Geographic Setting (According to Official Series Description) - Lohmiller soils are on flood plains and high bottom lands of rivers and streams and on alluvial fans of foot slopes. Slopes are typically less than 2 percent but range from 0 to 8 percent. The soils formed in calcareous alluvium from sedimentary rock. Mean annual air temperature ranges from 45 to 48 degrees F, and mean annual precipitation ranges from 10 to 19 inches.

KYLE
LOAM

Soil Mapping Unit "Ky"
Lab/BKS Sample ID: G08020806-017_020

Typical Pedon: Kyle loam- on a west-facing plane slope of 2 percent in native grass. (Colors are for dry soil unless otherwise stated.)

The Kyle series consists of very deep and well drained soils formed in sediments weathered from clay shale on uplands. Permeability is very slow. Slopes range from 0 to 15 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 47 degrees F.

A - 0-2 inches. Grayish brown (2.5YR 5/2) loam, moist; moderate medium and fine granular structure; hard, firm, sticky and plastic; thin crust in upper 1/4 inch of light brownish gray (2.5Y 6/2); common fine roots; neutral; clear wavy boundary; slightly acid (pH 6.3); noneffervescent.

Bt1 - 2-7 inches. Very dark grayish brown (10YR 3/2D) silty clay loam, moist; weak coarse blocky structure parting to weak medium and fine blocky; very hard, very firm, sticky and plastic; common fine roots; gradual wavy boundary; neutral (pH 7.3); noneffervescent.

Bt2 – 7-17 inches. Brown (10YR 4/3D)silty clay loam, moist; weak coarse subangular blocky structure parting to weak medium and fine blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; clear wavy boundary; moderately alkaline (pH 7.9); strongly effervescent.

Ck – 17-30 inches. Brown (10YR 4/3D) clay loam, moist; weak coarse subangular blocky structure parting to weak medium and fine blocky; extremely hard, very firm, very sticky and very plastic; few intersecting slickensides; few fine roots; clear wavy boundary; moderately alkaline (pH 8.0); strongly effervescent.

Type Location - Fall River County, South Dakota; refer to waypoint 85 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The soil typically does not have carbonates to depths of 4 to 6 inches, but some pedons contain carbonates to the surface. When the soil is dry, cracks 1/2 inch to 2 inches wide and several feet long extend downward through the solum. The control section averages 60 to 65 percent clay. The soil does not have a mollic epipedon but the upper 10 inches of the solum has an average organic carbon content between 0.6 and 1.7 percent. When the soil is dry, a porous surface crust 1/8 inch to 1/2 inch thick with dry color value of 6 or 7 is typical. Gypsum and other salts are below depths of 20 inches.

The A horizon has hue of 10YR, 2.5Y or 5Y, value of 5 or 6 and 3 to 5 moist, and chroma of 1 to 3. It typically is clay but some is silty clay. It is neutral or slightly alkaline.

The Bw and Bss horizons have hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. Both dry and moist colors of the surface of peds range from 1/2 to 1 value darker than the crushed peds. They are extremely hard or very hard when dry and extremely firm or very firm when moist. They are slightly alkaline or moderately alkaline.

The BCss horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It has few to common accumulations of gypsum and other salts in most pedons. It is slightly alkaline or moderately alkaline.

Some pedons have a Bk horizon that has colors similar to the BC horizon. It has few to common accumulations of carbonate. It is slightly alkaline or moderately alkaline.

The Cy horizon has hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 2 to 4. It is clay and some pedons contain up to 35 percent fragments of shale below 40 inches. It has few to many accumulations of gypsum or other salts. Unweathered shale typically is at depths greater than 5 feet but is as shallow as 40 inches in some pedons. It is slightly alkaline or moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer and have less clay than typical for the series.

Taxonomic Class - Very-fine, smectitic, mesic Aridic Haplusterts

Suitability for Topsoil (According to WDEQ Guideline 1) - Saturation percentage was marginal at 2-7 inches. Strongly effervescent at 7 inches. Estimated stripping depth is 30 inches.

Geographic Setting (According to Official Series Description) - Kyle soils are nearly level to strongly sloping on uplands and colluvial fans. Slopes are plane to convex, and slope gradients range from 0 to 15 percent. Gilgai microrelief is in most areas. The soil formed in clayey sediments weathered from calcareous clay shale. Mean annual air temperature ranges from 45 to 53 degrees F, and mean annual precipitation ranges from about 12 to 19 inches.

SAMSIL
NON CALCAREOUS VARIANT

Soil Mapping Unit "Sa"
Lab/BKS Sample ID: G08020806-021_023

Typical Pedon: Samsil clay loam- on a convex, southwest-facing slope of 15 percent in native grass. When described the soil was moist to 12 inches, dry from 12 to 21 inches, and moist below 21 inches. (Colors are for dry soil unless otherwise stated.)

The Samsil series consists of shallow, well drained soils formed in alluvium or residuum weathered from shale. Permeability is slow. Slope ranges from 2 to 60 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

A - 0-2 inches. Light brownish gray (2.5Y 6/2) clay loam, moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; common fine roots; few very fine fragments of shale; clear wavy boundary; neutral (pH 6.7); noneffervescent.

AC - 2-9 inches. Light yellowish brown (2.5Y 6/3D) silty clay, moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable, sticky and plastic; common fine roots; common fine fragments of soft shale; clear wavy boundary; slightly alkaline (pH 7.8); noneffervescent.

C - 9-18 inches. Grayish brown (2.5Y 5/2D) silt, moist; massive; hard, friable, sticky and plastic; common fine roots; about 50 percent by volume of fragments of soft shale; common distinct olive yellow (2.5Y 6/6) stains on faces of shale fragments; few fine and medium accumulations of carbonate; gradual wavy boundary; slightly alkaline (pH 7.6); noneffervescent.

Type Location - Pennington County, South Dakota; refer to waypoint 88 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The control section is clay and contains 50 to 65 percent clay. The depth to bedded shale ranges from 6 to 20 inches. Horizons above the shale range from loose to hard when dry, and friable or firm when moist. These horizons contain free carbonates. Effervescence ranges from slight to strong and reaction is slightly alkaline or moderately alkaline. The C1 and C2 horizons and upper part of the Cr horizons commonly have accumulations of carbonate, gypsum, and other salts. Colors throughout, including mottles and stains, are inherited from the shale.

The A horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 2 to 4. It is clay, silty clay, silty clay loam or clay loam and commonly contains few to common fragments of shale ranging from 2 to 25 mm in diameter. It has fine or medium subangular blocky or fine or very fine granular structure. The upper 1/4 to 1/2 inch commonly is a fragile crust or mulch or very fine granules when dry.

The AC horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It contains up to 35 percent fragments of shales by volume that range from less than 2 mm to 30 mm in diameter.

The C horizon has hue of 5Y, 2.5Y or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It is clay. The C horizon contains from 35 to more than 50 percent fragments of shale by volume that range from less than 2 mm to 35 mm in diameter.

The Cr horizon has the same range in color as the overlying C horizons. It ranges from medium acid to moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer and have less clay than typical for the series.

Taxonomic Class - Clayey, smectitic, calcareous, mesic, shallow Aridic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-9 inches. Estimated stripping depth is 18 inches.

Geographic Setting (According to Official Series Description) - Samsil soils are on gently sloping to very steep hills, ridges and breaks of dissected shale plains. Surfaces mainly are convex, and slope gradients range from 2 to 60 percent or more. The soil formed in alluvium or residuum weathered from shale. Mean annual air temperature ranges from 45 to 48 degrees F, and mean annual precipitation ranges from 14 to 19 inches.

PIERRE
SILTY CLAY LOAM

Soil Mapping Unit "Pe"
Lab/BKS Sample ID: G08020806-024_027

Typical Pedon: Pierre silty clay loam - on a convex slope of 7 percent in native grass. (Colors are for dry soil unless otherwise stated.)

The Pierre series consists of moderately deep, well drained soils formed in clayey residuum weathered from shale bedrock on uplands. Permeability is very slow. Slopes range from 0 to 30 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 46 degrees F.

A - 0-2 inches. Grayish brown (2.5Y 5/2) silty clay loam, moist; moderate fine subangular blocky structure parting to weak very fine granular; hard, firm, sticky and plastic; 1 percent pebbles; clear smooth boundary; strongly acid (pH 5.4); noneffervescent.

Bt- 2-18 inches. Brown (10YR 5/3) silty clay, moist; moderate medium and coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; common distinct intersecting slickensides; few fine accumulations of iron; 1 percent pebbles; gradual wavy boundary; slightly alkaline (pH 7.7); strongly effervescent.

C1n – 18-31 inches. Grayish brown (10YR 5/2) silty clay, moist; moderate coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; common distinct intersecting slickensides; few fine nests of iron and common fine accumulations of gypsum; 1 percent pebbles; gradual wavy boundary; slightly alkaline (pH 7.8); strongly effervescent.

C2n – 31-37 inches. Light brownish gray (2.5Y 6/2) silty clay, moist; common distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) iron stains; many fine accumulations of gypsum and carbonate; 1 percent pebbles; gradual wavy boundary; slightly alkaline (pH 7.7); very slightly effervescent.

Type Location - Haakon County, South Dakota; refer to waypoint 89 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The soil contains carbonates at or within 6 inches of the surface. The depth to soft shale bedrock ranges from 20 to 40 inches but commonly is at depths of 25 to 35 inches. The horizon above the shale has 0 to 60 percent, by volume soft shale fragments. The control section is 50 to 60 percent clay. When the soil is dry, cracks 1/2 inch to 2 inches wide and several feet long extend downward through the solum. The soil does not have a mollic epipedon, but the upper 10 inches of the solum has an average organic carbon content between 0.6 and 1.7 percent. The soil has a SAR of 1 to 7.

The A horizon has hue of 10YR to 5Y, value of 4 to 6 and 3 to 5 moist, and chroma of 1 to 3. It typically is clay but is silty clay in some pedons. It ranges from slightly acid to moderately alkaline. When the soil is dry it has a light gray (2.5Y 7/2) smooth, porous, platy surface crust ranging from 1/4 to 1 inch in thickness. Where the horizon has mollic colors, it is too thin to be a mollic epipedon. Some pedons do not have an AB horizon.

The Bss horizons have hue of 2.5Y or 5Y, value of 5 or 6 and 4 or 5 moist, and chroma of 1 to 3. They are extremely hard or very hard when dry and extremely firm to firm when moist. They range from neutral to moderately alkaline.

Bk and C horizons are present in some pedons.

The Cr horizon is soft shale bedrock and ranges from slightly acid to moderately alkaline. Bedding planes are evident in the partially weathered shale in some pedons. Gypsum and other salts are concentrated in very thin seams within the shale in some pedons.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Aridic Leptic Haplusterts

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-37 inches. pH was marginal (acid) at 0-2 inches. Strongly effervescent at 2 inches. Estimated stripping depth is 2 inches.

Geographic Setting (According to Official Series Description) - Pierre soils are on nearly level to steep uplands. Slope gradient typically is 3 to 15 percent, but ranges from 0 to 30 percent. The soils formed in residuum weathered from clay shale. Gilgai microrelief is in most areas. Mean annual air temperature is 44 to 53 degrees F, and mean annual precipitation ranges from 12 to 16 inches. Growing season is 125 to 140 days; average growing season precipitation is 10 to 13 inches; and growing degree days are 2600 to 3100. Elevation is 1300 to 3600 feet.

GRUMMIT
SILTY CLAY

Soil Mapping Unit "Gr"
Lab/BKS Sample ID: G08020806-028_030

Typical Pedon: Grummit silty clay - on a convex slope of 5 percent in native grass. When described, the soil was moist to bedded shale. (Colors are for dry soil unless otherwise stated.)

The Grummit series consists of shallow, well drained soils formed in clayey residuum from acid shale on uplands. Permeability is moderate or moderately slow. Slopes range from 2 to 60 percent. Mean annual precipitation is about 15 inches, and mean annual temperature is about 46 degrees F.

A - 0-2 inches. Light brownish gray (10YR 6/2) silty clay, moist; moderate fine granular structure; loose, friable; many fine roots; many very fine fragments of shale; clear smooth boundary; neutral (pH 6.8); noneffervescent.

AC - 2-8 inches. Grayish brown (10YR 5/2) silty clay, moist; weak coarse subangular blocky structure; hard, friable; many fine roots; 25 percent very fine fragments of shale; gradual wavy boundary; slightly alkaline (pH 7.4); noneffervescent.

C - 8-20 inches. Grayish brown (10YR 5/2) silty clay, moist; common distinct mottles of yellowish brown (l0YR 5/6); weak coarse subangular blocky structure; hard, friable; partially weathered fragments of shale make up 35 percent by volume; common roots; clear smooth boundary; slightly alkaline (pH 7.7); noneffervescent.

<u>Type Location</u> - Butte County, South Dakota; refer to waypoint 90 on map included in this report.

<u>Range in Soil Characteristics (According to Official Series Description)</u> - Depth to shale ranges from 10 to 20 inches. Colors throughout the soil are inherited from the shale. The horizons overlying the bedded shales typically average 50 to 65 percent clay but ranges from 35 to 65 percent clay. The low clay percentage is due to sand-size shale fragments. Consistence ranges from loose to hard when dry but is friable when moist. The soil ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR or 2.5Y, value of 5 or 6 and 3 or 4 moist, and chroma of 1 or 2 dry or moist. It typically is clay but is clay loam in some pedons. It has weathered fragments of shale that make up 5 to 35 percent by volume. The A horizon contains less than 1 percent more organic matter than the C.

The C horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 or 6 and 3 or 4 moist; and chroma of 1 or 2. Weathered fragments of shale make up 20 to over 50 percent by volume of the C horizon.

The fissile shale is very hard and brittle and will not disperse in water or in sodium hexametaphosphate.

<u>Range in Characteristics (according to field observations, lab analysis)</u>: Textures are slightly finer

than typical for the series.

Taxonomic Class - Clayey, smectitic, acid, mesic, shallow Aridic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 0-20 inches. Estimated stripping depth is 20 inches.

Geographic Setting (According to Official Series Description) - Grummit soils are gently sloping to very steep on uplands. Slope gradients range from 2 to 60 percent. The soil formed in clayey residuum weathered from acid shales. Mean annual temperature ranges from 43 to 50 degrees F, and mean annual precipitation is about 12 to 18 inches.

BONEEK
CLAY LOAM

Soil Mapping Unit "Bo"
Lab/BKS Sample ID: G08020806-031_035

Typical Pedon: Boneek clay loam - on a northeast-facing plane slope of 4 percent under native grass at 3500 feet elevation. (Colors are for dry soil unless otherwise stated.)

The Boneek series consists of deep and very deep, well drained soils formed in silty sediments underlain by sandstone or siltstone. Permeability is moderately slow in the solum and moderate in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is about 17 inches, and mean annual temperature is about 46 degrees F.

AC - 0-4 inches. Very dark grayish brown (10YR 3/2D) clay loam, moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable; many fine roots; clear wavy boundary; slightly alkaline (pH 7.6); very slight effervescent.

C1n - 4-19 inches. Dark grayish brown (10YR 4/2D) silt loam, moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable, slightly sticky and slightly plastic; common fine roots; shiny films on faces of peds; clear wavy boundary; slightly alkaline (pH 7.8); slight effervescent.

C2n – 19-40 inches. Brown (10YR 4/3D) silt loam, moist; weak medium and coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and medium accumulations of carbonate; gradual wavy boundary; moderately alkaline (pH 8.4); noneffervescent.

C3n – 40-48 inches. Dark yellowish brown (10YR 4/4D) silty clay loam, moist; few fine and medium prominent mottles of strong brown (7.5YR 5/8); weak coarse subangular blocky structure; very hard, friable; few fine roots; clear wavy boundary; moderately alkaline (pH 8.4); noneffervescent.

C4n – 48-60 inches. Very dark grayish brown (10YR 3/2D) silt loam, moist; thin platy rock structure; faces of fractures stained strong brown (7.5YR 5/6) moist; few coatings of carbonates on faces of fractures, but matrix is noncalcareous; moderately alkaline (pH 8.3); noneffervescent.

Type Location - Butte County, South Dakota; refer to waypoint 91 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to bedrock is 40 to 60 inches or more. Depth to carbonates ranges from 11 to 24 inches. Thickness of the mollic epipedon ranges from 7 to 15 inches and extends into the Bt horizon of some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 and 2 or 3 moist, and chroma of 2 or 3. It typically is silt loam, but some pedons are loam. It is slightly acid or neutral.

The Bt1 horizon has hue of 7.5YR or 5YR, value of 4 or 6 and 3 or 4 moist, and chroma of 2 to 4. It is silty clay loam or silty clay. Average clay content ranges from 35 to 45 percent with less than 15 percent fine sand or coarser. It is slightly acid or neutral.

The Bt2 horizon has hue of 10YR or 7.5Y, value of 5 or 6 and 3 or 5 moist, and chroma of 2 to 4. It is silty clay loam averaging between 30 and 40 percent clay and less than 15 percent fine sand or coarser. It is neutral or slightly alkaline.

The Bk and C horizons have hue of 10YR or 2.5Y, value of 5 through 7 and 4 or 5 moist, and chroma of 1 to 3. They typically are silt loam or silty clay loam, but some pedons are loam. They are slightly alkaline to strongly alkaline. Few to many, fine or medium accumulations of carbonate are in the Bk horizon.

The Cr horizon has hue of 10YR or 7.5YR.

Range in Characteristics (according to field observations, lab analysis): Textures have slightly less clay than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - Saturation percentage was marginal at 4-19 inches and 40-60 inches. Sodium absorption ratio was unsuitable at 19-60 inches. Electrical conductivity was unsuitable at 19-60. Selenium was marginal at 48-60 inches. Estimated stripping depth is 19 inches.

Geographic Setting (According to Official Series Description) - Boneek soils are nearly level to moderately sloping on high terraces and uplands. Surfaces are plane to slightly convex and slope gradients range from 0 to 15 percent. The soils formed in a silty mantle overlying sandstone or siltstones, or in loess or silty alluvium. Mean annual temperature ranges from 43 to 48 degrees, and mean annual precipitation ranges from 15 to 18 inches. Most of the precipitation comes in the spring and summer.

SAMSIL
SILTY CLAY LOAM

Soil Mapping Unit "Sa"
Lab/BKS Sample ID: G08020806-021_023

Typical Pedon: Samsil silty clay loam - on a convex, southwest-facing slope of 15 percent in native grass. When described the soil was moist to 12 inches, dry from 12 to 21 inches, and moist below 21 inches. (Colors are for dry soil unless otherwise stated.)

The Samsil series consists of shallow, well drained soils formed in alluvium or residuum weathered from shale. Permeability is slow. Slope ranges from 2 to 60 percent. Mean annual precipitation is about 15 inches, and mean annual air temperature is about 47 degrees F.

AC - 0-7 inches. Dark grayish brown (10YR 4/2D) silty clay loam, moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; common fine roots; few very fine fragments of shale; clear wavy boundary; slightly alkaline (pH 7.5); very slightly effervescent.

C – 7-19 inches. Dark grayish brown (10YR 4/2D) silty clay, moist; weak medium subangular blocky structure parting to weak medium granular; hard, friable, sticky and plastic; common fine roots; common fine fragments of soft shale; clear wavy boundary; slightly alkaline (pH 7.6); slightly effervescent.

Type Location - Pennington County, South Dakota; refer to waypoint 92 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - The control section is clay and contains 50 to 65 percent clay. The depth to bedded shale ranges from 6 to 20 inches. Horizons above the shale range from loose to hard when dry, and friable or firm when moist. These horizons contain free carbonates. Effervescence ranges from slight to strong and reaction is slightly alkaline or moderately alkaline. The C1 and C2 horizons and upper part of the Cr horizons commonly have accumulations of carbonate, gypsum, and other salts. Colors throughout, including mottles and stains, are inherited from the shale.

The A horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 2 to 4. It is clay, silty clay, silty clay loam or clay loam and commonly contains few to common fragments of shale ranging from 2 to 25 mm in diameter. It has fine or medium subangular blocky or fine or very fine granular structure. The upper 1/4 to 1/2 inch commonly is a fragile crust or mulch or very fine granules when dry.

The AC horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It contains up to 35 percent fragments of shales by volume that range from less than 2 mm to 30 mm in diameter.

The C horizon has hue of 5Y, 2.5Y or 10YR, value of 4 to 7 and 3 to 6 moist, and chroma of 1 to 4. It is clay. The C horizon contains from 35 to more than 50 percent fragments of shale by volume that range from less than 2 mm to 35 mm in diameter.

The Cr horizon has the same range in color as the overlying C horizons. It ranges from medium acid to moderately alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures are slightly finer than typical for the series.

Taxonomic Class - Clayey, smectitic, calcareous, mesic, shallow Aridic Ustorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 7-19 inches. Saturation percentage was marginal at 7-19 inches Estimated stripping depth is 7 inches.

Geographic Setting (According to Official Series Description) - Samsil soils are on gently sloping to very steep hills, ridges and breaks of dissected shale plains. Surfaces mainly are convex, and slope gradients range from 2 to 60 percent or more. The soil formed in alluvium or residuum weathered from shale. Mean annual air temperature ranges from 45 to 48 degrees F, and mean annual precipitation ranges from 14 to 19 inches.

SHINGLE
LOAM

Soil Mapping Unit "Sn"
Lab/BKS Sample ID: G08020806-021_023

Typical Pedon: Shingle loam-rangeland. (Colors are for dry soil unless otherwise stated.)

The Shingle series consists of well drained soils that are very shallow or shallow to bedrock. They formed in residuum and colluvium derived from interbedded shale and sandstone or in alluvium from mudstone. Shingle soils are on bedrock controlled hillslopes and ridges. Slopes are 0 to 80 percent. The mean annual precipitation is about 13 inches, and the mean annual temperature is 45 degrees F.

A - 0-4 inches. Light brownish gray (10YR 6/2) loam, moist; moderate very fine granular structure; soft, very friable, moderately sticky and moderately plastic; calcium carbonate disseminated; clear smooth boundary; neutral (pH 7.2); very slightly effervescent.

C – 4-8 inches. Light yellowish brown (2.5Y 6/3) loam, moist; weak medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; calcium carbonate disseminated; gradual smooth boundary; slightly alkaline (pH 7.5); strongly effervescent.

Type Location - Goshen County, Wyoming; refer to waypoint 93 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to soft bedrock and paralithic contact ranges from 4 to 20 inches. The mean annual soil temperature is 47 to 53 degrees F. The soils commonly are calcareous throughout, but some pedons are leached to 6 inches. The particle size control section averages 20 to 35 percent clay and has more than 15 percent but less than 35 percent fine or coarser sand. The soil is usually dry. The moisture control section is usually moist in April, May and early June. It is dry for 60 consecutive days or more during the 90 day period following the summer solstice. EC is 0 to 2 mmhos throughout.

The A horizon has hue of 5Y through 7.5YR, value of 5 through 7 dry, 3 through 6 moist, and chroma of 1 through 6. Reaction is neutral through strongly alkaline. Some pedons have a light gravel lag on the surface. Texture is loam, silt loam, clay loam, silty clay loam, cobbly loam, and gravelly clay loam. Rock fragments or shale channers range from 0 to 35 percent.

A Bw or AC horizon, when present, has the combined properties of the A and C horizons.

The C horizon has hue of 5Y through 7.5YR, value of 4 through 7 dry, 3 through 6 moist, and chroma of 1 through 6. It is loam, silt loam, clay loam or silty clay loam. Rock fragments or shale channers range from 0 to 35 percent. Reaction is slightly alkaline through strongly alkaline.

Range in Characteristics (according to field observations, lab analysis): Textures have less clay than typical for the series.

Taxonomic Class - Loamy, mixed, superactive, calcareous, mesic, shallow Ustic Torriorthents

Suitability for Topsoil (According to WDEQ Guideline 1) - No marginal or unsuitable parameters were found. Strongly effervescent at 4 inches. Estimated stripping depth is 8 inches.

Geographic Setting (According to Official Series Description) - The Shingle soils occur on all hillslope positions. Slopes are 0 to 80 percent. These soils formed in colluvium and residuum weathered from soft, interbedded sandstone and shale or in alluvium from mudstone. Elevation is 3,200 to 6,500 feet. The mean annual precipitation is about 10 to 14 inches, most of which falls in April, May, and June. The mean annual temperature is about 45 degrees F.but ranges from 43 to 51 degrees F. The frost-free season is about 105 to 130 days.

BOnEEk
NONCALCAREOUS VARIANT

Soil Mapping Unit "Bo"
Lab/BKS Sample ID: G08020806-040_045

Typical Pedon: Boneek silty clay - on a northeast-facing plane slope of 4 percent under native grass at 3500 feet elevation. (Colors are for dry soil unless otherwise stated.)

The Boneek series consists of deep and very deep, well drained soils formed in silty sediments underlain by sandstone or siltstone. Permeability is moderately slow in the solum and moderate in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is about 17 inches, and mean annual temperature is about 46 degrees F.

A - 0-2 inches. Brown (10YR 5/3) silty clay, moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable; many fine roots; clear wavy boundary; neutral (pH 6.9) noneffervescent.

C1 - 2-8 inches. Very dark grayish brown (10YR 3/2D) silty clay, moist; weak coarse subangular blocky structure; hard, very friable; many fine roots; clear wavy boundary; slighty alkaline (pH 7.6); noneffervescent.

C2n – 8-20 inches. Very dark grayish brown (10YR 3/2D) silty clay, moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable, slightly sticky and slightly plastic; common fine roots; shiny films on faces of peds; clear wavy boundary; slighty alkaline (pH 7.5); noneffervescent.

C3n – 20-32 inches. Very dark grayish brown (10YR 3/2D) silty clay loam, moist; weak medium and coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; gradual wavy boundary; slighty alkaline (pH 7.6); noneffervescent.

C4n – 32-44 inches. Very dark grayish brown (10YR 3/2D) silty clay, moist; weak coarse subangular blocky structure; very hard, friable; few fine roots; violent; clear wavy boundary; slighty alkaline (pH 7.6); noneffervescent.

C5n – 44-60 inches. Dark brown (10YR 3/3D) silty clay, moist; thin platy rock structure; faces of fractures stained strong brown (7.5YR 5/6) moist; few coatings of carbonates on faces of fractures, but matrix is noncalcareous; slighty alkaline (pH 7.8); noneffervescent.

Type Location - Butte County, South Dakota; refer to waypoint 94 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to bedrock is 40 to 60 inches or more. Depth to carbonates ranges from 11 to 24 inches. Thickness of the mollic epipedon ranges from 7 to 15 inches and extends into the Bt horizon of some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 and 2 or 3 moist, and chroma of 2 or 3. It typically is silt loam, but some pedons are loam. It is slightly acid or neutral.

The Bt1 horizon has hue of 7.5YR or 5YR, value of 4 or 6 and 3 or 4 moist, and chroma of 2 to 4.

It is silty clay loam or silty clay. Average clay content ranges from 35 to 45 percent with less than 15 percent fine sand or coarser. It is slightly acid or neutral.

The Bt2 horizon has hue of 10YR or 7.5Y, value of 5 or 6 and 3 or 5 moist, and chroma of 2 to 4. It is silty clay loam averaging between 30 and 40 percent clay and less than 15 percent fine sand or coarser. It is neutral or slightly alkaline.

The Bk and C horizons have hue of 10YR or 2.5Y, value of 5 through 7 and 4 or 5 moist, and chroma of 1 to 3. They typically are silt loam or silty clay loam, but some pedons are loam. They are slightly alkaline to strongly alkaline. Few to many, fine or medium accumulations of carbonate are in the Bk horizon.

The Cr horizon has hue of 10YR or 7.5YR.

Range in Characteristics (according to field observations, lab analysis): Textures have slightly more clay than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - Marginal texture (clay) was found from 2-20 inches and 32-60 inches. Saturation percentage was marginal at 0-60 inches. Estimated stripping depth is 2 inches.

Geographic Setting (According to Official Series Description) - Boneek soils are nearly level to moderately sloping on high terraces and uplands. Surfaces are plane to slightly convex and slope gradients range from 0 to 15 percent. The soils formed in a silty mantle overlying sandstone or siltstones, or in loess or silty alluvium. Mean annual temperature ranges from 43 to 48 degrees, and mean annual precipitation ranges from 15 to 18 inches. Most of the precipitation comes in the spring and summer.

BONEEK
LOAM

Soil Mapping Unit "Bo"
Lab/BKS Sample ID: G08020806-046_050

Typical Pedon: Boneek loam - on a northeast-facing plane slope of 4 percent under native grass at 3500 feet elevation. (Colors are for dry soil unless otherwise stated.)

The Boneek series consists of deep and very deep, well drained soils formed in silty sediments underlain by sandstone or siltstone. Permeability is moderately slow in the solum and moderate in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is about 17 inches, and mean annual temperature is about 46 degrees F.

A - 0-2 inches. Brown (10YR 5/3) loam, moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable; many fine roots; clear wavy boundary; neutral (pH 7.1) noneffervescent.

Bt - 2-8 inches. Brown (7.5 YR 4/3D) loam, moist; weak coarse subangular blocky structure; hard, very friable; many fine roots; clear wavy boundary; slighty alkaline (pH 7.6); noneffervescent.

C1k – 8-17 inches. Brown (7.5 YR 5/3D) loam, moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; very hard, friable, slightly sticky and slightly plastic; common fine roots; shiny films on faces of peds; clear wavy boundary; moderately alkaline (pH 7.9); strongly effervescent.

C2k – 17-24 inches. Brown (10YR 5/3D) loam, moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, friable, slightly sticky and slightly plastic; common fine roots; many fine and medium accumulations of carbonate; gradual wavy boundary; moderately alkaline (pH 8.3); strongly effervescent.

C3k – 24-38 inches. Dark grayish brown (10YR 4/2D) clay loam, moist; weak medium and coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and medium accumulations of carbonate; gradual wavy boundary; moderately alkaline (pH 8.3); strongly effervescent.

Type Location - Butte County, South Dakota; refer to waypoint 95 on map included in this report.

Range in Soil Characteristics (According to Official Series Description) - Depth to bedrock is 40 to 60 inches or more. Depth to carbonates ranges from 11 to 24 inches. Thickness of the mollic epipedon ranges from 7 to 15 inches and extends into the Bt horizon of some pedons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 and 2 or 3 moist, and chroma of 2 or 3. It typically is silt loam, but some pedons are loam. It is slightly acid or neutral.

The Bt1 horizon has hue of 7.5YR or 5YR, value of 4 or 6 and 3 or 4 moist, and chroma of 2 to 4. It is silty clay loam or silty clay. Average clay content ranges from 35 to 45 percent with less than 15 percent fine sand or coarser. It is slightly acid or neutral.

The Bt2 horizon has hue of 10YR or 7.5Y, value of 5 or 6 and 3 or 5 moist, and chroma of 2 to 4. It is silty clay loam averaging between 30 and 40 percent clay and less than 15 percent fine sand or coarser. It is neutral or slightly alkaline.

The Bk and C horizons have hue of 10YR or 2.5Y, value of 5 through 7 and 4 or 5 moist, and chroma of 1 to 3. They typically are silt loam or silty clay loam, but some pedons are loam. They are slightly alkaline to strongly alkaline. Few to many, fine or medium accumulations of carbonate are in the Bk horizon.

The Cr horizon has hue of 10YR or 7.5YR.

Range in Characteristics (according to field observations, lab analysis): Textures are coarser and have less clay than typical for the series.

Taxonomic Class - Fine, smectitic, mesic Aridic Argiustolls

Suitability for Topsoil (According to WDEQ Guideline 1) - Selenium was marginal at 24-38 inches. Strongly effervescent at 8 inches. Estimated stripping depth is 24 inches.

Geographic Setting (According to Official Series Description) - Boneek soils are nearly level to moderately sloping on high terraces and uplands. Surfaces are plane to slightly convex and slope gradients range from 0 to 15 percent. The soils formed in a silty mantle overlying sandstone or siltstones, or in loess or silty alluvium. Mean annual temperature ranges from 43 to 48 degrees, and mean annual precipitation ranges from 15 to 18 inches. Most of the precipitation comes in the spring and summer.

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APPENDIX 7.5-C

ORIGINAL LABORATORY DATA SHEETS

POWERTECH (USA) INC.

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 4515 Dewey-Burdock Soils
Workorder: G08020803

Report Date: 03/28/08
Date Received: 02/28/08

		Analysis	OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
		Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	Client Sample ID	Depth	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
G08020803-001	Hole #17	0-3	3.0	< 0.1	8	46	46	SiC	75.7	5.8	0.51	3.00	0.73	0.24	0.2
G08020803-002	Hole #17	3-8	1.6	< 0.1	5	45	50	SiC	72.0	5.7	0.39	2.36	0.54	0.27	0.2
G08020803-003	Hole #17	8-24	1.7	< 0.1	3	44	53	SiC	80.0	5.7	0.78	5.44	1.49	0.73	0.4
G08020803-004	Hole #17	24-40	1.3	< 0.1	< 1	46	54	SiC	75.9	5.8	1.25	7.52	3.76	2.02	0.8
G08020803-005	Hole #17	40-54	0.8	< 0.1	1	48	51	SiC	78.9	5.0	3.49	24.5	23.0	4.43	0.9
G08020803-006	Hole #17	54-60	0.9	< 0.1	9	46	45	SiC	75.7	4.5	3.83	23.4	30.8	4.78	0.9
G08020803-007	Hole #27	0-2	2.5	< 0.1	9	58	33	SiCL	63.3	7.4	0.56	2.41	1.14	2.41	1.8
G08020803-008	Hole #27	2-17	1.3	< 0.1	4	47	49	SiC	83.5	7.9	4.60	24.2	10.3	29.0	7.0
G08020803-009	Hole #27	17-24	1.2	4.5	4	43	53	SiC	77.5	8.0	6.16	22.7	14.0	50.3	11.7
G08020803-010	Hole #27	24-39	1.0	1.8	3	47	50	SiC	84.5	7.9	5.62	22.3	13.3	43.4	10.3
G08020803-011	Hole #27	39-60	0.8	< 0.1	5	50	45	SiC	79.0	7.9	5.88	21.9	15.9	44.7	10.3
G08020803-012	Hole #36	0-2	2.1	1.9	14	54	32	SiCL	68.0	8.0	0.64	2.10	0.88	3.61	3.0
G08020803-013	Hole #36	2-15	1.3	< 0.1	9	46	45	SiC	84.2	8.0	4.98	23.8	11.1	34.0	8.1
G08020803-014	Hole #36	15-26	1.1	< 0.1	9	46	45	SiC	78.6	8.0	6.15	23.3	16.2	47.7	10.7
G08020803-015	Hole #36	26-36	0.9	< 0.1	9	41	50	SiC	84.1	8.0	7.41	28.6	24.6	60.4	11.7
G08020803-016	Hole #36	36-60	0.8	< 0.1	11	39	50	C	77.4	8.0	6.22	22.7	21.3	45.8	9.8
G08020803-017	Hole #39	0-2	4.1	< 0.1	19	55	26	SiL	50.0	6.8	0.57	3.04	1.95	0.14	< 0.1
G08020803-018	Hole #39	2-15	1.9	4.3	17	46	37	SiCL	63.7	7.3	0.49	2.40	1.58	0.42	0.3
G08020803-019	Hole #39	15-32	1.0	1.7	31	37	32	CL	58.4	8.0	0.83	2.67	2.76	2.60	1.6
G08020803-020	Hole #39	32-52	0.7	< 0.1	27	36	37	CL	62.6	8.0	5.14	22.6	51.2	10.7	1.8
G08020803-021	Hole #39	52-60	0.7	< 0.1	21	72	7	SiL	75.4	8.1	5.25	23.5	54.5	10.1	1.6
G08020803-022	Hole #40	0-4	4.2	< 0.1	17	50	33	SiCL	71.4	6.6	0.59	3.15	1.47	0.14	0.1
G08020803-023	Hole #40	4-14	2.4	< 0.1	12	55	33	SiCL	60.7	7.1	0.58	3.54	1.48	0.60	0.3
G08020803-024	Hole #40	14-27	1.5	< 0.1	7	58	35	SiCL	57.8	7.8	0.76	4.25	1.64	1.95	1.1
G08020803-025	Hole #40	27-38	1.6	< 0.1	1	52	47	SiC	74.8	8.1	1.52	4.42	2.01	9.67	5.4
G08020803-026	Hole #40	38-60	1.7	< 0.1	3	51	46	SiC	75.8	7.9	4.42	24.0	11.3	25.1	6.0
G08020803-027	Hole #41	0-4	4.2	3.9	25	56	19	SiL	45.5	7.7	1.03	7.70	2.69	0.23	0.1
G08020803-028	Hole #41	4-21	1.1	1.7	11	54	35	SiCL	64.2	7.7	3.78	27.7	20.1	8.30	1.7
G08020803-029	Hole #41	21-36	0.6	1.2	< 1	95	5	Si	63.8	8.6	13.3	25.3	100	148	18.7
G08020803-030	Hole #41	36-45	0.6	1.8	18	64	18	SiL	42.4	8.7	16.6	27.9	122	216	25.0
G08020803-031	Hole #41	45-60	0.5	0.9	34	49	17	L	33.6	8.7	14.8	25.9	107	175	21.4
G08020803-032	Hole #42	0-6	3.4	1.5	22	62	16	SiL	44.6	7.8	7.56	28.7	54.2	37.2	5.8
G08020803-033	Hole #42	6-17	1.3	6.0	26	60	14	SiL	40.2	8.3	15.4	30.9	191	135	12.9
G08020803-034	Hole #42	17-39	0.6	< 0.1	28	62	10	SiL	35.0	8.6	14.5	31.2	187	125	12.0
G08020803-035	Hole #42	39-60	0.6	< 0.1	30	56	14	SiL	37.1	8.5	10.9	28.5	109	83.5	10.1
G08020803-036	Hole #43	0-2	11.7	1.1	24	48	28	CL	63.7	6.2	1.11	5.45	3.92	0.61	0.3
G08020803-037	Hole #43	2-14	2.1	< 0.1	22	36	42	C	68.8	7.4	0.89	5.28	3.27	0.87	0.4
G08020803-038	Hole #43	14-38	1.0	< 0.1	32	36	32	CL	43.3	8.5	0.61	1.13	1.12	4.10	3.9
G08020803-039	Hole #43	38-60	0.8	< 0.1	50	28	22	L	39.8	8.8	1.76	1.25	1.76	15.3	12.5
G08020803-040	Hole #50	0-2	2.3	2.6	44	38	18	L	30.8	6.6	0.37	1.97	1.10	0.14	0.1

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020803

Report Date: 03/28/08
Date Received: 02/28/08

	Analysis	OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
	Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	Client Sample ID	Depth	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
G08020803-041	Hole #50	2-7	1.8	2.6	32	34	34	CL	46.9	7.4	0.58	3.72	2.03	0.29	0.2
G08020803-042	Hole #50	7-13	1.9	2.4	26	38	36	CL	66.8	8.1	0.42	2.37	1.47	0.42	0.3
G08020803-043	Hole #50	13-25	1.0	3.1	44	29	27	CL	39.1	8.3	0.48	1.53	1.52	1.62	1.3
G08020803-044	Hole #56	0-3	6.0	< 0.1	16	56	28	SiCL	74.9	7.4	0.96	7.78	1.33	0.09	< 0.1
G08020803-045	Hole #56	3-14	2.5	< 0.1	< 1	72	28	SiCL	48.0	7.7	1.07	8.69	1.92	0.29	0.1
G08020803-046	Hole #56	14-26	2.2	< 0.1	8	60	32	SiCL	50.8	7.6	3.08	32.2	8.13	1.42	0.3
G08020803-047	Hole #56	26-36	2.0	1.5	18	56	26	SiL	46.4	7.5	3.43	36.7	9.58	2.45	0.5
G08020803-048	Hole #56	36-60	1.2	3.0	34	44	22	L	39.2	7.7	3.70	36.9	12.1	2.29	0.5
G08020803-049	Hole #57	0-2	2.1	5.4	22	42	36	CL	73.1	7.6	2.49	32.1	1.11	0.23	< 0.1
G08020803-050	Hole #57	2-8	0.7	< 0.1	32	38	30	CL	64.3	7.6	2.55	30.7	3.92	0.35	< 0.1

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ENERGY LABORATORIES, INC. * 400 W Boxelder Rd * Gillette, WY 82718-5315
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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020803

Report Date: 03/28/08
Date Received: 02/28/08

		Analysis	B-Hot H20	Se-Hot H20
		Units	mg/kg	mg/kg
Sample ID	Client Sample ID	Depth	Results	Results
G08020803-001	Hole #17	0-3	0.3	< 0.01
G08020803-002	Hole #17	3-8	0.3	< 0.01
G08020803-003	Hole #17	8-24	0.5	< 0.01
G08020803-004	Hole #17	24-40	0.6	< 0.01
G08020803-005	Hole #17	40-54	0.8	< 0.01
G08020803-006	Hole #17	54-60	0.8	< 0.01
G08020803-007	Hole #27	0-2	0.3	< 0.01
G08020803-008	Hole #27	2-17	2.0	0.03
G08020803-009	Hole #27	17-24	2.3	0.07
G08020803-010	Hole #27	24-39	1.6	0.06
G08020803-011	Hole #27	39-60	1.1	0.08
G08020803-012	Hole #36	0-2	0.4	< 0.01
G08020803-013	Hole #36	2-15	1.7	0.02
G08020803-014	Hole #36	15-26	2.3	0.03
G08020803-015	Hole #36	26-36	2.3	0.03
G08020803-016	Hole #36	36-60	1.5	0.03
G08020803-017	Hole #39	0-2	0.2	< 0.01
G08020803-018	Hole #39	2-15	0.3	< 0.01
G08020803-019	Hole #39	15-32	0.4	< 0.01
G08020803-020	Hole #39	32-52	0.9	0.04
G08020803-021	Hole #39	52-60	2.5	0.03
G08020803-022	Hole #40	0-4	0.3	< 0.01
G08020803-023	Hole #40	4-14	0.3	< 0.01
G08020803-024	Hole #40	14-27	0.4	< 0.01
G08020803-025	Hole #40	27-38	0.8	0.02
G08020803-026	Hole #40	38-60	0.7	0.06
G08020803-027	Hole #41	0-4	0.4	< 0.01
G08020803-028	Hole #41	4-21	0.7	0.03
G08020803-029	Hole #41	21-36	7.7	0.25
G08020803-030	Hole #41	36-45	4.2	0.24
G08020803-031	Hole #41	45-60	1.5	0.22
G08020803-032	Hole #42	0-6	1.0	0.07
G08020803-033	Hole #42	6-17	1.1	0.15
G08020803-034	Hole #42	17-39	1.8	0.09
G08020803-035	Hole #42	39-60	1.2	0.04
G08020803-036	Hole #43	0-2	0.4	< 0.01
G08020803-037	Hole #43	2-14	0.2	< 0.01
G08020803-038	Hole #43	14-38	0.5	< 0.01
G08020803-039	Hole #43	38-60	0.8	0.01
G08020803-040	Hole #50	0-2	0.1	< 0.01

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020803

Report Date: 03/28/08
Date Received: 02/28/08

		Analysis	B-Hot H20	Se-Hot H20
		Units	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**
G08020803-041	Hole #50	2-7	0.1	< 0.01
G08020803-042	Hole #50	7-13	0.3	< 0.01
G08020803-043	Hole #50	13-25	0.2	< 0.01
G08020803-044	Hole #56	0-3	0.2	< 0.01
G08020803-045	Hole #56	3-14	0.3	< 0.01
G08020803-046	Hole #56	14-26	0.3	< 0.01
G08020803-047	Hole #56	26-36	0.3	< 0.01
G08020803-048	Hole #56	36-60	0.2	< 0.01
G08020803-049	Hole #57	0-2	0.3	< 0.01
G08020803-050	Hole #57	2-8	0.3	< 0.01

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020805

Report Date: 03/31/08
Date Received: 02/28/08

	Analysis		OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
		Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	Client Sample ID	Depth	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
G08020805-001	Hole #60	0-3	3.4	3.5	30	40	30	CL	69.2	7.5	0.75	4.69	2.03	1.47	0.8
G08020805-002	Hole #60	3-10	1.6	< 0.1	20	38	42	C	74.1	8.4	1.55	1.18	1.86	13.5	11
G08020805-003	Hole #60	10-18	1.3	4.8	24	70	6	SiL	69.5	8.2	9.21	22.1	61.0	79.7	12
G08020805-004	Hole #63	0-2	3.0	14.3	52	36	12	L	33.2	6.4	0.79	5.94	1.88	0.56	0.3
G08020805-005	Hole #63	2-6	1.9	8.8	39	38	23	L	40.1	7.3	0.92	8.85	1.68	0.34	0.2
G08020805-006	Hole #63	6-18	1.9	8.2	22	51	27	CL	40.1	7.4	2.99	30.1	9.02	5.25	1.2
G08020805-007	Hole #64	0-6	2.4	< 0.1	14	53	33	SiCL	62.6	7.1	0.97	6.25	4.69	0.35	0.2
G08020805-008	Hole #64	6-17	1.7	< 0.1	8	59	33	SiCL	64.7	8.1	0.67	2.87	2.96	1.74	1.0
G08020805-009	Hole #64	17-33	0.8	< 0.1	6	61	33	SiCL	54.2	8.5	2.27	1.60	5.81	16.0	8.3
G08020805-010	Hole #64	33-42	0.7	< 0.1	10	61	29	SiCL	48.8	8.0	8.02	27.8	61.1	50.6	7.6
G08020805-011	Hole #64	42-60	0.6	< 0.1	16	57	27	SiCL	45.9	8.1	7.62	27.7	50.5	45.2	7.2
G08020805-012	Hole #72	0-3	3.3	< 0.1	17	51	32	SiCL	53.4	6.3	0.52	2.98	1.09	0.32	0.2
G08020805-013	Hole #72	3-18	1.2	< 0.1	26	39	35	CL	55.3	7.6	0.49	1.74	0.51	2.86	2.7
G08020805-014	Hole #72	18-28	1.2	2.8	10	47	43	SiC	69.7	7.9	4.52	20.2	12.3	30.1	7.5
G08020805-015	Hole #72	28-43	1.0	1.7	16	69	15	SiL	69.0	8.2	8.21	23.5	50.0	69.8	12
G08020805-016	Hole #72	43-60	0.8	2.1	22	53	25	SiL	67.4	8.3	10.0	21.9	73.5	94.0	14
G08020805-017	Hole #73	0-3	3.1	< 0.1	44	35	21	L	51.1	7.4	0.99	5.50	3.21	2.31	1.1
G08020805-018	Hole #73	3-15	1.7	< 0.1	16	41	43	SiC	77.6	7.9	6.51	8.5	9.4	52.4	18
G08020805-019	Hole #73	15-23	0.9	< 0.1	2	58	40	SiC	97.4	7.8	11.2	24.7	26.4	113	22
G08020805-020	Hole #73	23-34	1.1	< 0.1	< 1	60	40	SiC	95.5	8.0	12.9	35.5	35.5	134	22
G08020805-021	Hole #73	34-38	0.9	< 0.1	6	42	52	SiC	75.1	8.0	13.8	34.0	36.9	142	24
G08020805-022	Hole #73	38-60	0.9	< 0.1	4	31	65	C	97.7	8.0	12.2	33.0	31.8	123	22
G08020805-023	Hole #74	0-3	1.6	< 0.1	59	16	25	SCL	36.0	7.8	0.73	5.47	2.04	0.79	0.4
G08020805-024	Hole #74	3-15	0.8	< 0.1	54	19	27	SCL	46.2	8.3	0.69	1.62	1.45	4.66	3.8
G08020805-025	Hole #74	15-27	0.6	< 0.1	36	35	29	CL	51.5	8.5	5.68	5.4	15.9	55.9	17
G08020805-026	Hole #74	27-38	1.3	< 0.1	40	37	23	L	37.9	8.5	13.7	28.2	95.0	162	21
G08020805-027	Hole #74	38-51	0.5	< 0.1	50	31	19	L	34.3	8.4	13.2	25.9	92.3	150	20
G08020805-028	Hole #74	51-60	0.4	< 0.1	64	17	19	SL	33.1	8.4	12.7	23.9	82.0	143	20
G08020805-029	Hole #75	0-4	2.5	< 0.1	28	45	27	CL	60.4	7.8	0.84	4.62	1.79	2.13	1.2
G08020805-030	Hole #75	4-15	2.2	< 0.1	14	53	33	SiCL	63.9	7.7	1.78	7.76	2.94	8.47	3.7
G08020805-031	Hole #75	15-35	1.3	< 0.1	16	55	29	SiCL	52.2	7.6	6.61	28.4	15.6	48.5	10
G08020805-032	Hole #75	35-46	1.0	< 0.1	15	58	27	SiCL	53.9	7.8	8.46	28.3	24.1	74.1	14
G08020805-033	Hole #75	46-60	1.0	< 0.1	12	59	29	SiCL	54.5	7.8	8.23	27.4	24.2	69.8	14
G08020805-034	Hole #76	0-2	1.9	< 0.1	48	39	13	L	31.5	5.3	1.04	3.70	2.44	2.75	1.6
G08020805-035	Hole #76	2-21	1.3	< 0.1	14	42	44	SiC	69.1	7.7	5.77	19.6	14.2	43.2	11
G08020805-036	Hole #76	21-29	0.9	2.7	20	39	41	C	67.0	6.9	6.84	23.5	16.7	53.1	12
G08020805-037	Hole #76	29-46	1.0	5.7	19	45	36	SiCL	60.6	7.6	4.87	7.22	6.07	43.4	17
G08020805-038	Hole #76	46-60	0.6	< 0.1	10	58	32	SiCL	53.8	7.3	4.57	3.85	3.15	44.1	24
G08020805-039	Hole #77	0-4	2.0	1.7	36	37	27	CL	52.6	7.6	0.54	4.10	1.14	0.43	0.3
G08020805-040	Hole #77	4-17	1.5	< 0.1	22	41	37	CL	68.4	7.7	1.21	6.47	3.13	4.01	1.8

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020805

Report Date: 03/31/08
Date Received: 02/28/08

		Analysis	OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
		Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	Client Sample ID	Depth	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
G08020805-041	Hole #77	17-36	0.9	< 0.1	22	73	5	SiL	67.2	8.0	5.66	23.7	44.8	27.1	4.6
G08020805-042	Hole #77	36-48	0.8	< 0.1	24	61	15	SiL	64.9	7.8	6.62	23.8	62.6	32.0	4.9
G08020805-043	Hole #79	0-3	5.1	< 0.1	18	46	36	SiCL	58.5	6.1	0.78	1.65	1.19	4.02	3.4
G08020805-044	Hole #79	3-17	1.6	< 0.1	12	41	47	SiC	73.7	4.1	4.61	22.4	22.1	22.9	4.9
G08020805-045	Hole #79	17-30	0.9	6.8	18	33	49	C	72.4	3.6	4.75	24.7	20.4	21.9	4.6
G08020805-046	Hole #79	30-42	0.9	5.0	22	32	46	C	65.1	3.7	2.50	11.4	7.65	9.50	3.1
G08020805-047	Hole #79	42-60	0.9	9.5	16	37	47	C	61.9	3.6	2.30	10.1	6.32	7.31	2.6

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020805

Report Date: 03/31/08
Date Received: 02/28/08

	Analysis		B-Hot H20	Se-Hot H20
	Units		mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**
G08020805-001	Hole #60	0-3	0.2	< 0.01
G08020805-002	Hole #60	3-10	0.4	0.01
G08020805-003	Hole #60	10-16	1.5	0.11
G08020805-004	Hole #63	0-2	0.1	< 0.01
G08020805-005	Hole #63	2-6	< 0.1	< 0.01
G08020805-006	Hole #63	6-18	0.3	< 0.01
G08020805-007	Hole #64	0-6	< 0.1	< 0.01
G08020805-008	Hole #64	6-17	0.2	< 0.01
G08020805-009	Hole #64	17-33	1.1	0.03
G08020805-010	Hole #64	33-42	2.7	0.12
G08020805-011	Hole #64	42-60	1.5	0.06
G08020805-012	Hole #72	0-3	0.2	< 0.01
G08020805-013	Hole #72	3-18	0.2	< 0.01
G08020805-014	Hole #72	18-28	1.1	0.12
G08020805-015	Hole #72	28-43	2.0	0.27
G08020805-016	Hole #72	43-60	1.6	0.10
G08020805-017	Hole #73	0-3	0.2	< 0.01
G08020805-018	Hole #73	3-15	0.8	0.06
G08020805-019	Hole #73	15-23	2.5	0.34
G08020805-020	Hole #73	23-34	2.3	0.44
G08020805-021	Hole #73	34-38	1.7	0.42
G08020805-022	Hole #73	38-60	1.8	0.37
G08020805-023	Hole #74	0-3	0.2	< 0.01
G08020805-024	Hole #74	3-15	0.2	< 0.01
G08020805-025	Hole #74	15-27	1.1	0.08
G08020805-026	Hole #74	27-38	2.5	0.21
G08020805-027	Hole #74	38-51	1.7	0.20
G08020805-028	Hole #74	51-60	1.3	0.16
G08020805-029	Hole #75	0-4	0.3	< 0.01
G08020805-030	Hole #75	4-15	0.4	< 0.01
G08020805-031	Hole #75	15-35	0.5	< 0.01
G08020805-032	Hole #75	35-46	0.7	< 0.01
G08020805-033	Hole #75	46-60	0.9	0.01
G08020805-034	Hole #76	0-2	0.2	< 0.01
G08020805-035	Hole #76	2-21	1.2	0.02
G08020805-036	Hole #76	21-29	0.8	< 0.01
G08020805-037	Hole #76	29-46	0.6	0.04
G08020805-038	Hole #76	46-60	0.5	0.17
G08020805-039	Hole #77	0-4	0.2	< 0.01
G08020805-040	Hole #77	4-17	0.5	< 0.01

Powertech (USA) Inc.

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020805

Report Date: 03/31/08
Date Received: 02/28/08

		Analysis	B-Hot H20	Se-Hot H20
		Units	mg/kg	mg/kg
Sample ID	Client Sample ID	Depth	Results	Results
G08020805-041	Hole #77	17-36	4.4	0.03
G08020805-042	Hole #77	36-48	6.3	0.04
G08020805-043	Hole #79	0-3	0.6	< 0.01
G08020805-044	Hole #79	3-17	0.9	< 0.01
G08020805-045	Hole #79	17-30	0.6	< 0.01
G08020805-046	Hole #79	30-42	0.4	< 0.01
G08020805-047	Hole #79	42-60	0.3	< 0.01

POWERTECH (USA) INC.

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020806

Report Date: 04/07/08
Date Received: 02/28/08

		Analysis	OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
		Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
G08020806-001	Hole #82	0-4	3.0	0.9	51	32	17	L	35.7	5.3	1.78	8.96	4.91	0.19	0.08
G08020806-002	Hole #82	4-12	1.9	2.0	40	27	33	CL	49.3	7.1	1.16	5.93	3.57	1.95	0.89
G08020806-003	Hole #82	12-17	1.6	< 0.1	54	24	22	SCL	40.7	7.6	0.98	5.10	3.38	1.46	0.71
G08020806-004	Hole #82	17-28	1.3	< 0.1	54	24	22	SCL	39.0	7.9	0.99	3.09	3.19	3.75	2.12
G08020806-005	Hole #82	28-43	0.7	< 0.1	58	22	20	SCL	39.2	7.9	2.98	6.68	12.5	14.1	4.55
G08020806-006	Hole #83	0-3	3.2	< 0.1	14	53	33	SiCL	53.3	4.8	0.43	1.23	0.72	1.20	1.22
G08020806-007	Hole #83	3-17	1.6	< 0.1	14	43	43	SiC	52.2	4.8	0.31	0.40	0.23	1.82	3.23
G08020806-008	Hole #83	17-33	1.0	< 0.1	9	47	44	SiC	69.4	5.7	4.85	25.3	25.0	22.3	4.44
G08020806-009	Hole #83	33-42	0.6	< 0.1	6	69	25	SiL	78.1	7.6	5.71	26.5	35.1	30.4	5.47
G08020806-010	Hole #83	42-52	0.5	< 0.1	8	69	23	SiL	82.3	7.9	6.61	26.0	46.3	38.3	6.37
G08020806-011	Hole #83	52-60	0.4	< 0.1	12	79	9	SiL	74.9	7.9	6.67	24.4	42.7	42.6	7.36
G08020806-012	Hole #84	0-5	8.0	< 0.1	4	59	37	SiCL	87.0	7.4	1.87	1.83	6.46	12.7	6.22
G08020806-013	Hole #84	5-18	1.8	< 0.1	9	52	39	SiCL	83.2	8.2	11.8	24.5	105	112	14.0
G08020806-014	Hole #84	18-37	0.8	< 0.1	12	46	42	SiC	76.8	8.4	14.0	22.8	149	148	15.9
G08020806-015	Hole #84	37-47	1.1	< 0.1	6	55	39	SiCL	70.8	8.3	11.6	23.5	103	108	13.5
G08020806-016	Hole #84	47-60	0.6	< 0.1	32	37	31	CL	59.7	8.1	8.14	21.8	60.2	61.6	9.63
G08020806-017	Hole #85	0-2	4.2	< 0.1	32	48	20	L	51.5	6.3	0.43	2.37	1.44	0.23	0.16
G08020806-018	Hole #85	2-7	2.3	< 0.1	20	41	39	SiCL	80.6	7.3	0.71	4.24	2.39	0.73	0.40
G08020806-019	Hole #85	7-17	1.6	< 0.1	16	46	38	SiCL	68.9	7.9	0.71	2.58	1.79	2.93	1.98
G08020806-020	Hole #85	17-30	1.3	< 0.1	22	40	38	CL	65.4	8.0	1.71	4.81	4.08	9.26	4.39
G08020806-021	Hole #88	0-2	3.0	2.1	21	46	33	CL	64.7	6.7	0.54	3.27	1.99	0.43	0.26
G08020806-022	Hole #88	2-9	1.8	< 0.1	11	43	46	SiC	77.9	7.6	0.80	4.04	1.88	2.48	1.44
G08020806-023	Hole #88	9-18	1.3	< 0.1	14	82	4	Si	77.9	7.6	3.99	31.4	13.3	13.6	2.88
G08020806-024	Hole #89	0-2	4.4	3.1	12	54	34	SiCL	72.4	5.4	0.80	4.78	2.49	0.32	0.17
G08020806-025	Hole #89	2-18	2.4	3.7	9	45	46	SiC	87.3	7.7	1.41	5.88	4.12	5.67	2.54
G08020806-026	Hole #89	18-31	1.5	< 0.1	6	43	51	SiC	83.7	7.8	3.75	23.8	14.0	16.3	3.75
G08020806-027	Hole #89	31-37	1.5	< 0.1	3	49	48	SiC	86.0	7.7	3.98	27.7	15.5	16.0	3.44
G08020806-028	Hole #90	0-2	2.5	< 0.1	1	48	51	SiC	84.1	6.8	0.37	2.25	0.89	0.42	0.34
G08020806-029	Hole #90	2-8	1.8	< 0.1	2	44	54	SiC	89.8	7.4	0.44	2.82	0.78	0.76	0.56
G08020806-030	Hole #90	8-20	1.5	< 0.1	6	41	53	SiC	89.0	7.7	0.78	4.84	1.35	1.86	1.06
G08020806-031	Hole #91	0-4	2.0	< 0.1	26	44	30	CL	65.3	7.6	1.21	10.9	3.22	0.65	0.24
G08020806-032	Hole #91	4-19	1.2	< 0.1	22	67	11	SiL	85.3	7.8	4.65	25.3	14.5	26.3	5.89
G08020806-033	Hole #91	19-40	0.5	< 0.1	16	74	10	SiL	79.9	8.4	12.7	23.7	81.7	144	19.8
G08020806-034	Hole #91	40-48	0.8	< 0.1	19	47	34	SiCL	80.9	8.4	13.7	23.4	98.1	156	20.0
G08020806-035	Hole #91	48-60	0.6	< 0.1	10	68	22	SiL	94.3	8.3	14.4	25.1	109	170	20.7
G08020806-036	Hole #92	0-7	2.3	< 0.1	18	44	38	SiCL	74.9	7.5	0.79	4.99	1.58	2.09	1.15
G08020806-037	Hole #92	7-19	1.6	< 0.1	12	48	40	SiC	88.2	7.6	3.32	27.6	9.68	10.4	2.42
G08020806-038	Hole #93	0-4	2.9	< 0.1	50	38	12	L	41.8	7.2	0.77	6.13	1.94	0.22	0.11
G08020806-039	Hole #93	4-8	2.1	< 0.1	50	32	18	L	39.4	7.5	0.71	6.25	1.80	0.14	0.07
G08020806-040	Hole #94	0-2	6.3	< 0.1	8	48	44	SiC	85.7	6.9	0.92	4.54	3.22	1.06	0.54

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020806

Report Date: 04/07/08
Date Received: 02/28/08

	Analysis		OM	Coarse Fragments	Sand	Silt	Clay	Texture	SAT	pH-sat paste	EC-sat paste	Ca-sat paste	Mg-sat paste	Na-sat paste	SAR-sat paste
		Units	%	%	%	%	%		wt%	s_u_	mmhos/cm	meq/L	meq/L	meq/L	unitless
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
G08020806-041	Hole #94	2-8	1.8	< 0.1	8	48	44	SiC	87.8	7.6	0.66	3.55	1.58	1.61	1.00
G08020806-042	Hole #94	8-20	1.2	6.0	19	41	40	SiC	85.6	7.5	2.27	20.6	5.30	3.89	1.08
G08020806-043	Hole #94	20-32	1.0	3.1	16	45	39	SiCL	82.6	7.6	3.00	26.0	9.46	5.36	1.27
G08020806-044	Hole #94	32-44	1.2	8.9	9	49	42	SiC	87.2	7.6	3.81	26.2	18.1	13.4	2.84
G08020806-045	Hole #94	44-60	0.9	5.0	12	47	41	SiC	87.0	7.8	5.22	23.7	27.5	29.4	5.82
G08020806-046	Hole #95	0-2	3.6	< 0.1	39	43	18	L	46.4	7.1	0.70	5.33	2.36	0.10	0.05
G08020806-047	Hole #95	2-8	2.0	< 0.1	41	39	20	L	43.8	7.6	0.93	7.16	2.64	0.40	0.18
G08020806-048	Hole #95	8-17	1.2	< 0.1	40	41	19	L	39.5	7.9	0.65	3.56	2.66	0.71	0.40
G08020806-049	Hole #95	17-24	0.7	< 0.1	35	39	26	L	51.3	8.3	0.90	1.18	2.30	5.73	4.34
G08020806-050	Hole #95	24-38	1.0	> 0.1	34	33	33	CL	62.7	8.3	6.10	15.6	37.7	41.7	8.08

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020806

Report Date: 04/07/08
Date Received: 02/28/08

		Analysis	B-Hot H20	Se-Hot H20
		Units	mg/kg	mg/kg
Sample ID	Client Sample ID	Depth	Results	Results
G08020806-001	Hole #82	0-4	0.3	< 0.01
G08020806-002	Hole #82	4-12	0.3	< 0.01
G08020806-003	Hole #82	12-17	0.3	< 0.01
G08020806-004	Hole #82	17-28	0.3	< 0.01
G08020806-005	Hole #82	28-43	0.5	< 0.01
G08020806-006	Hole #83	0-3	0.3	< 0.01
G08020806-007	Hole #83	3-17	0.3	< 0.01
G08020806-008	Hole #83	17-33	1.9	< 0.01
G08020806-009	Hole #83	33-42	5.4	0.02
G08020806-010	Hole #83	42-52	8.4	0.04
G08020806-011	Hole #83	52-60	5.2	0.07
G08020806-012	Hole #84	0-5	1.0	< 0.01
G08020806-013	Hole #84	5-18	1.6	0.02
G08020806-014	Hole #84	18-37	2.8	0.05
G08020806-015	Hole #84	37-47	2.9	0.02
G08020806-016	Hole #84	47-60	1.8	< 0.01
G08020806-017	Hole #85	0-2	0.2	< 0.01
G08020806-018	Hole #85	2-7	0.2	< 0.01
G08020806-019	Hole #85	7-17	0.5	< 0.01
G08020806-020	Hole #85	17-30	0.8	< 0.01
G08020806-021	Hole #88	0-2	0.2	< 0.01
G08020806-022	Hole #88	2-9	0.4	< 0.01
G08020806-023	Hole #88	9-18	1.2	< 0.01
G08020806-024	Hole #89	0-2	0.3	< 0.01
G08020806-025	Hole #89	2-18	0.5	< 0.01
G08020806-026	Hole #89	18-31	1.3	0.02
G08020806-027	Hole #89	31-37	1.5	0.01
G08020806-028	Hole #90	0-2	0.3	< 0.01
G08020806-029	Hole #90	2-8	0.4	< 0.01
G08020806-030	Hole #90	8-20	0.8	< 0.01
G08020806-031	Hole #91	0-4	0.2	< 0.01
G08020806-032	Hole #91	4-19	0.3	0.02
G08020806-033	Hole #91	19-40	1.5	0.07
G08020806-034	Hole #91	40-48	1.0	0.08
G08020806-035	Hole #91	48-60	1.0	0.10
G08020806-036	Hole #92	0-7	0.2	< 0.01
G08020806-037	Hole #92	7-19	0.7	< 0.01
G08020806-038	Hole #93	0-4	< 0.1	< 0.01
G08020806-039	Hole #93	4-8	0.1	< 0.01
G08020806-040	Hole #94	0-2	0.6	< 0.01

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LABORATORY ANALYTICAL REPORT

Client: Knight Piesold and Company
Project: 451b Dewey-Burdock Soils
Workorder: G08020806

Report Date: 04/07/08
Date Received: 02/28/08

		Analysis	B-Hot H20	Se-Hot H20
		Units	mg/kg	mg/kg
Sample ID	**Client Sample ID**	**Depth**	**Results**	**Results**
G08020806-041	Hole #94	2-8	0.4	< 0.01
G08020806-042	Hole #94	8-20	0.5	< 0.01
G08020806-043	Hole #94	20-32	0.7	< 0.01
G08020806-044	Hole #94	32-44	1.1	< 0.01
G08020806-045	Hole #94	44-60	0.8	0.02
G08020806-046	Hole #95	0-2	0.2	< 0.01
G08020806-047	Hole #95	2-8	0.1	< 0.01
G08020806-048	Hole #95	8-17	0.1	< 0.01
G08020806-049	Hole #95	17-24	0.2	< 0.01
G08020806-050	Hole #95	24-36	1.5	0.15

POWERTECH (USA) INC.

APPENDIX 7.5-D

PRIME FARMLAND DESIGNATION

Powertech (USA) Inc.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
200 Fourth Street SW
Huron, South Dakota 57350

Phone: (605) 352-1200
Fax: (605) 352-1270

September 5, 2008

Mr. Adam Beilke
BKS Environmental Associates, Inc.
P.O. Box 3467
Gillette, Wyoming 82717

RE: Maps for Custer and Fall River Counties, South Dakota (SD)

Dear Mr. Beilke:

Attached are the prime and important farmland maps you requested for the Sections in Township 6 and 7 North and Range 1 East in Custer and Fall River Counties in SD.

Important farmland is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate state agency or agencies.

Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. Below is the criteria we use in determining important farmland in South Dakota:

A map unit is "Farmland of Statewide Importance" if 50 percent or more of named Components meet the Criteria and the Land Capability Class of all named components is Class 4 or less.

Mesic or frigid temperature regime
Available Water Capacity (AWC): 5.00 or Better (high) in top 40 inches.
pH: 4.5 - 8.4 in top 24 inches
EC: less than 8 in top 24 inches
SAR: less than 15 in top 24 inches
Surface Fragments > 3 in: less than 10%.
Water erosion: Kw*slope Representative Value < 3.
Wind Erosion: I*C < 60.
Flooding or Ponding: Less than Frequent.
Wetness: High Water table > 6 inches.
Mapunit is not prime farmland under all conditions

If I can be a further assistance, do not hesitate to let me know.

Sincerely,

DANIEL SHURTLIFF
Acting State Soil Scientist

Attachments

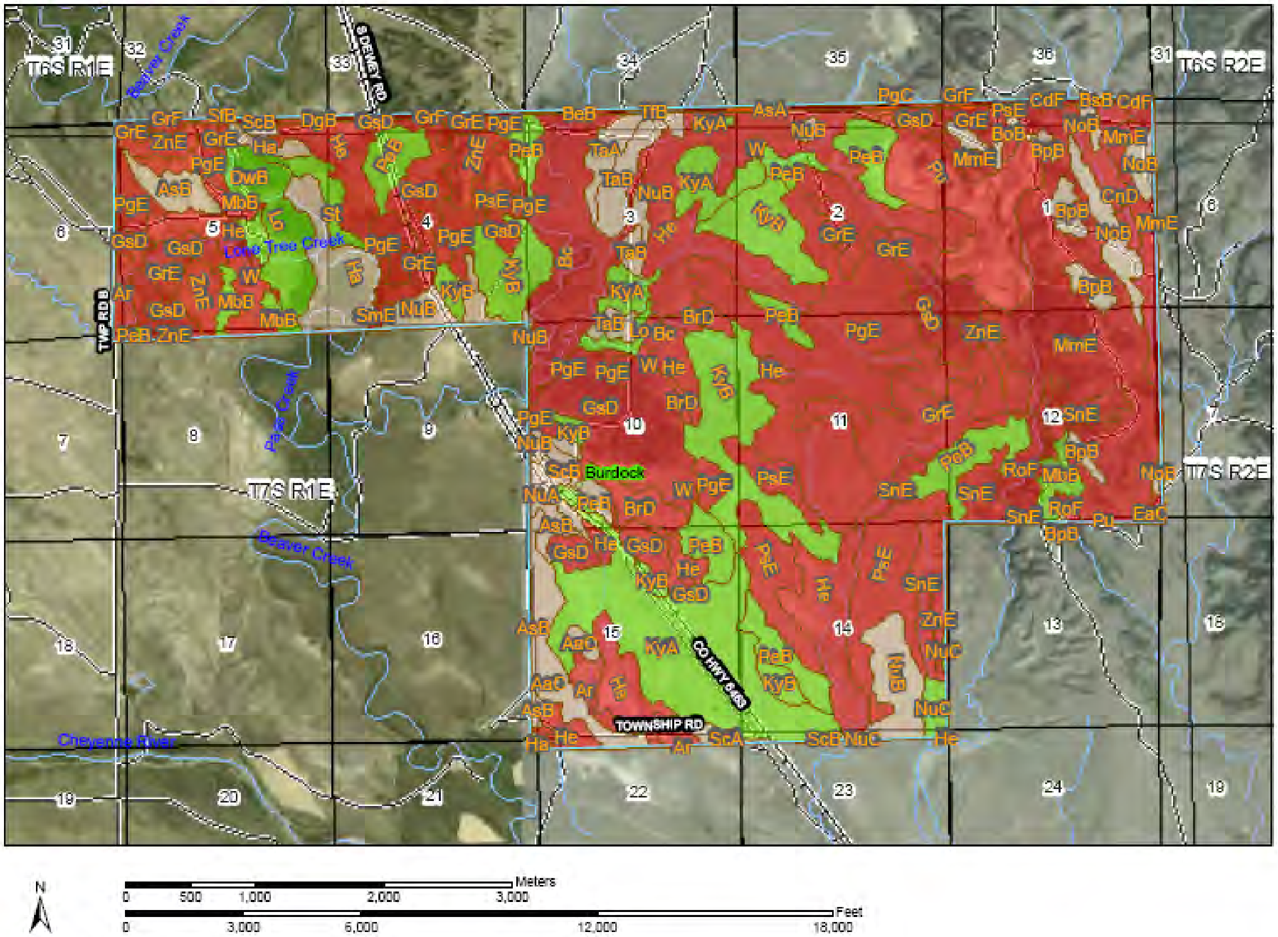
cc: Kory Bossert, DC, NRCS, Hot Springs FO

Helping People Help the Land

An Equal Opportunity Provider and Employer

POWERTECH (USA) INC.

Farmland Classification–Custer and Pennington Counties, Black Hills Parts, South Dakota; and Fall River County, South Dakota
(BKS Env 7S 1E)



USDA Natural Resources Conservation Service

Web Soil Survey 2.0
National Cooperative Soil Survey

8/8/2008
Page 1 of 5

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features

Public Land Survey
- Township and Range
- Section

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 13N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Custer and Pennington Counties, Black Hills Parts, South Dakota
Survey Area Data: Version 9, Feb 6, 2008

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 10, Feb 6, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 1991; 1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Custer and Pennington Counties, Black Hills Parts, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AsA	Arvada-Slickspots complex, 0 to 3 percent slopes	Not prime farmland	11.1	0.2%
BeB	Barnum-Winetti complex, 0 to 6 percent slopes	Not prime farmland	5.0	0.1%
BrB	Bullflat silt loam, 3 to 6 percent slopes	Not prime farmland	1.2	0.0%
BsB	Bullflat-Cordeston silt loams, 2 to 9 percent slopes	Not prime farmland	2.7	0.0%
CdF	Canyon-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland	6.7	0.1%
DgB	Demar-Grummit-Slickspots complex, 0 to 6 percent slopes	Not prime farmland	5.2	0.1%
GrD	Grummit-Rock outcrop complex, 6 to 15 percent slopes	Not prime farmland	1.5	0.0%
GrF	Grummit-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland	14.6	0.2%
HaA	Haverson loam, 0 to 2 percent slopes	Prime farmland if irrigated	0.7	0.0%
NfE	Nihill-Zigweid complex, 15 to 50 percent slopes	Not prime farmland	1.8	0.0%
PgC	Pierre-Grummit clays, 2 to 9 percent slopes	Not prime farmland	7.8	0.1%
SfB	Satanta-Arvada complex, 2 to 6 percent slopes	Not prime farmland	2.5	0.0%
TfB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated	3.5	0.1%
ZnD	Zigweid-Nihill complex, 6 to 15 percent slopes	Not prime farmland	1.5	0.0%

Farmland Classification— Summary by Map Unit — Fall River County, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AaC	Alice fine sandy loam, 2 to 9 percent slopes	Prime farmland if irrigated	99.8	1.5%
Ar	Arvada loam	Not prime farmland	69.0	1.0%
AsB	Ascalon fine sandy loam, 0 to 6 percent slopes	Prime farmland if irrigated	66.4	1.0%

Farmland Classification— Summary by Map Unit — Fall River County, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bc	Barnum silt loam	Not prime farmland	251.7	3.8%
BoB	Boneek silt loam, 2 to 6 percent slopes	Prime farmland if irrigated	19.1	0.3%
BpB	Boneek silt loam, bedrock substratum, 2 to 6 percent slopes	Prime farmland if irrigated	56.2	0.9%
BrD	Broadhurst clay, 2 to 15 percent slopes	Not prime farmland	66.4	1.0%
CnD	Colby-Norka silt loams, 6 to 15 percent slopes	Not prime farmland	99.5	1.5%
DwB	Dwyer loamy fine sand, 2 to 6 percent slopes	Not prime farmland	13.7	0.2%
EaC	Eckley loam, 0 to 9 percent slopes	Not prime farmland	5.0	0.1%
GrE	Grummit-Rock outcrop complex, 3 to 40 percent slopes	Not prime farmland	327.9	5.0%
GsD	Grummit-Snomo clays, 3 to 15 percent slopes	Not prime farmland	523.3	7.9%
Ha	Haverson loam	Prime farmland if irrigated	130.0	2.0%
He	Hisle-Slickspots complex	Not prime farmland	733.9	11.1%
KyA	Kyle clay, 0 to 2 percent slopes	Farmland of statewide importance	466.2	7.1%
KyB	Kyle clay, 2 to 6 percent slopes	Farmland of statewide importance	421.1	6.4%
Lo	Lohmiller silty clay loam	Farmland of statewide importance	131.5	2.0%
MbB	Manzanola silty clay loam, 2 to 6 percent slopes	Farmland of statewide importance	75.0	1.1%
MmE	Mathias-Midway-Rock outcrop complex, 15 to 30 percent slopes	Not prime farmland	512.2	7.7%
NoB	Norka silt loam, 2 to 6 percent slopes	Prime farmland if irrigated	92.5	1.4%
NuA	Nunn clay loam, 0 to 2 percent slopes	Prime farmland if irrigated	26.0	0.4%
NuB	Nunn clay loam, 2 to 6 percent slopes	Prime farmland if irrigated	160.5	2.4%
NuC	Nunn clay loam, 6 to 9 percent slopes	Farmland of statewide importance	25.3	0.4%
PeB	Pierre clay, 2 to 6 percent slopes	Farmland of statewide importance	322.0	4.9%
PgE	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland	747.0	11.3%
PsE	Pierre-Samsil clays, 6 to 25 percent slopes	Not prime farmland	289.6	4.4%

Farmland Classification— Summary by Map Unit — Fall River County, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Pu	Pits, mine	Not prime farmland	214.8	3.2%
RoF	Rock outcrop-Mathias-Butche complex, 30 to 75 percent slopes	Not prime farmland	52.7	0.8%
ScA	Satanta loam, 0 to 2 percent slopes	Prime farmland if irrigated	13.3	0.2%
ScB	Satanta loam, 2 to 6 percent slopes	Prime farmland if irrigated	38.6	0.6%
ScC	Satanta loam, 6 to 9 percent slopes	Farmland of statewide importance	0.0	0.0%
SmE	Schamber-Eckley complex, 9 to 40 percent slopes	Not prime farmland	7.1	0.1%
SnE	Shingle-Penrose-Rock outcrop complex, 15 to 40 percent slopes	Not prime farmland	158.7	2.4%
St	Stetter clay	Farmland of statewide importance	36.0	0.5%
TaA	Tilford silt loam, 0 to 2 percent slopes	Prime farmland if irrigated	42.7	0.6%
TaB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated	75.0	1.1%
W	Water	Not prime farmland	9.9	0.1%
ZnE	Zigweid-Nihill complex, 6 to 20 percent slopes	Not prime farmland	160.5	2.4%
Totals for Area of Interest (AOI)			6,609.1	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands– Custer and Pennington Counties, Black Hills Parts, South Dakota		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AsA	Arvada-Slickspots complex, 0 to 3 percent slopes	Not prime farmland
BeB	Barnum-Winetti complex, 0 to 6 percent slopes	Not prime farmland
BrB	Bullflat silt loam, 3 to 6 percent slopes	Not prime farmland
BsB	Bullflat-Cordeston silt loams, 2 to 9 percent slopes	Not prime farmland
CdF	Canyon-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland
DgB	Demar-Grummit-Slickspots complex, 0 to 6 percent slopes	Not prime farmland
GrD	Grummit-Rock outcrop complex, 6 to 15 percent slopes	Not prime farmland
GrF	Grummit-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland
HaA	Haverson loam, 0 to 2 percent slopes	Prime farmland if irrigated
NfE	Nihill-Zigweid complex, 15 to 50 percent slopes	Not prime farmland
PgC	Pierre-Grummit clays, 2 to 9 percent slopes	Not prime farmland
SfB	Satanta-Arvada complex, 2 to 6 percent slopes	Not prime farmland
TfB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated
ZnD	Zigweid-Nihill complex, 6 to 15 percent slopes	Not prime farmland

Prime and other Important Farmlands– Fall River County, South Dakota		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AaC	Alice fine sandy loam, 2 to 9 percent slopes	Prime farmland if irrigated
Ar	Arvada loam	Not prime farmland
AsB	Ascalon fine sandy loam, 0 to 6 percent slopes	Prime farmland if irrigated
Bc	Barnum silt loam	Not prime farmland
BoB	Boneek silt loam, 2 to 6 percent slopes	Prime farmland if irrigated
BpB	Boneek silt loam, bedrock substratum, 2 to 6 percent slopes	Prime farmland if irrigated

Prime and other Important Farmlands– Fall River County, South Dakota		
Map Symbol	**Map Unit Name**	**Farmland Classification**
BrD	Broadhurst clay, 2 to 15 percent slopes	Not prime farmland
CnD	Colby-Norka silt loams, 6 to 15 percent slopes	Not prime farmland
DwB	Dwyer loamy fine sand, 2 to 6 percent slopes	Not prime farmland
EaC	Eckley loam, 0 to 9 percent slopes	Not prime farmland
GrE	Grummit-Rock outcrop complex, 3 to 40 percent slopes	Not prime farmland
GsD	Grummit-Snomo clays, 3 to 15 percent slopes	Not prime farmland
Ha	Haverson loam	Prime farmland if irrigated
He	Hisle-Slickspots complex	Not prime farmland
KyA	Kyle clay, 0 to 2 percent slopes	Farmland of statewide importance
KyB	Kyle clay, 2 to 6 percent slopes	Farmland of statewide importance
Lo	Lohmiller silty clay loam	Farmland of statewide importance
MbB	Manzanola silty clay loam, 2 to 6 percent slopes	Farmland of statewide importance
MmE	Mathias-Midway-Rock outcrop complex, 15 to 30 percent slopes	Not prime farmland
NoB	Norka silt loam, 2 to 6 percent slopes	Prime farmland if irrigated
NuA	Nunn clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
NuB	Nunn clay loam, 2 to 6 percent slopes	Prime farmland if irrigated
NuC	Nunn clay loam, 6 to 9 percent slopes	Farmland of statewide importance
PeB	Pierre clay, 2 to 6 percent slopes	Farmland of statewide importance
PgE	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland
PsE	Pierre-Samsil clays, 6 to 25 percent slopes	Not prime farmland
Pu	Pits, mine	Not prime farmland
RoF	Rock outcrop-Mathias-Butche complex, 30 to 75 percent slopes	Not prime farmland
ScA	Satanta loam, 0 to 2 percent slopes	Prime farmland if irrigated
ScB	Satanta loam, 2 to 6 percent slopes	Prime farmland if irrigated
ScC	Satanta loam, 6 to 9 percent slopes	Farmland of statewide importance
SmE	Schamber-Eckley complex, 9 to 40 percent slopes	Not prime farmland
SnE	Shingle-Penrose-Rock outcrop complex, 15 to 40 percent slopes	Not prime farmland
St	Stetter clay	Farmland of statewide importance
TaA	Tilford silt loam, 0 to 2 percent slopes	Prime farmland if irrigated
TaB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated
W	Water	Not prime farmland
ZnE	Zigweid-Nihill complex, 6 to 20 percent slopes	Not prime farmland

Data Source Information

Soil Survey Area: Custer and Pennington Counties, Black Hills Parts, South Dakota
Survey Area Data: Version 9, Feb 6, 2008

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 10, Feb 6, 2008

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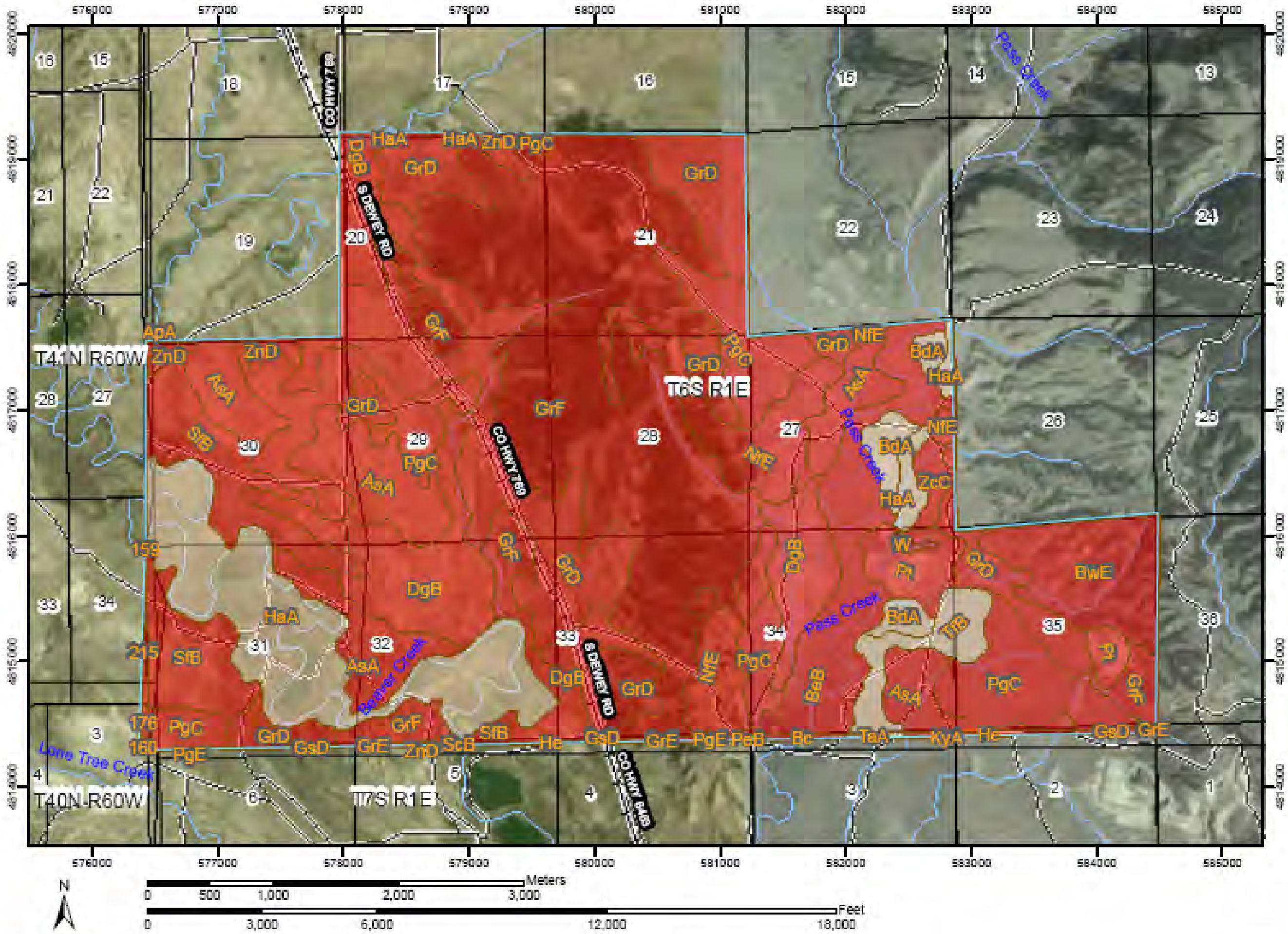
Farmland Classification–Custer and Pennington Counties, Black Hills Parts, South Dakota; Fall River County, South Dakota; and Niobrara County, Wyoming
(BKS_Farmland_4)



USDA Natural Resources Conservation Service

Web Soil Survey 2.0
National Cooperative Soil Survey

9/5/2008
Page 1 of 5

Farmland Classification–Custer and Pennington Counties, Black Hills Parts, South Dakota; Fall River County, South Dakota; and Niobrara County, Wyoming
(BKS_Farmland_4)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features

Public Land Survey
- Township and Range
- Section

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 13N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Custer and Pennington Counties, Black Hills Parts, South Dakota
Survey Area Data: Version 10, Aug 26, 2008

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 10, Feb 6, 2008

Soil Survey Area: Niobrara County, Wyoming
Survey Area Data: Version 6, Mar 4, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 1991; 1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Custer and Pennington Counties, Black Hills Parts, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ApA	Arvada variant loam, 0 to 2 percent slopes	Not prime farmland	6.8	0.1%
AsA	Arvada-Slickspots complex, 0 to 3 percent slopes	Not prime farmland	610.9	8.5%
BdA	Barnum very fine sandy loam, 0 to 3 percent slopes	Prime farmland if irrigated	87.5	1.2%
BeB	Barnum-Winetti complex, 0 to 6 percent slopes	Not prime farmland	343.7	4.8%
BwE	Butche-Rock outcrop complex, 9 to 60 percent slopes	Not prime farmland	256.0	3.6%
DgB	Demar-Grummit-Slickspots complex, 0 to 6 percent slopes	Not prime farmland	602.8	8.4%
GrD	Grummit-Rock outcrop complex, 6 to 15 percent slopes	Not prime farmland	1,116.0	15.6%
GrF	Grummit-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland	1,657.8	23.2%
HaA	Haverson loam, 0 to 2 percent slopes	Prime farmland if irrigated	635.7	8.9%
NfE	Nihill-Zigweid complex, 15 to 50 percent slopes	Not prime farmland	373.1	5.2%
PgC	Pierre-Grummit clays, 2 to 9 percent slopes	Not prime farmland	697.2	9.7%
Pt	Pits, quarries	Not prime farmland	119.5	1.7%
SfB	Satanta-Arvada complex, 2 to 6 percent slopes	Not prime farmland	379.9	5.3%
TfB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated	109.9	1.5%
W	Water	Not prime farmland	8.1	0.1%
ZcC	Zigweid-Canyon complex, 2 to 15 percent slopes	Not prime farmland	35.5	0.5%
ZnD	Zigweid-Nihill complex, 6 to 15 percent slopes	Not prime farmland	33.5	0.5%

Farmland Classification— Summary by Map Unit — Fall River County, South Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bc	Barnum silt loam	Not prime farmland	7.2	0.1%
GrE	Grummit-Rock outcrop complex, 3 to 40 percent slopes	Not prime farmland	10.7	0.1%
GsD	Grummit-Snomo clays, 3 to 15 percent slopes	Not prime farmland	13.3	0.2%
Ha	Haverson loam	Prime farmland if irrigated	0.5	0.0%
He	Hisle-Slickspots complex	Not prime farmland	19.7	0.3%
KyA	Kyle clay, 0 to 2 percent slopes	Farmland of statewide importance	0.1	0.0%
PeB	Pierre clay, 2 to 6 percent slopes	Farmland of statewide importance	2.0	0.0%
PgE	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland	4.7	0.1%
Pu	Pits, mine	Not prime farmland	0.1	0.0%
ScB	Satanta loam, 2 to 6 percent slopes	Prime farmland if irrigated	1.8	0.0%
TaA	Tilford silt loam, 0 to 2 percent slopes	Prime farmland if irrigated	4.9	0.1%
ZnE	Zigweid-Nihill complex, 6 to 20 percent slopes	Not prime farmland	1.3	0.0%

Farmland Classification— Summary by Map Unit — Niobrara County, Wyoming				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
159	Lohmiller-Haverdad complex, saline, 1 to 4 percent slopes	Not prime farmland	0.0	0.0%
160	Manzanola silty clay loam, 0 to 6 percent slopes	Not prime farmland	1.1	0.0%
176	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland	4.1	0.1%
185	Samday-Savageton-Bahl association, 3 to 10 percent slopes	Not prime farmland	0.4	0.0%
215	Ulm-Forkwood loams, 0 to 6 percent slopes	Not prime farmland	8.5	0.1%

Totals for Area of Interest (AOI)	7,153.3	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands– Custer and Pennington Counties, Black Hills Parts, South Dakota		
Map Symbol	Map Unit Name	Farmland Classification
ApA	Arvada variant loam, 0 to 2 percent slopes	Not prime farmland
AsA	Arvada-Slickspots complex, 0 to 3 percent slopes	Not prime farmland
BdA	Barnum very fine sandy loam, 0 to 3 percent slopes	Prime farmland if irrigated
BeB	Barnum-Winetti complex, 0 to 6 percent slopes	Not prime farmland
BwE	Butche-Rock outcrop complex, 9 to 60 percent slopes	Not prime farmland
DgB	Demar-Grummit-Slickspots complex, 0 to 6 percent slopes	Not prime farmland
GrD	Grummit-Rock outcrop complex, 6 to 15 percent slopes	Not prime farmland
GrF	Grummit-Rock outcrop complex, 15 to 60 percent slopes	Not prime farmland
HaA	Haverson loam, 0 to 2 percent slopes	Prime farmland if irrigated
NfE	Nihill-Zigweid complex, 15 to 50 percent slopes	Not prime farmland
PgC	Pierre-Grummit clays, 2 to 9 percent slopes	Not prime farmland
Pt	Pits, quarries	Not prime farmland
SfB	Satanta-Arvada complex, 2 to 6 percent slopes	Not prime farmland
TfB	Tilford silt loam, 2 to 6 percent slopes	Prime farmland if irrigated
W	Water	Not prime farmland
ZcC	Zigweid-Canyon complex, 2 to 15 percent slopes	Not prime farmland
ZnD	Zigweid-Nihill complex, 6 to 15 percent slopes	Not prime farmland

Prime and other Important Farmlands– Fall River County, South Dakota		
Map Symbol	Map Unit Name	Farmland Classification
Bc	Barnum silt loam	Not prime farmland
GrE	Grummit-Rock outcrop complex, 3 to 40 percent slopes	Not prime farmland
GsD	Grummit-Snomo clays, 3 to 15 percent slopes	Not prime farmland

Prime and other Important Farmlands– Fall River County, South Dakota		
Map Symbol	**Map Unit Name**	**Farmland Classification**
Ha	Haverson loam	Prime farmland if irrigated
He	Hisle-Slickspots complex	Not prime farmland
KyA	Kyle clay, 0 to 2 percent slopes	Farmland of statewide importance
PeB	Pierre clay, 2 to 6 percent slopes	Farmland of statewide importance
PgE	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland
Pu	Pits, mine	Not prime farmland
ScB	Satanta loam, 2 to 6 percent slopes	Prime farmland if irrigated
TaA	Tilford silt loam, 0 to 2 percent slopes	Prime farmland if irrigated
ZnE	Zigweid-Nihill complex, 6 to 20 percent slopes	Not prime farmland

Prime and other Important Farmlands– Niobrara County, Wyoming		
Map Symbol	**Map Unit Name**	**Farmland Classification**
159	Lohmiller-Haverdad complex, saline, 1 to 4 percent slopes	Not prime farmland
160	Manzanola silty clay loam, 0 to 6 percent slopes	Not prime farmland
176	Pierre-Grummit clays, 6 to 25 percent slopes	Not prime farmland
185	Samday-Savageton-Bahl association, 3 to 10 percent slopes	Not prime farmland
215	Ulm-Forkwood loams, 0 to 6 percent slopes	Not prime farmland

Data Source Information

Soil Survey Area: Custer and Pennington Counties, Black Hills Parts, South Dakota
Survey Area Data: Version 10, Aug 26, 2008

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 10, Feb 6, 2008

Soil Survey Area: Niobrara County, Wyoming
Survey Area Data: Version 6, Mar 4, 2008

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APPENDIX 7.5-E

SITE PHOTOGRAPHS

POWERTECH (USA) INC.

Photo 1: Hole 17 Profile

Photo 2: Hole 17 General View W

Photo 3: Hole 27 Profile

Photo 4: Hole 27 General View N

Photo 5: Hole 36 Profile

Photo 6: Hole 36 General View S

Photo 7: Hole 39 Profile

Photo 8: Hole 39 General View E

Photo 9: Hole 40 Profile

Photo 10: Hole 40 General View W

POWERTECH (USA) INC.

Photo 11: Hole 41 Profile

Photo 12: Hole 41 General View W

Powertech (USA) Inc.

Photo 13: Hole 42 Profile

Photo 14: Hole 42 General View

Photo 15: Hole 43 Profile

Photo 16: Hole 43 General View NW

Photo 17: Hole 50 Profile

Photo 18: Hole 50 General View

Photo 19: Hole 56 Profile

Photo 20: Hole 56 General View

Photo 21: Hole 57 Profile

Photo 22: Hole 57 General View ESE

Photo 23: Hole 60 Profile

Photo 24: Hole 60 General View W

Photo 25: Hole 63 Profile

Photo 26: Hole 63 General View N

Photo 27: Hole 64 Profile

Photo 28: Hole 64 General View N

Powertech (USA) Inc.

Photo 29: Hole 72 Profile

Photo 30: Hole 72 General View E

Photo 31: Hole 73 Profile

Photo 32: Hole 73 General View E

Photo 33: Hole 74 Profile

Photo 34: Hole 74 General View E

Photo 35: Hole 75 Profile

Photo 36: Hole 75 General View N

Photo 37: Hole 76 Profile

Photo 38: Hole 76 General View N

Photo 39: Hole 77 Profile

Photo 40: Hole 77 General View N

Photo 41: Hole 79 Profile

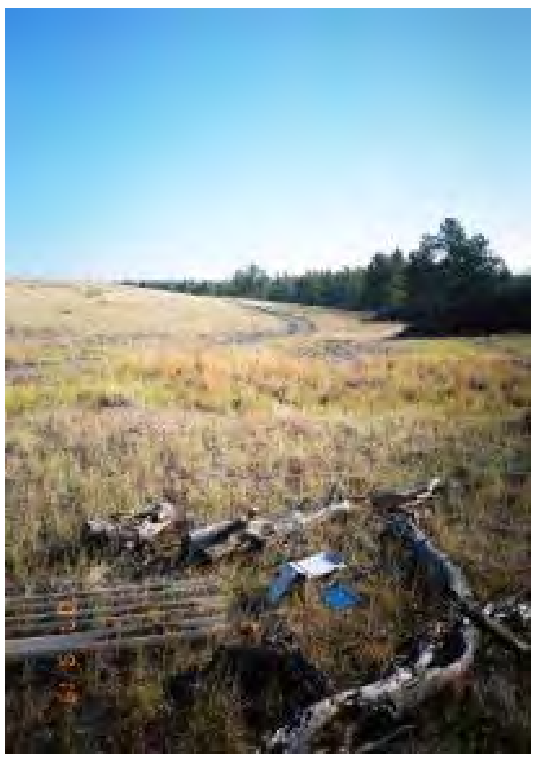

Photo 42: Hole 79 General View NE

Photo 43: Hole 82 Profile

Photo 44: Hole 82 General View E

Photo 45: Hole 83 Profile

Photo 46: Hole 83 General View N

Photo 47: Hole 84 Profile

Photo 48: Hole 84 General View SE

Photo 49: Hole 85 Profile

Photo 50: Hole 85 General View S

Photo 51: Hole 88 Profile

Photo 52: Hole 88 General View

Photo 53: Hole 89 Profile

Photo 54: Hole 89 General View N

Photo 55: Hole 90 Profile

Photo 56: Hole 90 General View


Photo 57: Hole 91 Profile


Photo 58: Hole 91 General View N

Photo 59: Hole 92 Profile

Photo 60: Hole 92 General View N

Photo 61: Hole 93 Profile

Photo 62: Hole 93 General View N

Photo 63: Hole 94 Profile

Photo 64: Hole 94 General View SSE

Photo 65: Hole 95 Profile

Photo 66: Hole 95 General View N

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APPENDIX 7.6-A

USGS EARTHQUAKE RESULTS

NEIC: Earthquake Search Results

U. S. G E O L O G I C A L S U R V E Y

E A R T H Q U A K E D A T A B A S E

FILE CREATED: Mon Apr 7 18:18:37 2008
Circle Search Earthquakes= 10
Circle Center Point Latitude: 43.300N Longitude: 103.900W
Radius: 100.000 km
Catalog Used: PDE
Data Selection: Historical & Preliminary Data

CAT	YEAR	MO	DA	ORIG TIME	LAT	LONG	DEP	MAGNITUDE	IEFM NFPO TFS	DTSVNWG	DIST km
PDE	1975	05	16	055701.50	43.24	-103.68	5		4F	. ...	19
PDE	1987	01	01	080224.07	42.79	-103.48	5	3.50 LgGS	3F	. ...	66
PDE	1992	11	02	065410.34	42.74	-104.39	5	3.00 MLGS	5F	. ...	73
PDE	1994	03	18	225143.15	43.40	-103.50	5	2.80 LgGS	.F	. ...	34
PDE	1994	03	20	071506	43.40	-103.50	5	2.30 LgGS	.F	. ...	34
PDE	1996	02	06	160836.75	43.98	-103.73	5	3.70 LgGS	5F	. ...	76
PDE	1996	04	09	024808.19	43.07	-104.10	5	3.70 LgGS	3F	. ...	30
PDE	1996	05	03	074751.53	43.04	-104.02	5	3.10 LgGS	..	. ...	30
PDE	2004	01	05	025316.58	43.60	-104.00	5	2.80 LgGS	.F	. ...	33
PDE	2004	01	24	040901.30	44.00	-103.20	5	2.50 LgGS	.F	. ...	96

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USGS
science for a changing world

NEIC: Earthquake Search Results

U. S. G E O L O G I C A L S U R V E Y

E A R T H Q U A K E D A T A B A S E

FILE CREATED: Wed Apr 16 16:32:15 2008
Circle Search Earthquakes= 49
Circle Center Point Latitude: 43.300N Longitude: 103.900W
Radius: 200.000 km
Catalog Used: PDE
Data Selection: Historical & Preliminary Data

CAT	YEAR	MO	DA	ORIG TIME	LAT	LONG	DEP	MAGNITUDE	IEFM NFPO TFS	DTSVNWG	DIST km
PDE	1975	05	16	055701.50	43.24	-103.68	5		4F	. ...	19
PDE	1976	09	03	041816.20	44.04	-106.15	10	4.80 mb GS	.F	. ...	199
PDE	1978	01	16	035001.70	42.44	-105.32	5	3.00 MLGS	.F	. ...	150
PDE	1978	05	07	160619.60	42.30	-101.93	15	4.30 MLGS	5F	. ...	195
PDE	1981	09	13	221629.74	43.04	-101.85	5	3.40 LgTUL	5F	. ...	169
PDE	1983	02	13	134444.09	42.23	-105.73	5	4.00 MLGS	4F	. ...	190
PDE	1983	05	06	061446.95	42.96	-102.20	5	3.30 MLGS	..	. ...	143
PDE	1983	11	15	123312.19	43.02	-105.96	5	3.00 MLGS	3F	. ...	170
PDE	1984	05	29	201832.68	44.23	-105.96	18	5.00 mb GS	5F	. ...	195
PDE	1984	10	18	153023.06	42.38	-105.72	33	5.50 MLGOL	6D	M	180
PDE	1984	10	18	155737.38	42.37	-105.81	33	4.50 mb GS	.F	. ...	187
PDE	1984	10	18	173827.41	42.41	-105.77	33	3.80 MLGOL	..	. ...	181
PDE	1984	10	19	162904.44	42.41	-105.77	33	3.30 MLGS	..	. ...	182

```
PDE  1984  10 20 115108.63  42.40 -105.87  33 3.50 MLGS    .. . .......
189
PDE  1984  10 22 111756.30  42.40 -105.88  33 3.10 MLGS    .. . .......
190
PDE  1984  10 24 090354.78  42.32 -105.72  21 3.20 MLGS    .. . .......
184
PDE  1984  11 06 113852.51  42.31 -105.71  33 3.30 MLGS    .. . .......
184
PDE  1984  12 06 040452.33  42.44 -105.82  20 2.90 MLGS    .. . .......
183
PDE  1984  12 17 093132.24  42.36 -105.73  33 3.30 MLGS    .. . .......
182
PDE  1986  06 12 151434.03  42.40 -105.69  20 3.00 MLGS    .. . .......
177
PDE  1987  01 01 080224.07  42.79 -103.48   5 3.50 LgGS    3F . .......
66
PDE  1989  02 09 051545.80  42.69 -101.90   5 3.80 LgGS    5F . .......
176
PDE  1990  01 28 045959.19  43.31 -102.50   5 4.00 LgTUL   5F . .......
113
PDE  1990  03 02 041527     43.30 -102.50   5 3.20 MLGS    4F . .......
113
PDE  1991  11 05 161849     44.35 -103.75   0 2.50 MLGS    .F . ....R..
117
PDE  1992  11 02 065410.34  42.74 -104.39   5 3.00 MLGS    5F . .......
73
PDE  1993  02 24 235217.58  43.71 -105.29   0 3.60 MLGS    .F . ....E..
121
PDE  1993  06 30 065057.83  42.99 -105.37   5 3.00 MLGS    .. . .......
124
PDE  1993  07 23 063023.84  42.48 -105.70   5 3.70 MLGS    4F . .......
173
PDE  1993  09 05 081235.50  44.40 -103.80   5 2.70 MLGS    3F . .......
122
PDE  1993  10 10 041746.76  42.42 -105.87   5 3.70 MLGS    4F . .......
188
PDE  1993  12 13 145103.05  42.33 -105.50   5 3.50 MLGS    .. . .......
169
PDE  1994  03 18 225143.15  43.40 -103.50   5 2.80 LgGS    .F . .......
34
PDE  1994  03 20 071506     43.40 -103.50   5 2.30 LgGS    .F . .......
34
PDE  1996  02 06 160836.75  43.98 -103.73   5 3.70 LgGS    5F . .......
76
PDE  1996  04 09 024808.19  43.07 -104.10   5 3.70 LgGS    3F . .......
30
PDE  1996  05 03 074751.53  43.04 -104.02   5 3.10 LgGS    .. . .......
30
PDE  1996  10 19 132757.97  43.09 -106.06   5 4.20 MLGS    .F . .......
176
PDE  1998  06 18 162638.32  42.62 -103.00   5 3.40 LgGS    .F . .......
104
PDE  2000  04 13 181731.73  42.41 -105.81   5 3.30 MLGS    .. . .......
185
```

```
PDE   2003  02 01 184411.53  43.08 -106.18   5 3.70 MLGS    .F . .......
186
PDE   2003  05 25 073233.39  43.09 -101.79   5 4.00 LgGS    4F . .......
172
PDE   2004  01 05 025316.58  43.60 -104.00   5 2.80 LgGS    .F . .......
33
PDE   2004  01 24 040901.30  44.00 -103.20   5 2.50 LgGS    .F . .......
96
PDE   2004  02 15 031818.02  42.94 -105.40  10 3.50 MLGS    3F . .......
128
PDE   2004  08 29 184944.26  42.89 -105.49   5 3.80 MLGS    4F . .......
136
PDE   2006  09 07 062320.02  42.98 -102.24   5 2.60 LgGS    .. . .......
140
PDE   2007  02 07 103558.70  44.03 -102.58   5 3.10 LgGS    3F . .......
134
PDE   2007  04 24 093501.26  42.58 -102.94   5 2.70 LgGS    .. . .......
111
```

POWERTECH (USA) INC.

APPENDIX 7.9-A

WATER LEVELS IN INYAN KARA

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	12	38	49	607	608	609	610	613	614	615	619	622	628	631
Formation	Lakota	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Fall River	Fuson	Lakota	Lakota	Fall River	nyan Kara	Fall River
SubSurface (SS) or Free-Flowing (FF)	FF	FF	FF	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
Targeted Measurement Frequency	Quarterly	Quarterly	Quarterly	Monthly	Monthly	Monthly	Monthly	Quarterly	Quarterly	Monthly	Quarterly	Monthly	Quarterly	Quarterly
Surveyed Well Casing Elevation, ft	3641.14		3620.86	3610.55	3609.26	3700.67	3704.85	3736.93	3741.16	3741	3700.12	3753.28	3731.99	3745.37
Stick Up (Well Casing Mark), ft	-0.58			-0.07	-0.08	-0.1	-0.49	-0.45	-0.11	-0.54	0	-0.46	-0.56	-0.33
Surveyed Control Point Elevation, ft		3637.49	3618.86											
Stick Up (Control Point), ft		-2.15												
Calculated Measuring Point Elevation, ft	**3641.72**	**3639.64**	**3618.86**	**3610.62**	**3609.34**	**3700.77**	**3705.34**	**3737.38**	**3741.27**	**3741.54**	**3700.12**	**3753.74**	**3732.55**	**3745.7**
Well No.	12	38	49	607	608	609	610	613	614	615	619	622	628	631
Units	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
9/25/2007		3644.25	3640.54			3690.47	3692.81	3701.3	3700.14	3691.6			3695.95	
9/26/2007														3715.79
9/27/2007	3653.72										3679.13		3695.72	
10/2/2007														
10/9/2007														
10/26/2007				3584.35		3690.52	3692.81							
11/9/2007	3653.26	3644.02	3641.93	3584.61							3679.19			3715.85
11/14/2007						3690.27	3690.12						3694.86	3715.85

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	12	38	49	607	608	609	610	613	614	615	619	622	628	631
Formation	Lakota	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Fall River	Fuson	Lakota	Lakota	Fall River	nyan Kara	Fall River
11/19/2007								3701.07	3700.07	3691.85				
11/27/2007													3696.44	
12/11/2007						3690.21	3693.83						3696.24	
1/11/2008								3701.39	3700.08	3690.42				
1/30/2008				3585.69		3689.85	3694.98							
2/3/2008														
2/5/2008												3710.04		
2/20/2008						3688.25	3694.6						3696.07	3715.68
2/21/2008			3641.52	3585.21										
3/6/2008						3689.55	3692.63	3701.08	3700.01	3691.08				3712.68
3/9/2008				3584.9										
3/24/2008														
3/30/2008														
3/31/2008														
4/1/2008										3691.03		3709.1		
4/21/2008										3690.99		3709.52		
4/22/2008														
4/29/2008				3585.21	3584.19	3689.81	3692.64							
5/8/2008														
5/12/2008														
5/19/2008						3689.45	3692.32							3713.64
5/21/2008														
5/28/2008								3701.23	3699.92	3690.47		3709.32		
5/29/2008													3695.87	
5/30/2008														
6/1/2008														
6/9/2008				3585.27	3584.45									
6/10/2008														
6/23/2008														
6/24/2008														
6/25/2008								3701.18	3699.89	3690.06		3709.14		

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	12	38	49	607	608	609	610	613	614	615	619	622	628	631
Formation	Lakota	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Fall River	Fuson	Lakota	Lakota	Fall River	nyan Kara	Fall River
6/30/2008	3652.22	3643.95	3639.69			3689.09	3692.45							
7/1/2008														
7/13/2008														
7/14/2008										3689.69		3709.29		
7/28/2008				3585.49	3584.47	3688.86	3692.22							
n	**3**	**3**	**4**	**8**	**3**	**11**	**11**	**6**	**6**	**9**	**2**	**6**	**7**	**6**
Average	**3653.06**	**3644.07**	**3640.92**	**3585.09**	**3584.37**	**3689.67**	**3692.86**	**3701.21**	**3700.02**	**3690.8**	**3679.16**	**3709.4**	**3695.87**	**3714.92**

Notes: Water surface elevation (WSE) calculated by subtracting depth measurement from or adding pressure measurement (converted to water head in feet) to measuring point elevation (MPE).

WSE = MPE +/- (measured depth or measured pressure)

Conversion of pressure measurement (psi) to head (ft) uses density of water at 4C

Head (feet of H_2O) = Measured Pressure (lb / in^2) x 144 (in^2 / ft^2) x 0.01602 (ft^3 / lb)

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	650	668	680	681	685	688	689	694	695	696	697	698	3026	8002	8003
Formation	Lakota	Inyan Kara	Lakota	Fall River	Fall River	Fall River	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Lakota	Lakota	Unknown
SubSurface (SS) or Free-Flowing (FF)	SS	FF	SS	FF	FF	SS	FF	FF	FF	FF	FF	SS	SS	FF	FF
Targeted Measurement Frequency	Quarterly	Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Quarterly	Quarterly
Surveyed Well Casing Elevation, ft			3701.94	3626.99	3627.85	3701.26	3627.27	3598.29	3597.8	3597.96	3597.69	3714.25	3820.48		
Stick Up (Well Casing Mark), ft			0.26	-0.15	-0.12	-0.04	-0.12	-1.71	-3.13	-1.94	-2.56	-0.23	-0.2		
Surveyed Control Point Elevation, ft	3821.06	3624.14												3543.42	3543.16
Stick Up (Control Point), ft	-0.56	-1.17												-1.43	-1.34
Calculated Measuring Point Elevation, ft	**3821.62**	**3625.31**	**3701.68**	**3627.14**	**3627.97**	**3701.3**	**3627.39**	**3600**	**3600.93**	**3599.9**	**3600.25**	**3714.48**	**3820.68**	**3544.85**	**3544.5**
Well No.	650	668	680	681	685	688	689	694	695	696	697	698	3026	8002	8003
Units	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet	Feet
9/25/2007															
9/26/2007														3574.83	
9/27/2007															
10/2/2007	3682.35														
10/9/2007		3650.68													
10/26/2007															
11/9/2007	3682.35	3650.68													
11/14/2007															

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	650	668	680	681	685	688	689	694	695	696	697	698	3026	8002	8003
Formation	Lakota	Inyan Kara	Lakota	Fall River	Fall River	Fall River	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Lakota	Lakota	Unknown
11/19/2007															
11/27/2007		3652.99													
12/11/2007														3579.45	
1/11/2008			3662.69												
1/30/2008			3662.68												
2/3/2008			3662.73												
2/5/2008														3578.64	3563.35
2/20/2008	3682.13														
2/21/2008															
3/6/2008															
3/9/2008		3649.88	3662.41												
3/24/2008	3681.92														
3/30/2008								3648.48	3634.12		3679.14	3680.02	3681.89		
3/31/2008			3662.33												
4/1/2008															
4/21/2008			3660.88			3662.22									
4/22/2008									3630.68		3679.85	3679.98	3681.77		
4/29/2008															
5/8/2008							3685.02								
5/12/2008				3644.75											
5/19/2008									3630.26						
5/21/2008								3648.09			3679.6		3682.13		
5/28/2008						3661.26						3679.68	3681.73		
5/29/2008															
5/30/2008	3682														
6/1/2008			3661.85												
6/9/2008															
6/10/2008			3660.56			3669.41									
6/23/2008									3631.05						
6/24/2008								3648.81			3680.8	3679.88	3681.85		
6/25/2008				3642.95		3662.45	3685.6								

POWERTECH (USA) INC.

Water Levels in Inyan Kara Wells

Well No.	650	668	680	681	685	688	689	694	695	696	697	698	3026	8002	8003
Formation	Lakota	Inyan Kara	Lakota	Fall River	Fall River	Fall River	Lakota	Fall River	Fall River	Lakota	Lakota	Fall River	Lakota	Lakota	Unknown
6/30/2008		3649.65				3662.01									
7/1/2008				3641.99			3685.43								
7/13/2008									3631.95				3681.78		
7/14/2008				3639.89			3681.62	3648.63			3680.66	3679.87			
7/28/2008						3662.68									
n	**5**	**5**	**8**	**4**	**0**	**6**	**4**	**4**	**5**	**0**	**5**	**5**	**6**	**3**	**1**
Average	**3682.2**	**3650.8**	**3662**	**3642.4**		**3663.3**	**3684.4**	**3648.5**	**3631.6**		**3680**	**3679.9**	**3681.9**	**3577.6**	**3563.4**

Water surface elevation (WSE) calculated by subtracting depth measurement from or adding pressure measurement (converted to water head in feet) to measuring point elevation (MPE).

WSE = MPE +/- (measured depth or measured pressure)

Conversion of pressure measurement (psi) to head (ft) uses density of water at 4C

Head (feet of H2O) = Measured Pressure (lb / in^2) x 144 (in^2 / ft^2) x 0.01602 (ft^3 / lb)

POWERTECH (USA) INC.

APPENDIX 7.9-B

DEWEY-BURDOCK PUMPING TEST

Knight Piésold
CONSULTING

Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests:
Results and Analysis

November 2008

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Rev. No.	Date	Description	Knight Piésold	Client
0	November 2008	Final to Client	Paul Bergstrom	Powertech (USA)

Knight Piésold
CONSULTING

Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests:
Results and Analysis

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Knight Piésold CONSULTING

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Knight Piésold
CONSULTING

Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests:
Results and Analysis

1.0 Introduction

Powertech Uranium Corp. (Powertech) is submitting an application to the United States Nuclear Regulatory Commission (USNRC) for the Radioactive Source Materials License to develop and operate the Dewey-Burdock Uranium Project using in-situ recovery (ISR) methods. The project is located near Edgemont, South Dakota in Custer and Fall River Counties and will consist of injection and production well fields and a central processing plant (ion exchange resin columns and yellowcake dryer) to recover the final uranium product.

Figure 1.1 shows the project location and license boundary. The Project is located approximately 12 miles north-northwest of Edgemont, South Dakota and spans northern Fall River and southern Custer Counties. The project boundary encompasses approximately 11,000 acres of private land on either side of County Road 6463. The Dewey-Burdock project will operate uranium ISR production facilities at both the Dewey and Burdock project areas, with a central processing plant located at the Burdock site. It is anticipated that the ISR well fields at each site will operate at an estimated flow rates of between 1500 gallons per minute (gpm) to 2000 gpm. Net withdrawal of groundwater during ISR leaching operations is expected to be 0.5 to 3 percent of total flow, or 10 to 60 gpm at each site. Total production from both sites is expected to produce approximately 1,000,000 pounds of U_3O_8 per year.

1.1 Objectives

USNRC NUREG 1569 Sections 2.7.2 and 2.7.3, Hydrology, Review Procedures (3) and Acceptance Criteria (3), describe the type of information and analyses that can fulfill the requirements for a description of Site hydrogeology. Consistent with the examples provided in the NUREG sections referenced above, the objective of this report is to provide the determinations of aquifer properties obtained with two pumping tests together with the results of laboratory tests Powertech conducted on related core samples. The pumping tests are interpreted in the context of geological and hydrogeological data that are summarized here and presented authoritatively in greater detail in NRC Technical Report Sections 2.6 and 2.7. The more detailed information presented outside this report consists of: (1) geologic cross-sections, including the underlying electric log data from test pumping wells, test observation wells and nearby exploration boreholes; (2) isopach maps of the production zone, overlying confining units and aquifers and underlying confining units and aquifers; and (3) potentiometric surface maps of the major aquifers.

Other information prescribed in NUREG 1569 Section 2.7.1, Hydrology, Areas of Review (3), notably soil survey and baseline groundwater quality information, is presented in separate reports. It is noted that the pumping tests described here are not intended to replace well field-scale pumping tests that are proposed to be conducted prior to startup of each particular mine unit. The following information is included in this report:

- Site location maps
- A summary of previous pumping test results
- A synopsis of geologic and hydrogeologic information for the Project Area relevant to the interpretation of pumping tests, including detailed conceptual stratigraphic cross-sections illustrating the test layouts relative to ore-body features
- Presentation of the pumping test results, including raw test data (drawdown graphs) that provide overall response characteristics for all wells monitored during the tests
- Interpretation of aquifer parameters using type curve matches and other methods of parameter determinations
- Interpretation, based on the communication of pumping and observation wells that it is likely feasible to conduct ISR mining within limited portions of the major aquifers
- Interpretation, based on the pumping test data and laboratory core data, that there is likely additional vertical containment between major aquitards overlying and underlying the major aquifers

1.2 Report Organization

This report includes seven sections. Section 1 (this section) is the introduction. Section 2 describes site-specific geologic and hydrogeologic conditions followed by a summary of previous aquifer tests in the period 1979 to 1982. Section 3 describes the general procedures for well installation, test equipment used, background measurements, and data processing procedures for the pumping tests. Details of the background monitoring and analysis are provided in Appendix A-1, and Appendix A-2 provides an overview of pumping test interpretation methods, theoretical considerations, and spreadsheet tools used for test analysis. Section 4 describes the results and analysis of the pumping test at the Dewey test location; Appendix B provides backup data for the Dewey Pumping Test including well completion diagrams, processed time-drawdown data used to perform the test analysis, and the determinations of aquifer parameters with graphical methods not directly presented in the text. Similarly, Section 5 describes the results and analysis at the Burdock test location and Appendix C provides the related data for the Burdock test. Section 6 is a summary of laboratory core testing information and Appendix D provides the laboratory data report for the core testing. Section 7 is a summary describing major conclusions from the testing. Appendix E is a CD-ROM that contains the raw digital pressure transducer data in binary files.

1.3 Limitations and Disclaimer

This report entitled "Powertech (USA) Inc., Dewey-Burdock Project, 2008 Pumping Tests: Results and Analysis" has been prepared by Knight Piésold and Co. for the exclusive use of Powertech (USA) Inc. No other party is an intended beneficiary of this report or the information, opinions, and conclusions contained herein. Any use by any party other than Powertech (USA) Inc. of any of the information, opinions, or conclusions is the sole responsibility of said party. The use of this report shall be at the sole risk of the user regardless of any fault or negligence of Powertech (USA) Inc. or Knight Piésold and Co.

The information and analyses contained herein have been completed to a level of detail commensurate with the objectives of the assignment. This report and its supporting documentation have been reviewed and/or checked for conformance with industry-accepted norms and applicable government regulations. Calculations and computer simulations have been checked and verified for reasonableness, and the content of the report has been reviewed for completeness, accuracy, and appropriateness of conclusions. To the best of the information and belief of Knight Piésold and Co. the information presented in this report is accurate to within the limitations specified herein.

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2.0 Site Characterization

This section presents a synopsis of geologic and hydrogeologic information. Section 2.1 presents geologic information (see Figure 2.2) taken from Section 2.6 of the USNRC Technical Report. Section 2.2 presents hydrogeologic information presented in Section 2.7 of the Technical Report. Section 2.3 describes the history of previous aquifer testing in relation to uranium exploration and development.

2.1 Stratigraphy

The sedimentary rocks of interest that underlie the Dewey-Burdock Project range in age from Upper Jurassic to Early Cretaceous. These are the Upper Jurassic Sundance Formation, the Unkpapa Formation, and the Morrison Formation. The Early Cretaceous Lakota Formation, the Fall River Formation, the Skull Creek Shale Formation and the Mowry Shale Formation. Figure 2.1.

Underlying these, are rocks that range in age from Cambrian to Pennsylvanian in age. The sediments exposed at the Dewey-Burdock Project are of Early Cretaceous age.

2.1.1 Overlying Unit: Skull Creek Formation Shales

The combined Skull Creek Shale – Mowry Shale reaches a thickness of 400 ft (ft) in the western part of the Dewey-Burdock project.

Mowry Shale

The Mowry Shale consists of light gray marine shale with minor amounts of siltstone, fine grained sandstone, and a few thin beds of bentonite.

Newcastle Sandstone Formation

The Newcastle Sandstone, normally occurring between the Skull Creek Shale and the Mowry Shale, is composed of fine-grained sandstone interbedded with siltstones. This formation is discontinuous across the region and is absent across the project area. At the Dewey-Burdock Project the Skull Creek Shale is directly overlain by the Mowry shale.

Skull Creek Shale Formation

The Skull Creek Shale is a sequence of dark-gray to black marine shales. The Skull Creek shale consists of black shale, organic material, and some silt sized quartz grains. The Skull Creek

Shale has a thickness of approximately 200 ft. The Skull Creek Shale is eroded from the eastern parts of the project.

2.1.2 Inyan Kara Group: Fall River Formation and Lakota Formation Sandstones

Inyan Kara Group

The Early Cretaceous Inyan Kara Group consists of two formations, the Lakota and the Fall River. The Inyan Kara is composed of interbedded sandstone siltstone and shale. The depositional environment of the Inyan Kara is fluvial to marginal marine.

Fall River Formation

The Fall River formation is composed of carbonaceous interbedded siltstone and sandstone, channel sandstones, and a sequence of interbedded sandstone and shale. The lower part of the Fall River consists of dark carbonaceous siltstone interbedded with thin laminations of fine-grained sandstone. Channels were cut into this interbedded sequence by northwest flowing rivers and fluvial sandstones were deposited. These channel sandstones occur across various parts of the Dewey-Burdock Project and generally contain the uranium deposits. Overlying the channel sandstones is another sequence of alternating sandstone and shales.

Lakota Formation

The Lakota Formation consists of three members, from lower to upper is the **Chilson** Member, the **Minnewasta Limestone** Member and the **Fuson** Member.

The **Minnewasta Limestone** Member is not present in the Dewey-Burdock Project area.

The **Chilson** Member is composed largely of fluvial deposits. These deposits consist of sandstone, shale, siltstone, and shale. The unit consists of a complex of channel sandstone deposits and their fine-grained equivalents. The unit contains uranium deposits.

The **Fuson** Member is the upper most member of the Lakota Formation and the shale-siltstone portion of the Fuson has been used to divide the Lakota Formation from the Fall River Formation.

The Fuson is described as having a lower discontinuous sandstone unit at its' base and an upper discontinuous sandstone at the top of the member. If present the lower sandstone unit was mapped as a Lakota sandstone. Similarly if the upper sandstone was present it was mapped as a Fall River sandstone. The Lakota was deposited by a northwest flowing river system.

2.1.3 Underlying Units: Morrison Formation Shale and Unkpapa/Sundance Formation Sandstone

Morrison Formation

The Upper Jurassic Morrison Formation was deposited as flood plain deposits. It is composed of waxy, unctuous, calcareous, noncarbonaceous massive shale with numerous limestone lenses and a few thin fine grained sandstones.

Unkpapa Formation

Overlying the Sundance Formation is a sandstone unit that has been called the Unkpapa formation. The Unkpapa is a massive fine grained sandstone that was deposited as sand dunes.

Sundance Formation

The Sundance Formation of Upper Jurassic age consists of marine rocks composed of red shales and sandstones. The Sundance has been subdivided into five members. In ascending order they are the **Canyon Springs** sandstone member, the **Stockade Beaver** shale member, the **Hulett** sandstone member, the **Lak** member, and the **Redwater** shale member.

2.2 Hydrogeologic Conditions: Potentiometric Surface and Hydraulic Gradient

Groundwaters within the Inyan Kara formations are under artesian conditions in much of the Dewey-Burdock area. Some wells are known to have flowed for years. Figure 2.3 is a potentiometric surface map of the Fall River Formation aquifer within the Inyan Kara group. The map is based on measurements made in 2008. Based on Figure 2.3, groundwater flow direction in the Fall River aquifer is generally to the southwest, consistent with the topography of the broad Black Hills domal uplift, with significant components either more southerly or more westerly as reflected by the curvature of the potentiometric surface equipotential lines.

Groundwater gradient in the Fall River aquifer varies significantly throughout the project area. Near the outcrop areas upgradient of both the Dewey and Burdock project portions of the Site, the gradient is about 20 to 25 ft per mile (0.0038 to 0.0047 feet per foot [ft/ft]). At the Burdock portion of the Site, the Fall River aquifer gradient flattens to about 14 ft per mile (0.0026 ft/ft) extending downgradient to the southwestern project boundary. At the Dewey portion of the Site, however, the groundwater gradient in the Fall River aquifer increases sharply to as much as about 52 ft per mile [0.01 ft/ft] within the central portion of the project area.

Figure 2.4 is a potentiometric surface map of the Lakota Formation aquifer below the Fall River aquifer within the Inyan Kara Group, based on measurements made in 2008. Groundwater flow direction is generally to the southwest with locally more southerly component. At the Burdock portion of the site, the groundwater gradient is relatively uniform from the outcrop area to the project boundary, about 18 ft per mile (about 0.0034 ft/ft). At the Dewey portion of the site Figure 2.4 indicates a somewhat flatter overall gradient, about 16 ft per mile (0.003 ft/ft). However, within the central portion of the Dewey project area there a broad area where the potentiometric surface elevations in the Lakota are between 3,680 and 3,690 ft above mean sea level (amsl).

The variations in the potentiometric surfaces in both Inyan Kara formations produce variations in the direction of vertical gradients throughout the project area. At the Burdock portion of the Site, the potentiometric surface in the Fall River aquifer is generally close to that in underlying Lakota (Chilson) aquifer; where there are differences, the Fall River appears to be slightly higher in elevation by a few (less than five) feet. This indicates minimal overall vertical gradients with possible downward flow direction between the two formations through the intervening Fuson Member of the Lakota Formation.

By contrast, at the Dewey portion of the Site there are areas where the potentiometric surface in the Lakota Formation is 20 to 30 ft higher than in the overlying Fall River Formation, indicating a vertically upward gradient. This is consistent with the character of the intervening Fuson Member in previous pumping tests, described in Section 2.6 below, where the Fuson was described as leaky in the Burdock area but a more effective aquitard in the Dewey area. This was also noted in earlier investigations (Keene, 1973, p. 26), which stated that “pressures in the Lakota Formation appear greater than those of the Fall River aquifer in the northwestern townships of the [Fall River] county. This is reasonable when one considers the higher intake elevation of the Lakota Formation, the greater thickness of the Chilson Member than the Fall River sands, and the smaller production from the Lakota aquifer.”

Figure 2.5 is a potentiometric surface map of the Unkpapa aquifer below the Inyan Kara group, based on measurements made in 2008 at four locations. The potentiometric surface in the Unkpapa Formation indicates groundwater flow direction to the southwest with locally more southerly components. Overall gradient is about 100 ft per 3 miles, which corresponds to an average gradient of about 0.006 ft/ft. The potentiometric surface elevation is generally about 50 to 100 ft higher in both the overlying Lakota and Fall River Formation aquifers. This indicates vertical upward gradients between the Unkpapa Formation, the intervening Morrison Formation and the Inyan Kara Group. The Morrison Formation thus appears to function as an effective aquitard throughout the project area.

2.3 Summary of Previous Aquifer Testing Results

The Tennessee Valley Authority (TVA) conducted groundwater pumping tests from 1977 through 1982 as part of a uranium mine development project near the towns of Edgemont and Dewey, South Dakota. TVA produced two summary pumping test reports, "Analysis of Aquifer Tests Conducted at the Proposed Burdock Uranium Mine Site" (Boggs and Jenkins, 1980) and "Hydrogeologic Investigations at Proposed Uranium Mine Near Dewey, South Dakota" (Boggs, 1983). In addition, TVA prepared a draft Environmental Impact Statement for the proposed Edgemont Uranium Mine in 1979.

TVA first conducted two unsuccessful tests in 1977 at the Burdock test site. The results of the 1977 tests were considered inconclusive because of various problems including questionable discharge measurements, some observation wells improperly constructed, and some pressure gauges malfunctioned. No data from the 1977 tests are currently available.

TVA conducted three successful pumping tests, two in 1979 near the current Burdock Project Area, and one in 1982 about two miles north of the current Dewey Project Area. The results of these successful tests are described in separate sections below. However, no data for these tests, in particular electronic records of drawdown, are available, other than information contained in the reports.

2.3.1 Dewey Project Area

The Dewey test was conducted in 1982 northeast of the Dewey Road at the location shown on Figure 1.1. The test consisted of pumping in the Lakota formation for 11 days at an average rate of 495 gpm. The test developed the following information:

- Transmissivity of the Lakota averaged about 4,400 gallons per day per foot (gpd/ft) which is equivalent to 590 ft squared per day (ft^2/day).
- Storativity of the Lakota was about 1.0×10^{-4} (dimensionless).

- There was response between the Fall River and Lakota formations through the intervening Fuson shale-siltstone member that was manifested at relatively late time (3000 to 10000 minutes).

- The vertical hydraulic conductivity of the Fuson aquitard using the Neuman-Witherspoon ratio method (Neuman and Witherspoon, 1973) was 2×10^{-4} ft/day; storativity of the Fuson Member was not determined and specific storage was about 7×10^{-7} ft^{-1}.

- A barrier boundary, or a decrease in transmissivity due to lithologic changes with distance from the test site, or both, were observed; a possible geologic feature corresponding to a barrier was noted to be the Dewey Fault Zone, located about 1.5 miles north of the test site, where the Lakota and Fall River formations are structurally offset.

2.3.2 Burdock Project Area

The Burdock tests were conducted in 1979 near the Dewey road at the location shown on Figure 1.1. The Burdock tests consisted of separate pumping tests from the Lakota (Chilson) and Fall River Aquifer, respectively in April and July of 1979. The tests used the same pumping well with packers to alternately isolate screens open to the respective formations. Test durations were 73 hours for the Lakota test and 49 hours for the Fall River test. Pumping rates were about 200 gpm from the Lakota aquifer and 8.5 gpm from the Fall River. The reason for the unexpected low pumping rate from the Fall River aquifer was not specified in the TVA report.

The tests developed the following information:

- Interpreted transmissivity of the Lakota was based on analysis of later time data and inferred decreasing transmissivity with distance from the test site due to changes in lithology; overall transmissivity averaged about 1,400 gpd/ft (190 ft^2/day) and storativity about 1.8×10^{-4} (dimensionless); maximum transmissivity from early time data was about 2,300 gpd/ft (310 ft^2/day).

- Transmissivity of the Fall River averaged about 400 gpd/ft (54 ft^2/day) and storativity about 1.4×10^{-5} (dimensionless).

- There was communication between the Fall River and Lakota formations through the intervening Fuson shale-siltstone member; leaky behavior was observed in the Fall River Formation and believed to exist in the Lakota although “leakage effects in the Lakota drawdown data are masked by the conflicting effect of a decreasing transmissivity in site vicinity” (p. 16 in Boggs and Jenkins, 1980).

- The vertical hydraulic conductivity of the Fuson aquitard determined with the Neuman-Witherspoon ratio method (Neuman and Witherspoon, 1973) ranged from

10^{-3} to 10^{-4} ft/day; storativity was not determined, and specific storage was assumed to be about 10^{-6} ft^{-1}.

3.0 2008 Pumping Tests: Design and Procedures

In 2008 pumping tests were performed at both the Dewey and Burdock project areas. A work plan (Knight Piésold, 2008) was prepared and distributed to interested representatives of State and Federal agencies, including the South Dakota DENR and the USEPA. Individual production zones within the Inyan Kara Group will likely be on the order of 10 to 15 ft thick to target ore horizons in both the Fall River and Lakota aquifers. Uranium ore is often located at different horizons in both aquifers at the same spatial locations (Drawings 4.1, 4.2, 5.1, 5.2 and 5.3).

Powertech performed geologic interpretations, well design, well installation and mechanical integrity testing. Well completions are described in detail for the test layout at each of the Dewey and Burdock project areas (Sections 4 and 5). Field activities for the Dewey and Burdock pumping tests were jointly performed by Powertech and Knight Piésold personnel. Aquifer test analyses were performed and this aquifer testing report was written by Knight Piésold.

3.1 Well Installation, Completion and Mechanical Integrity Testing

Well bores are drilled to diameters specified in SDDENR regulations. New casing is set and 15.2 pounds per gallon (lb/gal) cement is positively displaced into the annulus. After a cement cure time not less than 24 hours, the well is pressured up with air for a minimum of 1 hour. After the mechanical integrity test has passed, the well is developed until the water runs clear, and the screen is then pushed into place. The casing is cut off to 2.5 ft above ground surface and capped. Applicable reports are filed with the State. Wells are not used under conditions that do not meet manufacturer's recommendations and specifications for its type (SDA74:02:04:42).

3.2 Pumping Test Equipment and Facilities

Powertech personnel installed the pumping and monitoring equipment prior to testing. Knight Piésold verified the performance of the pumping test equipment by conducting step-drawdown tests at each site. Thereafter, Knight Piésold performed or supervised pump operations throughout the constant rate tests together with the datalogger programming and day-to-day downloads of data.

The tests were performed using a 5-horsepower (Hp) electrical submersible pump powered by a portable generator. At each site the pump was set at 300 ft with 2-inch diameter drop pipe. Surface flow monitoring equipment were Cameron 1-inch NUFLO™ flowmeters and MP-III™ digital flow analyzer with readout of instantaneous flow and totalizer of flow. In accordance with the temporary discharge permit received from South Dakota DENR, the pump discharge water was piped to temporary holding ponds via 1 1/4-inch diameter high density polyethylene plastic pipe. Throughout the tests, a portion of the discharge water was routed through a YSI™ flow-through cell with multi-parameter probe that read field parameters (temperature, pH, conductivity, dissolved oxygen and turbidity) that were recorded twice daily through pumping phases of the tests.

Water levels in each well were measured and recorded with vented In-Situ™ Level TROLL™ pressure transducers with built in data loggers. The pressure ratings for the transducers range from 100 to 300 pounds per square inch (psi). Transducer accuracy (in comparison to known pressure or other pressure reading devices) is stated by the manufacturer to be ±0.1 percent of full-scale reading (i.e., 100 to 300 psi), so the limit of accuracy varies from 0.1 to 0.3 psi, or about 0.2 to 0.7 ft. Transducer sensitivity is stated to be ±0.01 percent of full-scale, resulting in sensitivity limits of about 0.01 to 0.03 psi, or 0.02 to 0.07 ft.

The sequence of events before and during the 2008 pumping tests is summarized in Figures 3.1 and 3.2. Figure 3.1 illustrates background pressure transducer and site barometer measurements that are described in Section 3.3, below. Evaluation of the background monitoring data produced several methods for correcting water levels; however, after these were applied on a test data set it was concluded that necessary corrections to water level data were minimal and that the test interpretations could equally well rely on uncorrected time-drawdown data.

Figure 3.2 displays output from the discharge flow data logger that is described in Section 3.4, below.

3.3 Background Monitoring and Water Level Corrections

Pressure transducers were installed in wells at both sites by April 2, 2008 in order to obtain background groundwater level measurements. At the Burdock test site, a transducer was installed in the designated pumping well (DB07-11-11C) in the lower Lakota Formation. At the Dewey test site, a transducer was installed in observation well (DB07-32-4C), screened in the same zone as the pumping well in the lower Fall River Formation. The right hand axis of Figure 3.1 graphs hourly barometric pressure measurements in millibars obtained from the meteorological station installed at the site. The site station is maintained by South Dakota State University (SDSU) and data are available at the following URL: “http://climate.sdstate.edu/awdn/edgemont/archive3.asp”.

One month of background measurements were obtained from April 8 to May 9, 2008 (Figure 3.1). Background measurements shown on Figure 3.1 fluctuate over a range of about 0.4 psi with the expected inverse relationship between site barometer readings and increases/decreases in groundwater levels. There are also smaller cyclic sinusoidal variations that occur twice daily and are attributable to Earth tide cycles. A period of two weeks (April 23 to May 8, 2008) after pump installation and initial testing produced undisturbed background water level data.

Three types of water level correction procedures were evaluated using the background monitoring data. The first procedure was manually correcting the transducer psi values with a constant barometric efficiency (BE) determined for each major aquifer (e.g., Kruseman and de Ridder, 1991). The BE is defined as the change in water level in a well versus a related change in atmospheric pressure. Gontheir (2007) describes the historical methods of determining BE, which by convention is dimensionless and ranges from zero to one.

The second type of correction that was evaluated considers additional factors, chiefly long-term seasonal trends and Earth tides (Gontheir, 2007). A spreadsheet distributed by the USGS as an open-file report (Halford, 2006) has programming that empirically factors the overall water level response into multiple synthetically generated time series with adjustments to both phase and amplitude of each component (see Appendix A.1, Figures A.1-3 and A.1-4). The USGS spreadsheet was used to determine that the Dewey background water level data from April 23 to May 8, 2008, could be closely matched as a series of four components: (1) water level increase at a linear rate [i.e., slope], (2) variation in air pressure measured with the site barometer, (3 and 4) two Earth tide components.

The third type of correction procedure evaluated was a computer method known as BETCO (Sandia Corporation, 2005; Toll and Rasmussen, 2006). This software is available at "http://www.sandia.gov/betco/". To correct data, water level, time and barometric pressure are input and BETCO calculates corrected water level values. Compared with the manual BE correction, the corrected water levels calculated in BETCO yielded similar results, generally within about ± 0.01 psi.

The manual BE method was judged to be better than the BETCO computer method for the background calibration period examined (Appendix A). Moreover, both the BETCO and USGS methods were difficult to apply with confidence to the drawdown data after the background monitoring period because wells with similar construction to the pumping test wells, but outside the area of test influence, are not available to validate the corrections. A further difficulty with the BETCO and USGS computer methods is that they do not accommodate logarithmic measurement times as input data.

To examine the possible importance of BE corrections on water levels, the drawdown phase of the Dewey test was manually corrected with a BE of 0.48 (see Figure A.1-1 in Appendix A) relative to the site barometer over the test period. The maximum effect of the BE correction was to add about 0.2 ft to the water levels at the end of the drawdown phase due to an overall barometric pressure decline of about 15 millibars (i.e., from about 1,030 to 1,015 millibars, Figure 3.1). Test interpretations (Theis drawdown) were made with and without the BE corrections for the Dewey test. The corrections were found to have no discernable effect on the visual fits to type curves. Because the changes in barometric pressure during the 3-day constant rate tests at Burdock and Dewey were similar (Figure 3.1), the analysis determined that BE corrections would be no greater for the Burdock test compared to the Dewey test. Therefore, corrections to water level data were not further performed and the test interpretations rely on uncorrected time-drawdown data.

3.4 Test Procedures, Data Collection, Data Processing

The discharge flow data logger was set to record at hourly intervals and was downloaded at the end of the tests (Figure 3.2). The discharge flow rate was adjusted with a manual gate valve. Step-drawdown tests were performed on May 12 and 13, 2008 (Figures 3.1 and 3.2). The step-drawdown tests consisted of four steps at 10 gpm, 20 gpm, 25 gpm, and 30 gpm for a minimum of 90 minutes at each step. The step-drawdown data indicated successful performance of all equipment at both test sites. Subsequent analysis of the step-drawdown data was not performed due to the better quality (i.e., much longer time) data obtained from the constant rate tests for determining both aquifer parameters and well efficiencies.

Constant rate tests were performed on May 15 to May 18, 2008 at Dewey and from May 18 to May 21, 2008 at Burdock (Figures 3.1 and 3.2) after recovery from the step-rate tests. At both test sites the recorded hourly flow rates during the constant rate tests varied no more than 2 percent (between 30.0 and 30.7 gpm) throughout the tests and the pumping rates for the entire 3-day tests at each site averaged 30.2 gpm.

The data loggers in all wells were synchronized to the same clock-time immediately prior to start-up. To collect closely-spaced measurements during the start-up of the drawdown phase of the test, the transducers were programmed to record temperature and psi measurements at one-second intervals for two hours, then at ten second-intervals for 70 to 72 hours. For recovery, the data loggers returned to a measurement frequency of one-second for two hours, during which time the pump was shut off, followed by ten-second measurement intervals thereafter.

The time-drawdown data output from the data loggers consisted of two hours of data at one-second intervals followed by 72 or 74 hours of data collected at ten-second intervals, with the sequence repeated for the recovery phase. The WinSitu™ software produced drawdown graphs that are reproduced in Sections 4 and 5. The software exported records to text ".csv" files with approximately 60,000 to 70,000 records for each well. The time-drawdown data were processed using a custom FORTRAN program that wrote data records to an output file based on a template file specifying which date-time records would be written. The template file was prepared to produce logarithmically spaced data with 30 records per log cycle (in seconds). Due to slight variations in transducer output and the precision of the Microsoft Excel date-time format, there are some ± one-second variations in the sequences of records from well to well.

The FORTRAN program also converted transducer psi to drawdown in ft using formulas described in Appendix A. The reference value for zero drawdown was set as the average of psi readings from the start of the data log to the time just prior to test startup. Separate time-drawdown files were prepared for both drawdown and recovery phases of the tests. Tables of the processed time-drawdown data used for test interpretations are provided in Appendices B and C. Complete binary files with the raw data for each well in Win-Situ™ format are also provided on a CD-ROM in Appendix E.

4.0 Dewey Project Area Pumping Test

4.1 Test Layout and Initial Potentiometric Surface Measurements

The Dewey pumping test well is located in NE ¼ NW ¼ Sec. 32, T.6S, R.1E, Custer County, South Dakota (Figure 4.1, Table 4.1). Powertech completed the pumping well (DB07-32-3C) with a fifteen-ft screen within the lower sandstone layer in the Fall River Formation near the roll front ore zones (Drawings 4.1 and 4.2). Three new observation wells were similarly screened at the same stratigraphic horizon within the lower Fall River Formation, located at radial distances of 265, 467 and 2,400 ft away from the pumped well (Figure 4.1 Table 4.1). A pre-existing stock watering well (GW-49) was also monitored. The stock well is located approximately 1,400 ft west of the pumped well and is believed (based on a recent electric log) to be an open hole for about 70 ft corresponding to about the top half of the Fall River formation.

Additional information on the design of the pumping test well layout and objectives for test analysis are provided in Appendix A.2. Well Construction diagrams and borehole electric logs for the Dewey test wells are provided, respectively, in Appendices B.1 and B.2.

Within a fifty-ft radius around the pumping well, additional observation wells were completed in a vertical nest in order to provide hydraulic data for the degree of confinement of both the test sandstone horizon and the entire Fall River Formation aquifer. Observation well DB-07-32-9C was screened in the upper Fall River aquifer at 41 ft lateral distance and 95 ft vertically above the screen in pumping well 32-3C. Observation well DB-07-32-10 was located within the underlying Lakota Formation 61 ft laterally and 130 ft vertically below the screen in the pumping well. Observation well DB-07-32-11 was located in the underlying Unkpapa Formation aquifer 50 ft laterally and 325 ft vertically below the screen in pumping well 32-3C.

Piezometric measurements (Eric Krantz, RESPEC, personal communication, May 2008) and well survey data provided by Powertech were used to calculate potentiometric surface elevations in ft above mean sea level with an estimated accuracy of ± 3 ft (Table 4.2). The potentiometric surface elevations for the Unkpapa, Lakota, and Fall River aquifers at the wells in the vertical well nest at the Dewey test site indicate artesian conditions. The three major geologic formations appear to be locally hydraulically isolated with upward vertical gradients, as follows:

- nearly 80 ft head difference upward (Table 4.2) between the Unkpapa and lower Lakota aquifers

- nearly 40 ft head difference upward between the lower Lakota and lower Fall River aquifers
- nearly 20 ft head difference upward between the wells screened in the lower Fall River and upper Fall River formation

4.2 Pumping Rate and Duration

The pumping phase of the constant-rate test at the Dewey area was started at 10:30:09 AM on May 15, 2008 and the pump was shut down at 12:30:59 PM on May 18, 2006, for a total duration of 4,440 minutes or 3.08 days (Figure 3.2). Because of the artesian condition in the pumping zone, the pumping well (32-3C) was shut-in, the pump turned on at 10:29:54 AM and the shut-in valve opened at 10:30:09 AM, the designated starting time of the test. The artesian observation wells had been left open for at least a day prior to startup to test for leakage from gaskets surrounding the transducer cables. Leakage during the constant rate test was not observed at any well except observation well 32-11 in the Unkpapa Formation, as described in Section 4.6, below.

The average pumping rate for the 3.08 day test was 30.2 gpm (Figure 3.2). During drawdown, there was a major flow rate adjustment where the gate valve was opened and throttled back; this occurred from 0.4 to 1.2 minutes and produces a discontinuity on logarithmically displayed time-drawdown data at the pumping well (Figure 4.7). Minor flow rate adjustments were also made at 21, 125, and 2777 minutes into the test that can also be seen on time-drawdown data for the pumping well (Figure 4.7). During recovery, the pumping well was initially left open to discharge water in piping and then shut-in when it was determined that the well was discharging due to artesian flow; this produces a discontinuity shown on the recovery plot for the well (Figure 4.7).

4.3 Responses at Pumping and Observation Wells

Table 4.2 summarizes the responses to pumping for the Dewey test. Figures 4.2, 4.3 and 4.4 display the transducer responses. Drawdown throughout the lower Fall River aquifer was 44.8 ft at the pumping well and ranged from 13.0 to 1.5 ft at the observation wells. Response to pumping varied progressively with distance from the pumping well throughout the lower Fall River: within 3 minutes at the two observation wells at 265 and 467 ft, and response was at 140 minutes at 2,400 ft distance. Similarly, the upper Fall River stock well (GW-49) responded at 40 minutes at 1,400 ft distance (Table 4.2).

However, it took 10.6 minutes for upper Fall River well (32-9C) to respond at 41 ft radial distance and 95 ft vertical distance (Table 4.2. The delayed response at the upper Fall River well is attributed to vertical anisotropy due to shale interbeds overlying the lower sandstone layer (Drawings 4.1 and 4.2).

The pumping and observation wells generally had symmetrical patterns of drawdown response and recovery response, except at the distant observation well 29-7 (Figure 4.3). There, the drawdown began at 140 minutes into the test, and drawdown continued to a maximum of 2.1 ft at about two days after the pump was shut down (Table 4.2). Therefore, the recovery response at well 29-7 was not further analyzed.

4.4 Determination of Aquifer Parameters

Aquifer parameters determined with the Theis drawdown, Theis recovery, Cooper-Jacob drawdown, Theis-Cooper-Jacob recovery, and distance drawdown methods are summarized in Table 4.3. Appendix A provides a definition of the well function parameters (u, u'), a complete description of the methods used, and corresponding assumptions for aquifer parameter determinations. For the straight-line methods, analyses with u or u' > 0.01 are reported but are not considered acceptable, as indicated in the table. Appendix B provides the graphical analyses that determined aquifer parameters at each well listed in Table 4.3.

The following discussion and Figures 4.5 through 4.8 illustrate the overall analysis of the pumping test and exemplify the determination of aquifer parameters with figures illustrating each of the major graphical analysis methods used. The observation well exhibiting the most diagnostic response is discussed first, followed by the drawdown at all observation wells, the drawdown at the pumping well, and finally the recovery at all wells.

4.4.1 Theis Drawdown and Recovery Analysis

Figure 4.5 displays time drawdown data and analysis on the log-log Theis plot for the closest observation well (32-5 at 265 ft distance). The data indicate a confined aquifer response fitting the Theis type curve until latest time, where there is a barrier boundary, where the drawdown increased above the theoretical rate of drawdown. The boundary was encountered at a time of about 0.6 days into the test (Table 4.2). The data at the next closest observation wells (32-4C and the stock well GW-49) also suggest a barrier boundary at times ranging from about 0.7 to 1.9 days into the test (Table 4.2).

Drawdown analyses using the Theis method for all applicable wells (i.e., 32-3C, 32-5, 32-4C, 29-7, and GW-49) are given in Appendix B.4 (Figures B.4-1 through Figure B.4-5) and summarized in Table 4.3. The Theis analyses in Appendix B use test analysis software (AquiferWin32^{TM} ESI, 2003). Input data is weighted to ignore the late-time barrier boundary using an automated curve matching procedure. The weighting for all samples is the same, as follows: time-drawdown data before the first response are ignored, and data after the earliest occurrence of the barrier boundary at any of the wells (0.6 days) are ignored. The aquifer parameters transmissivity and storativity determined with Theis analyses are summarized in Table 4.3.

Figure B.4-6 in Appendix B shows the data at observation well 32-9C, completed in the upper Fall River 41 ft radially and 95 ft vertically from the screened interval in the pumping well. Samples are weighted as described above. This data cannot be interpreted successfully with the Theis analysis because only the middle-time portion of the drawdown closely follows the type curve. The poor fit to the Theis curve for well 32-9C yields a transmissivity of 217 ft^2/d, a value within the range of other observation wells, but a high storativity value of 0.016, which is inappropriate for a confined aquifer (e.g., Freeze and Cherry, 1979, Halford and Kuniansky, 2002). The artificially high storativity is attributed to the time-delay in response. The time-delay is attributed to vertical anisotropy as described in Section 4.3, above. Therefore, aquifer parameters from this well are reported in Table 4.3 but are not considered reliable determinations and are not used in determining the overall average aquifer parameters for the test.

4.4.2 Theis-Cooper-Jacob Straight-line Analysis

Figure 4.6 displays the Theis recovery analysis at the closest observation well 32-5 using automated straight-line fitting in AquiferWin32^{TM} software. Appendix A.2 provides an overview of the theoretical basis for straight-line test analysis and definitions for the terms u', t and t'. Samples are weighted according to (1) the theoretical criterion that u' be < 0.01, which restricts the data to later-time (to the left on the t/t' axis); and (2) the portion of the recovery before the change in slope due the barrier boundary. The sample weighting restricts the matched straight-line portion of the recovery plot to the line-segment shown in Figure 4.6 and a value for the transmissivity, but not storativity, is obtained (Table 4.3).

Figure 4.7 (top) shows a Cooper-Jacob straight-line drawdown plot for the Dewey pumping well 32-3C. This USGS graphical-analysis tool is a spreadsheet that allows manual fitting of the straight-line (Halford and Kuniansky, 2002). The portion of the plot corresponding to later time where is indicated, and this slope is used to determine transmissivity of 250 ft^2/d and well efficiency of 81 percent (Table 4.3).

The bottom portion of Figure 4.7 shows the USGS spreadsheet implementation of the Theis recovery analysis for the pumping well 32-3C, referred to as the Theis-Cooper-Jacob method (Halford and Kuniansky, 2002). Similar to Figure 4.6, the portion of the plot corresponding to later time is indicated to the left on the t/t' axis, and this slope is used to determine transmissivity of 270 ft^2/d (Table 4.3). The recovery plot at the pumping well also shows the change in slope with an increase in rate of drawdown at the latest times which is ignored in the manual fit of the straight-line.

4.4.3 Distance-Drawdown Analysis

Figure 4.8 is distance-drawdown analysis plot that determines transmissivity, storativity, and pumping well efficiency by considering all observation wells at once. The pumping well efficiency of 93 to 95 percent is determined by extending the straight line to the assumed diameter of the pumping well (0.25 ft for the 6-inch diameter well casing or possibly 0.33 ft for the 8-inch diameter borehole) relative to the actual drawdown observed at the pumping well. The aquifer parameters and the high efficiency are somewhat questionable given the relatively poor (r^2 = 0.7) straight-line fit through all data points. However, transmissivity and storativity values obtained are reasonable and the distance drawdown results are included in the overall average aquifer parameters for the test (Table 4.3).

The distance-drawdown analysis also gives the maximum radius of influence of the test. Based on Figure 4.8, the radius of influence was about 5,700 ft, about twice the radial distance to the most distant responding well (i.e., 29-7 at 2,400 ft). The radius of influence may be compared to the dimensions of prospective well fields in the area to evaluate whether aquifer parameters have been adequately characterized.

4.4.4 Summary of Dewey Test – Lower Fall River Formation Aquifer Parameters

The aquifer parameters determined by the techniques described above are summarized in Table 5.3. Ten accepted determinations of transmissivity (outlined) range from 180 to 330 ft^2/day and the mean and median are close at 251 to 255 ft^2/day. The five accepted storativity determinations ranged from 2.3 x 10^{-5} to 2.0 x 10^{-4}. The geometric mean and median storativity values are respectively 5.2 to 4.6 x 10^{-5}. The median transmissivity of 255 ft^2/day and median storativity of 4.6 x 10^{-5} are considered the best measures of the central tendency of the test results.

4.5 Underlying Lakota Aquifer Test Results

Observation well (DB-07-32-10, Figure 4.1, Drawing 4.2) was located within the underlying Lakota Formation 61 ft laterally and 130 ft vertically below the screen in pumping well 32-3C. Figure 4.4 illustrates that there was no response of observation well 32-10 to the drawdown or recovery phases at the pumping well 32-3C. Therefore, there was no further analysis of this observation well.

4.6 Underlying Unkpapa Aquifer Test Results

Observation well DB-07-32-11 is screened in the underlying Unkpapa Formation aquifer 50 ft radially and 325 ft vertically below the screen in pumping well 32-3C (Table 4.1). Figure 4.4 depicts a generally rising trend in transducer response with sinusoidal variations associated with Earth tides indicating the aquifer remained undisturbed when the pump was turned on and turned off. Mid-way through the recovery, a shift in the pressure response on May 20, 2008 was noted similar to when leaks in the gasket-seal were observed previously. The threaded cap and gasket were checked on May 21, 2008 and found to be moist suggesting that a temporary leak may have occurred.

Figure 4.4 illustrates that there was no response of observation well 32-11 to the drawdown or recovery phases at the pumping well 32-3C. Therefore, there was no further analysis of this observation well.

5.0 Burdock Project Area Pumping Test

5.1 Test Layout and Initial Potentiometric Surface Measurements

The Burdock pumping test well is located in NE ¼ SW ¼ Sec. 11, T.7S, R.1E, Fall River County, South Dakota (Figure 5.1, Table 5.1). Powertech completed the pumping well (DB07-11-11C) with a ten-ft screen within a lower sandstone layer in the Lakota (Chilson) formation. Hereafter, the term Lakota is used to refer to the Chilson member of the Lakota formation. The ten-ft screen was set near the horizon of the lower Lakota ore zone(s), indicated by the roll fronts on Drawings 5.1 through 5.3. Three new observation wells were similarly screened at the same stratigraphic horizon within the lower Lakota Formation, located at radial distances of 243, 250 and 1,292 ft away from the pumped well (Figure 5.1, Table 5.1).

Additional information on the design of the pumping test well layout and objectives for test analysis are provided in Appendix A.2. Well Construction diagrams and borehole electric logs for the Burdock test pumping and observation wells are provided respectively, in Appendices C.1 and C.2.

Within a fifty-ft radius around the pumping well, additional observation wells were completed in a vertical nest in order to provide hydraulic data for the degree of confinement of both the test sandstone horizon and the entire Lakota formation aquifer. Observation well DB-07-11-19 was screened in the upper Lakota aquifer at 50 ft lateral distance and 100 ft vertical distance above the screen in pumping well 11-11C. Observation well DB-07-11-19 was located within the overlying Fall River Formation 61 ft laterally and 180 ft vertically above the screen in the pumping well. Observation well DB-07-11-18 was located in the underlying Unkpapa Formation aquifer 50 ft radially and 195 ft vertically below the screen in the pumping well.

Piezometric measurements (Eric Krantz, RESPEC, personal communication, May 2008) and well survey data provided by Powertech were used to calculate potentiometric surface elevations in ft msl with an estimated accuracy of ±3 ft (Table 5.2). The potentiometric surfaces of the Lakota and Fall River aquifers at the wells in the vertical well nest at the Burdock site indicate confined and non-artesian conditions. The two major aquifers (Fall River and Lakota) appear to be locally hydraulically connected through the intervening Fuson Member with minimal vertical gradients because the water levels are similar within ± 2-3 ft (Table 5.2).

Piezometric surface information for the Unkpapa and Lakota/Fall River aquifers indicate that the Unkpapa formation aquifer is artesian and hydraulically isolated with a nearly 70 ft head difference directed vertically upward (Table 5.2).

5.2 Pumping Rate and Duration

The pumping phase of the constant-rate test at the Burdock area was started at 2:20:36 PM on May 18, 2008 and the pump was shut down at 2:30:37 PM on May 21, 2008, for a total duration of 4,320 minutes or 3.0 days. The average pumping rate was 30.2 gpm. A flow rate adjustment was made at 160 minutes into the test that can be seen on logarithmic time-drawdown data for the pumping well (Figure 5.7). The average pumping rate for the 3.0 day test was 30.2 gpm (Figure 3.2).

5.3 Responses at Pumping and Observation Wells

Table 5.2 summarizes the responses to pumping for the Burdock test. Figures 5.2, 5.3 and 5.4 display the transducer responses. Drawdown throughout the lower Lakota aquifer was 91.1 ft at the pumping well and ranged from 17.0 to 3.1 ft at the observation wells. Response to pumping varied with distance from the pumping well in the Lakota aquifer in a non-systematic manner indicating significant lateral and vertical anisotropy, as follows:

- Response was within 3.6 minutes at the observation well (11-14C) at 250 ft distance with 17 ft of ultimate drawdown (Table 5.2).
- But the other lower Lakota observation well at 243 ft distance (11-15) took 140 minutes to respond, with 10 ft of ultimate drawdown.
- Upper Lakota observation well 11-19 took 160 minutes to respond with 3.4 ft ultimate drawdown at 50 ft radial distance and 100 ft vertical distance.
- First response was at 280 minutes at the most distant well (11-2) at 1,292 ft distance.

The responses of close-in well 11-14C and the distant well 11-2 are interpreted as a typical sequence of response to pumping well in a confined aquifer with similar transmissivity connecting all three wells. The delayed response at the upper Lakota well 11-19 is attributable to vertical anisotropy due to shale interbeds overlying the lower sandstone layer (Drawings 5.1 through 5.3). The delayed response of the closest observation well 11-15 requires an explanation in addition to lateral anisotropy. Powertech geologists were contacted and have subsequently indicated that there may have been problems with the installation of well 11-15 because it was subjected to intensive efforts during development.

Figures 5.2 through 5.4 indicate symmetrical patterns of drawdown response and recovery response, such that if the drawdown response was delayed there was a generally similar time before the recovery response (e.g., wells 11-2, and 11-19 on Figure 5.3). The anomalous recovery response at observation well 11-17, screened in the overlying Fall River aquifer, is discussed in Section 5.5, below.

5.4 Determination of Aquifer Parameters

Aquifer parameters determined with the Theis drawdown, Hantush-Jacob drawdown, Cooper-Jacob drawdown, Theis-Cooper-Jacob recovery and distance drawdown methods are summarized in Table 5.3. For the straight-line methods, analyses with u or u' > 0.01 are reported but are not considered acceptable, as indicated in the table. Appendix A provides a complete description of the methods used and corresponding assumptions for aquifer parameter determinations. Appendix C provides the graphical analyses that determined aquifer parameters at each well listed in Table 5.3.

The following discussion and Figures 5.5 through 5.8 illustrate the overall analysis of the pumping test and exemplify the determination of aquifer parameters with figures illustrating each of the major graphical analysis methods used. The observation well exhibiting the most diagnostic response is discussed first, followed by the drawdown at all observation wells, the drawdown at the pumping well, and finally the recovery at all wells.

5.4.1 Theis Drawdown Analysis

Figure 5.5 displays time-drawdown data and analysis on the log-log Theis plot for close-in observation well 11-14C at 250 ft distance. The data indicate confined aquifer response fitting the Theis type curve for the first 1.1 days of the test. After 1.1 days, the drawdown indicates a recharge boundary or vertical leakage from an adjacent confining layer where the actual rate of drawdown is less than the theoretical rate of drawdown. The drawdown at the most distant observation well (11-2 at 1,292 ft distance) also fits the Theis type curve for the first 1.8 days of the test (see Appendix C, Figure C.4-5) at which time a recharge boundary is encountered. Boundary responses are summarized in Table 5.2.

Drawdown analyses using the Theis method for all applicable wells (i.e., 11-11C, 11-15, 11-14C and 11-29) are given in Appendix C.4 (Figures C.4-1 through Figure C.4-5) and summarized in Table 5.3. The Theis analyses in Appendix C use test analysis software (AquiferWin32™ ESI, 2003). Input data is weighted to ignore the late-time recharge boundary using an automated curve matching procedure. The weighting for all samples is the same, as follows:

time-drawdown data before the first response are ignored, and data after the earliest occurrence of the recharge boundary at any of the wells (1.1 days) are ignored. The aquifer parameters transmissivity and storativity determined with Theis analyses are summarized in Table 5.3.

The data at the close-in Lakota observation well 11-15 at 243 ft distance are successfully fitted with the Theis curve and recharge boundary (see Appendix C, Figure C.4-2). A trial analysis of the best fit yields a transmissivity value lower than the range of other observation wells and a relatively high storativity value of 0.0013. Because this storativity value is high compared to confined aquifers in general (e.g., Freeze and Cherry, 1979, Halford and Kuniansky, 2002) and also the other Burdock test wells (Table 5.3), aquifer parameters from this well were not further considered. The high storativity is attributable to the delayed response time (140 minutes at 243 ft distance), and the cause of the delay is attributed to problems with well construction.

At observation well 11-19, completed in the upper Lakota 50 ft radially and 130 ft vertically from the screened interval in the pumping well, the drawdown data appear to be interpretable with the Theis analysis and yield a transmissivity value within the range of other observation wells (see Appendix C, Figure C.4-7). However, the very high storativity value of 0.10 is inappropriate for a confined aquifer. As described in Appendix A.2, there are a number of violations of the Theis test conditions when attempting to analyze drawdown due to pumping between partially penetrating well screens set apart 130 ft vertically. The artificially high storativity is attributed to the time-delay in response (160 minutes). The time-delay is attributed to vertical anisotropy as described in Section 5.3, above. Therefore, aquifer parameters from this well were not further considered.

5.4.2 Hantush-Jacob Drawdown Analysis

The AquiferWin32™ software implements the Hantush-Jacob (Hantush and Jacob, 1955) analytical model for drawdown analysis that follows the Theis curve in early-time and calculates a flattening recharge boundary due to vertical leakage from an assumed overlying leaky confining layer. The vertical leakage is described in the term r/B, which is implemented in this analysis as follows:

- $r/B = r/((T\ b')/K')^{0.5}$
- T transmissivity of confined Lakota aquifer (assume provisional value of 145 ft^2/day)
- b’ thickness of Fuson member aquitard/confining layer (35 ft, based on Drawing 5.3)

- K' vertical hydraulic conductivity of Fuson (10^{-3} ft/day from the TVA test, Section 2.3.2)
- radial distance (r = 250 ft to well 11-14C and 1,292 ft to well 11-2)
- r/B well 11-14C = 0.11; r/b well 11-2 = 0.57

Figure 5.6 shows the Hantush-Jacob analysis at observation well 11-14C where r/B is input as fixed and all data after initial response are equally weighted. It is noted that automated curve-fitting in the AquiferWin32™ software can also be set to optimize to r/B, and a value of 0.11 is also obtained, indicating that this is a good match. For distant observation well 11-2 the software optimized to an r/B value of 0.77, so the calculated value of 0.57 was fixed (see Figure C.4-6 in Appendix C). Transmissivity and storativity values obtained through the curve matching at the two observation wells are entered in Table 5.3.

5.4.3 Theis-Cooper-Jacob Straight-line Analysis

Figure 5.7 (top) shows a Cooper-Jacob drawdown plot for the Burdock pumping well 11-11C. This USGS graphical-analysis tool is a spreadsheet that allows manual fitting of the straight-line (Halford and Kuniansky, 2002). Appendix A.2 provides an overview of the theoretical basis for straight-line test analysis and definitions for the terms u, u', t and t'. The portion of the plot corresponding to later time where u < 0.01 is indicated, and this slope is used to determine transmissivity of 150 ft^2/day and well efficiency of 65 percent (Table 5.3).

The bottom portion of Figure 5.7 shows the USGS spreadsheet implementation of the Theis recovery analysis for the pumping well 11-11C, referred to as the Theis-Cooper-Jacob method (Halford and Kuniansky, 2002). The portion of the plot corresponding to later time where u' < 0.01 is indicated to the left on the t/t' axis, and this slope is used to determine transmissivity of 140 ft^2/d (Table 5.3). A definite change in slope indicating a late time leakage/recharge boundary is not apparent at the pumping well, but the late-time data has a slight upward concavity indicating reduction in the rate of drawdown.

The results of Theis recovery analyses for all wells are summarized in Table 5.3, together the u' criteria on which each transmissivity determination is based. Analyses with u' > 0.01 are tabulated but are not considered acceptable, as indicated in the table.

5.4.4 Distance-Drawdown Analysis

Figure 5.8 is distance-drawdown analysis plot that determines transmissivity, storativity, and pumping well efficiency by considering all observation wells at once. As shown on Figure 5.8, fitting a straight line to incorporate the close-in observation wells 11-14C and 11-15 simultaneously is not ideal because it averages the clearly anisotropic response between the close-in wells. On the other hand, convention (Driscoll, 1986 and numerous other references) dictates that a distance-drawdown analysis should be based on a minimum of three observation wells. It is noted that if a two-well solution is used ignoring the anisotropic response at well 11-14C, transmissivity is 108 ft^2/day and storativity is 2.8 x 10^{-5}. Nevertheless, the three-well solution with greater transmissivity and storativity is accepted as indicated on the figure and in Table 5.3.

The pumping well efficiency of 61 to 63 percent is determined with the three-well distance-drawdown solution by extending the straight line to the assumed diameters of the pumping well. These efficiencies agree with the 65 percent determined in the USGS spreadsheet (Table 5.3). The aquifer parameters are somewhat questionable given the relatively poor (r^2 = 0.7) straight-line fit through all data points. Based on the large u criterion (0.08) at one of the wells (11-15), the transmissivity and storativity values obtained are not included in the overall average aquifer parameters for the test (Table 5.3).

The distance-drawdown analysis also gives the maximum radius of influence of the test. Based on Figure 5.8, the radius of influence was about 2,100 ft, somewhat greater than the radial distance to the most distant responding well (i.e., 11-2 at 1,292 ft). The radius of influence may be compared to the dimensions of prospective well fields in the area to evaluate whether aquifer parameters have been adequately characterized.

5.4.5 Summary of Burdock Test – Lower Lakota (Chilson) Formation Aquifer Parameters

The aquifer parameters determined by the techniques described above are summarized in Table 5.3. Nine accepted determinations of transmissivity (outlined) range from 120 to 223 ft^2/day and the mean and median are close at 150 and 158 ft^2/day. Four accepted storativity determinations ranged from 6.8 x 10^{-5} to 1.9 x 10^{-4}. The geometric mean and median storativity values are 1.1 x 10^{-4} and 1.2 x 10^{-4}. The median transmissivity of 150 ft^2/day and median storativity of 1.2 x 10^{-4} are considered the best measures of the central tendency of the test results.

Only two wells were used to contribute to the overall storativity results because of the large anisotropy in responses exhibited between wells 11-15 and 11-14C and the anomalous results at

11-15 described above. Powertech geologists have noted that there were problems with the installation of well 11-15.

5.5 Overlying Fall River Aquifer Test Results

Observation well 11-17 is screened in the lower Fall River 50 ft laterally and about 185 ft vertically above the screen in pumping well 11-11C (Table 5.2, Drawing 5.3). Piezometric surface information for the Lakota aquifer indicates the two wells are locally hydraulically connected with similar water levels within ± 2 ft (Table 5.2).

Figure 5.3 illustrates response of observation well 11-17 to the drawdown phase of the Burdock well 11-11C pumping in the Lakota Formation. The first response was a very slight increase in pressure over a period of about 600 minutes, corresponding to a water level increase of about 0.12 ft (3.5 centimeter [cm]). The water level stopped increasing then underwent 1.1 ft of drawdown to time of pump shut-down (2:00 PM) on May 21, 2008. Drawdown continued for about a day to a maximum of 1.4 ft, then remained flat with erratic fluctuations for another 24 hours, until the evening of May 23, 2008 where a partial and sharply “spiked” recovery started.

The response of a “reverse” drawdown monitored in a zone above (or below) the pumping zone is known as the Noordbergum effect (Ohio EPA, 2006). There is uncertainty whether the water level increase at Burdock well 11-17 is the Noordbergum effect or alternatively a barometric response. In any case, the Noordbergum effect was observed in the 1979 TVA Lakota aquifer pumping test at Burdock pumping at 200 gpm where increases in water levels were monitored in the Fall River aquifer and Fuson Member observation wells for 30 to 90 minutes after the start of the test. Judging from the water level plot figures (Boggs and Jenkins, 1980), the increases were a fraction of a ft in the Fall River and up to about 1.5 ft in the Fuson.

In a 1985 pumping test in the Eastern Black Hills near Wall, South Dakota, pumping at 125 gpm, a water level rise of about 1.7 ft just after pumping started, eventually declining in an “erratic manner”, was attributed to the Noordbergum effect (Rahn, 1992). There the well (Kelly Well) with the anomalous response was open to an unknown portion of the Inyan Kara aquifer; however it was considered to be somewhat hydraulically isolated from the pumping and other observation wells based on differing background water levels.

The fact that substantial Noordbergum effects were observed in pumping tests in the Fuson/Fall River and Inyan Kara (undifferentiated) monitoring wells at widely spaced locations in the Black

Hills uplift (i.e., the TVA and Wall tests) suggests the effect is a characteristic of the Inyan Kara Group. A small magnitude Noordbergum effect response observed in the 2008 test at Burdock is attributable to the much lower pumping rate and relatively short, 10-ft screened intervals of both pumping and observation wells. The Noordbergum effect of a 10 cm rise in water levels has been simulated with numerical models by the USGS (Hsieh, 1997), where three-dimensional deformation caused by groundwater withdrawal from a confined aquifer can induce positive hydraulic head changes in adjacent aquitards (and presumably in an aquifer overlying an aquitard).

An alternative explanation for the slight rise in water level in the Fall River (Burdock 11-17) is found in similar patterns of water level changes seen in the Unkpapa Formation (Burdock 11-18), underlying the Lakota Formation, at about the same time and magnitude. This will be described further in Section 5.6 below.

Referring again to Figure 5.3, an explanation for the drawdown in the Fall River aquifer at Burdock continuing for about a day past the pump shut-down and then stabilizing for another day is not apparent. It is most similar to the 1.5 days of extended drawdown and poor recovery observed at well 29-7 at the Dewey pumping test. These anomalous responses are attributed to the observation wells having been located away from the sandstone layer with the pumping well; it is possible the observation wells are monitoring localized effects in sedimentary facies separated from the pumping well by numerous shale layers,

5.6 Underlying Unkpapa Aquifer Test Results

As discussed in Section 3, observation well 11-18 is screened in the Unkpapa aquifer 35 ft laterally and 195 ft vertically below the screen in pumping well 11-11C (Table 5.1). Piezometric surface information for the Unkpapa and Lakota aquifers indicate the two wells are locally hydraulically isolated, with a nearly 70 ft head difference directed vertically upward (Table 5.1).

Figure 5.4 illustrates that there was no response of observation well 11-18 to the drawdown or recovery phases at the pumping well 11-11C. However, comparison with the Fall River observation well (Burdock 11-17, Figure 5.3) finds a similar pattern, timing and magnitude of several water level changes. In addition to the early time rise in water levels (i.e. possible Noordbergum effect described above) starting at about 2:00 PM on 5/18/08 (i.e., the time of pump shut-down and start of recovery), there are the following similarities:

- the erratic transducer readings starting at about 3:00 PM on 5/22/08

- the upward spike in transducer readings at about 7:00 PM on 5/23/08

The barometer readings for the site (Figure 3.1) were examined in detail, and there is a possible correlation with barometric fluctuations where the water level increases start at the times of temporary declines (troughs) in barometric pressure throughout an overall period of increasing atmospheric pressure (i.e., going forward in time from the start of Burdock Recovery on Figure 3.1). However, throughout several days there were equally large fluctuations in barometric pressure with no similar corresponding changes in water levels.

An explanation for the water level variations simultaneously in both wells is that the Unkpapa monitoring well 11-18 (Figure 5.4) records a barometric and tidal response while the Fall River monitoring well 11-17 (Figure 5.3) records a combination of both drawdown (without recovery) and barometric response. As noted above, the existence of the Noordbergum effect at the Fall River monitoring well is possible but uncertain.

6.0 Laboratory Core Data

6.1 Background

Selected core samples were sent to Core Laboratories by Powertech (Personal Communication, Frank Lichnovsky, February 1, 2008) for measurement of intrinsic permeability to assess the differences in the less permeable Skull Creek shale, Fuson shale, Morrison shale, and interbed units of the Dewey (Fall River) and Burdock (Lakota) sandstone units. The intrinsic permeability data were converted to hydraulic conductivity values as shown in Table 6.1.

6.2 Conversion from Intrinsic Permeability to Hydraulic Conductivity

Intrinsic permeability is a property of the core material (rock) only and does not include any fluid properties. The core intrinsic permeability was measured by moving air through the core under confining pressure in the laboratory which resulted in the measurement of both porosity (from the bulk density and particle density of the core) and intrinsic permeability in milliDarcys (mD) as shown in Table 6.1. The footnotes at the bottom of Table 6.1 show the constants assumed for the conversion from intrinsic permeability to hydraulic conductivity at the prevailing temperatures of the laboratory, assumed to be 70 ^{o}F, and the site groundwater (average of 52.8 ^{o}F from field measurements by RESPEC (Personal Communication, Crystal M. Hocking, February 4, 2008).

It is well known that the units of intrinsic permeability can be changed from mD to cm^2 by using equations shown in Table 6.1. The intrinsic permeability is multiplied by the fluid properties of water density times the gravitational constant divided by the dynamic viscosity (both temperature dependent) of the site groundwater to obtain the hydraulic conductivity.

Analyses of core data in Table 6.1 indicate that the horizontal hydraulic conductivity of the Skull Creek shale is approximately 6.0 x 10^{-8} centimeters per second (cm/s). The horizontal hydraulic conductivity of the Fuson Shale ranges from 8.0 x 10^{-7} to 3.2 x 10^{-8} cm/s, and for the Morrison between 7.7 x 10^{-7} and 3.1 x 10^{-9} cm/s. Vertical hydraulic conductivities of the Skull Creek and Morrison shales, and the Fuson shale from the Dewey project area, are typically one-tenth to one-twentieth the horizontal values. In terms of ft per day (ft/day) vertical hydraulic conductivities for all the above shale units range from about 2 to 6 x 10^{-5} ft/day.

The average vertical hydraulic conductivity for the two core samples from the Fuson shale from the Burdock project area is considerably more permeable (9.8 x 10^{-8} cm/sec), at roughly 25 percent the horizontal value. In terms of ft/day, vertical hydraulic conductivities for the

Burdock Fuson shale units are about 3 x 10^{-4} ft/day, about one order of magnitude less than the Fuson shale sample at the Dewey project area (2 x 10^{-5} ft/day) and also all the Skull Creek and Morrison shale samples.

In contrast, the core units of the Burdock Lakota sandstone unit have an average horizontal hydraulic conductivity of 2.6 x 10^{-3} cm/s (7.4 ft/day), ranging from 2.1 x 10^{-3} to 3.2 x 10^{-3} cm/s. Core from the Dewey Fall River sandstone unit has a horizontal hydraulic conductivity of 2.2 x 10^{-3} cm/s (6.1 ft/day). The ratio of horizontal to vertical hydraulic conductivity (K_h:K_v) for the Burdock sandstone units is 2.4:1, and for the Dewey sandstone unit it is 4.5:1, based on the core data shown in Table 6.1.

6.3 Interpretations of the Laboratory Core Data

Comparison of horizontal hydraulic conductivity of the Dewey and Burdock sandstone samples in Table 6.1 with the conductivity calculated from pumping test transmissivity (Tables 4.3 and 5.3) can be made as follows:

- Dewey Transmissivity 255 ft^2/d divided by 15 ft screen length = 17 ft/day
- Dewey Transmissivity 255 ft^2/d divided by 165 ft formation thickness = 1.5 ft/day
- Burdock Transmissivity 150 ft^2/d divided by 10 ft screen length = 15.0 ft/day
- Burdock Transmissivity 150 ft^2/d divided by 170 ft formation thickness = 0.9 ft/day

The most commonly used procedure when converting test results is to use the screen length of the pumping well as the divisor. The above analysis indicates that the pumping test data may be interpreted to yield up to two to three times greater higher hydraulic conductivity than core data.

However, the above analysis also indicates that the hydraulic conductivities calculated from the pumping test transmissivities and the overall formation thicknesses bracket the core data at the lower end of ranges in hydraulic conductivity, with the core falling in the middle of the range. The core data can be considered to be generally consistent with, and therefore independently confirming, the pumping test results. Generally, the above ranges in calculated hydraulic conductivity also indicate order-of-magnitude uncertainty (generally, about one to 17 ft/day),

Powertech reports that the laboratory would not take samples containing uranium, so sandstone core samples from outside of the ore zone were submitted. The electric logs and boring lithologic logs indicate that the core samples were taken from sandstone layers which may have had slightly different, possibly less permeable, ideologies than the screened intervals used for the pumping tests in the ore zones.

6.4 Conclusions

The first conclusion from the core analyses is that the major shale aquitards (Fuson, Skull Creek, Morrison formations) have hydraulic conductivities several orders of magnitude lower than hydraulic conductivities of either the Fall River or Lakota sandstone units. Using the vertical hydraulic conductivities as a measure of degree of confinement, at the Burdock project area Table 6.1 indicates that the shales in the Fuson overlying the Lakota formation (K_h = 7.4 ft/day) have an average vertical permeability of about 2.7 x 10^{-4} ft/day and the underlying Morrison formation 6.0 x 10^{-5} ft/day. At the Dewey project area, shales in the Fuson formation underlying the Fall River formation (Kh = 6.6 ft/day) have an average vertical permeability of 1.8 x 10^{-5} ft/day, and shale in the single sample of overlying Skull Creek shale has a vertical permeability of 1.5 x 10^{-5} ft/day.

The second conclusion is that core data from the sandstones are within the range of hydraulic conductivities determinable from test transmissivities, specifically 1.5 to 17 ft/day at the Dewey project area and 0.9 to 15 ft/day at the Burdock project area. This is also an appropriate range of uncertainty for converting the test results to hydraulic conductivity. Using the usual procedure for determining hydraulic conductivity from pumping test transmissivity, the sandstone core results may have two to three times smaller hydraulic conductivities than those estimated from the pumping tests, perhaps due to slightly different lithologies between the core and screened intervals. Overall, there is reasonable agreement between the laboratory and field hydraulic tests considering typically order-of-magnitude differences in hydraulic conductivity determinations.

7.0 Summary and Conclusions

The following sections first summarize new facts about the Dewey and Burdock project areas based on the 2008 tests and related information. A discussion of the results in comparison to the 1979 to 1982 TVA pumping tests follows. The Burdock site is discussed first because comparison with the TVA tests is most straightforward.

7.1 Burdock Project Area

7.1.1 Summary

A summary of aquifer parameters for the 2008 Burdock pumping test and related laboratory core testing is as follows:

- Nine determinations of transmissivity (Table 5.3) ranged from 120 to 223 ft^2/day with the median value of 150 ft^2/day.
- Four storativity determinations (Table 5.3) ranged from 6.8×10^{-5} to 1.9×10^{-4} with the median value of 1.2×10^{-4}.
- The radius of influence of the pumping test determined by a distance-drawdown plot was 2,100 ft (Section 5.3.3).
- The pumping well in the lower Lakota formation was determined to be moderately efficient: 80 to 83 percent by the empirical distance-drawdown method and 65 percent the USGS (Halford and Kuniansky, 2002) theoretical method.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 6.1) were made on sandstone layers similar to that tested in the pumping test; measured horizontal hydraulic conductivity ranged from 5.9 to 9.1 ft/day, the mean value was 7.4 ft/day and the mean ratio of horizontal to vertical hydraulic conductivity in Burdock area sandstone was 2.47:1
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 6.1) were made on shale layers from the two major confining units for the Lakota formation in the pumping test area with the following results:
  - Fuson Shale: the laboratory core data indicate vertical permeabilities of about 2×10^{-7} to 1×10^{-8} cm/sec (average 2.7×10^{-4} ft/day) for shale samples from within the Fuson member overlying the Lakota formation.
  - Morrison Shale: the laboratory core data for the shales in the underlying Morrison formation indicate vertical permeabilities of 9×10^{-9} to 3×10^{-8} cm/sec (average 6.0×10^{-5} ft/day).

- The range of hydraulic conductivities determinable from test transmissivities (Section 6.3) was 0.9 to 15.0 ft/day, which is considered an appropriate range that is also verified by the sandstone core sample results falling in the middle of the range; it is noted that the lower end of the hydraulic conductivity range is probably appropriate for use with the entire formation thickness (shale layers included) and the upper end represents the most permeable sandstone layers such as the ore zone areas tested in the pumping test.

7.1.2 Conclusions

The Burdock pumping test in 2008 may be directly compared to the 1979 TVA test for the Lakota (Chilson) aquifer as the tests were nearly at the same location (Figure 1.1). The average transmissivity and storativity values determined from the TVA tests were 190 ft^2/d and 1.8×10^{-4} (Section 2.3, see p. 17 in Boggs and Jenkins, 1980). Comparing median transmissivity of 150 ft^2/d and storativity of 1.2×10^{-4}determined in the 2008 test (Section 5.4.4) to the TVA test, the new aquifer parameters for the lower Lakota are respectively about 80 and 70 percent of the 1979 results. Because transmissivity and storativity depend on aquifer thickness, comparing the results suggests that there may be some scaling effect between the tests due to the differing lengths of screened intervals.

Therefore, the 1979 TVA test is transmissivity of 190 ft^2/d is considered representative of the entire Lakota aquifer for a regional application, such as groundwater flow model where an average hydraulic conductivity of about 1 ft/day over a thickness of 170 ft could be specified. The 2008 test provides specific data at the operational-scale of a prospective ISR well field where local hydraulic conductivities of up to 15 ft/day could be specified for the most permeable ore zones horizons.

Within the Lakota formation, vertical communication throughout the entire formation is indicated by the delayed response at the upper Lakota observation well (11-19). The 160-minute delay in response at the upper Lakota observation well 11-19 is attributed to lateral and vertical anisotropy due to the shale interbeds seen on the conceptual stratigraphic cross-sections for the pumping test site (Drawings 5.1, 5.2 and 5.3). The extent and continuity of the shale interbeds are unknown. Whether the shale interbeds in the Lakota aquifer are sufficiently thick and continuous to serve as vertical confinement for ISR operations will probably need to be evaluated by analyzing cores from borings as well fields are drilled.

The 2008 test indicates that the lower and upper portions of the Lakota formation behave as a single, confined, leaky aquifer. Confinement and leakage from the overlying Fuson member is evident in the matches to the Hantush-Jacob type curves seen most clearly at observation wells 11-14C and 11-2. These results are more definitive than the 1979 TVA test where confined, leaky behavior for the Lakota was predicted but not demonstrated with curve match results. Hydraulic communication through the Fuson member between the Lakota and Fall River aquifers is evidenced by the drawdown at the Fall River observation well 11-17, indicating that leakage was established through underlying the Fuson formation.

The laboratory core data indicate an average vertical permeability of 9.3 x 10^{-8} (2.7 x 10^{-4} ft/day) for shale samples from within the Fuson member. The shale core permeability values are about one to two orders of magnitude less permeable than pumping test values determined in the 1979 TVA test at Burdock, where the vertical hydraulic conductivity of the Fuson aquitard was calculated using the Neuman-Witherspoon ratio method to be about 10^{-3} ft/day (see page i in Boggs and Jenkins, 1980).

As described in Section 5.1, the potentiometric surface in the Fall River aquifer is close to that in the Lakota aquifer at the Burdock pumping test site, indicating some local connection between the two formations through the intervening Fuson member. In other locations in the Inyan Kara, the Fuson member is known to have sandstone layers that are downcut into the Lakota member (Gott et al., 1974). Therefore, determining the degree of vertical confinement for ISR operations by the Fuson will probably need to be evaluated by analyzing cores from borings as well fields are drilled, and with well field-scale pumping tests that are proposed to be conducted prior to startup of each particular mine unit.

The aquifer tests in 1979 and 2008 indicate that the Lakota Formation is a confined aquifer with a leaky confining layer, which is demonstrably the Fuson member. The laboratory core data for the shales in the underlying Morrison formation indicate an average vertical permeability of 2.1 x 10^{-8} cm/sec (6 x 10^{-5} ft/day). Together with the pumping test data, the core data indicate that the underlying Morrison formation and overlying Fuson member can serve as aquitards for ISR operations.

For the Lakota sandstone, the laboratory core data indicate an average horizontal hydraulic conductivity of 7 ft/day, and as high as 9.1 ft/day. Interpretation of the test results calculates that horizontal permeability may be as great as 15 ft/day throughout one of the ore zones. Within the lower Lakota formation, the test results indicate transmissive response between pumping and observation wells up to 250 ft apart with 17 ft of drawdown. Response was nearly 3 ft of drawdown at 1,290 ft distance. This indicates the aquifer was stressed to produce good quality analytical results.

7.2 Dewey Project Area

7.2.1 Summary

A summary of aquifer parameters for the 2008 Dewey pumping test and related laboratory core testing is as follows:

- Ten determinations of transmissivity (Table 4.3) ranged from 180 to 330 ft^2/day with the median value of 255 ft^2/day.
- Five storativity determinations (Table 4.3) ranged from 2.3 x 10^{-5} to 2.0 x 10^{-4} with the median value of 4.6 x 10^{-5}.
- The radius of influence of the pumping test determined by a distance-drawdown plot was 5,700 ft (Section 4.4.3).
- The pumping well in the Fall River formation was determined to be highly efficient: 93 to 95 percent by the empirical distance-drawdown method and 81 percent the USGS (Halford and Kuniansky, 2002) theoretical method.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 6.1) were made in a core sample from the sandstone layer similar to that tested in the pumping test; measured horizontal hydraulic conductivity was 6.1 ft/day, and the ratio of horizontal to vertical hydraulic conductivity was 4.5:1.
- Laboratory measurements of horizontal and vertical hydraulic conductivity (Table 6.1) were made on shale samples from the two major confining units overlying and underlying the pumping test area with the following results:
  - Skull Creek shale: laboratory core data for the shale sample from the overlying Skull Creek formation indicate a vertical permeability of 5.4 x 10^{-9} cm/sec (1.5 x 10^{-5} ft/day).
  - Fuson Formation: laboratory core data for the shale sample from the underlying Fuson formation indicate a vertical permeability of 6.2 x 10^{-9} cm/sec (1.8 x 10^{-5} ft/day).

7.2.2 Conclusions

The Dewey pumping test in 2008 in the Fall River aquifer is not directly comparable to the 1982 TVA test because the underlying Lakota aquifer was tested in 1982. As demonstrated above for the Lakota aquifer (Section 7.1), a scaling effect may be assumed between total formation transmissivity and storativity (i.e., regional-scale) and the 2008 operational-scale test.

However, there are several lines of evidence that the 2008 test transmissivity and storativity results are representative of the entire Fall River aquifer at the Dewey test site, as follows:

1. Thickness of the sandstone layer screened by the pumping well is about one-half the total formation thickness as shown in Drawings 4.1 and 4.2.

2. Response at the stock tank well (GW-49 at 1,400 ft distance) was within the acceptable range for a confined aquifer; this is interpreted to indicate that the effects of partial penetration (due to elevation differences between the pumping well screen and the observation well open to the upper half of the aquifer) were diminished at the 1,400 ft distance and 40 minute response time.

3. The delay in response at the upper Fall River observation well 32-9C was a relatively brief 11 minutes (Table 4.2), compared to 160 minutes in the Burdock test; together with (2) above, these responses suggest that the vertical anisotropy due to shale interbeds overlying the lower sandstone layer does not extend laterally for more than about 1,400 ft.

The 2008 test indicates that the lower and upper sandstone portions of the Fall River formation behave as a single, confined, aquifer with some form of lateral barrier due changing lithology, such as a channel boundary. The TVA test in 1982 observed a barrier boundary in the underlying Lakota formation which was attributed to either a change in lithology or the Dewey Fault zone. Apparently, both the Lakota and Fall River formations in the general Dewey project area are highly transmissive and show barrier boundaries. These test results are more definitive than the 1982 TVA test concerning the proximity of the barrier boundary, because the 2008 radius of influence was about one mile compared to greater than two to three miles distance to the fault zone.

Vertical communication throughout the entire Fall River formation is indicated by the delayed response at the upper Fall River observation well (32-9C). Within the Fall River formation, the 11-minute delay in response at the upper observation well is attributed to lateral and vertical anisotropy due to the shale interbeds seen on the conceptual stratigraphic cross-sections for the pumping test site (Drawings 4.1 and 4.2). The extent and continuity of the shale interbeds are not known. Whether the shale interbeds in the Fall River aquifer are sufficiently thick and continuous to serve as vertical confinement for ISR operations will need to be evaluated by analyzing cores from borings as well fields are drilled.

Leakage from a confining layer, presumably the Fuson member, was observed in the 1982 TVA test of the Lakota formation. However, the leakage was observed only relatively late in the TVA tests, at 3,000 to 10,000 minutes, with a much greater pumping rate (495 gpm) and radius of influence. The large-scale vertical hydraulic conductivity value of 2 x 10^{-4} ft/day (7.1 x 10^{-8} cm/sec) determined in the 1982 TVA regional test at Dewey using the Neuman-Witherspoon ratio method is sufficiently impermeable to be considered an aquitard or aquiclude.

Hydraulic communication through the Fuson member between the Fall River and underlying Lakota aquifers is not indicated by the 2008 response at observation well 32-10. The 2008 test demonstrates that vertical leakage through the Fuson may not occur over a mile-wide radius. As described in Section 4.1, the Lakota and Fall River aquifers at the Dewey test site appear to be locally hydraulically isolated by the intervening Fuson member with nearly 40 ft head difference. The laboratory core data indicate a very low vertical permeability of 6.2 x 10^{-9} cm/sec (1.8 x 10^{-5} ft/day) for the shale sample from within the Fuson shale member.

The laboratory core data for the shale sample from the Skull Creek formation, overlying the Fall River formation, indicate a very low vertical permeability of 5.4 x 10^{-9} cm/sec (1.5 x 10^{-5} ft/day), also appropriate for an aquitard or aquiclude.

For the Fall River sandstone, the laboratory core data indicate a horizontal hydraulic conductivity of 6.1 ft/day, and interpretation of the test results calculates that horizontal permeability may be as great as 17 ft/day throughout one of the ore zones. Within the lower Fall River formation, the test results indicate transmissive, rapid response (two to three minutes) between pumping and observation wells up to 467 ft apart with nearly 10 ft of drawdown. Response was nearly 9 ft of drawdown at 1,400 ft distance. This indicates the aquifer was stressed to produce good quality analytical results.

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8.0 Certification

This report "Powertech (USA) Inc., Dewey-Burdock Project, 2008 Pumping Tests: Results and Analysis" has been prepared for Powertech (USA) Inc. by Knight Piésold and Co. The material in it reflects the best judgment of Knight Piésold and Co. in light of the information available to both firms at the time of the report preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. Knight Piésold and Co. and Powertech (USA), Inc. accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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Tables

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Table 4.1
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Dewey Pumping Test Completion Information

Well ID and Stratigraphic Interval	Well Type	Location	Radial Distance from pumping Well (ft)	Depth to top of Screen (ft bgs)	Depth to bottom of Screen (ft bgs)	Note
Ore Zone (lower Fall River Sandstone)						
DB 07-32-3C	Pumping Well	NWQ Sec. 32	0	585	600	
DB 07-32-05	Obs. Well #1	NWQ Sec. 32	265	593	608	
DB 07-32-4C	Obs. Well #2	NWQ Sec. 32	467	580	595	
DB 07-29-7	Obs. Well #3	SEQ Sec. 29	2,400	635	650	
Upper Fall River Sandstone						
DB 08-32-9C	Obs. Well	NWQ Sec. 32	41	490	505	
Lakota Sandstone Layer						
DB 08-32-10	Obs. Well	NWQ Sec. 32	61	715	730	
Unkpapa Formation						
DB 07-32-11	Obs Well	NWQ Sec. 32	50	910	930	
Additional Wells						
GW-49	Upper Fall River 70 ft	NEQ Sec. 29	1,433	475	540	Stock Well

Notes: Screen completion information from diagrams prepared by Powertech, Appendix B
Radial distance information provided by Powertech.

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Table 4.2
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Dewey Pumping Test Drawdown and Response Summary

Well ID and Stratigraphic Interval	Well Type	Radial Distance from pumping Well (ft)	Approximate Ground Surface Elevation (ft amsl)[1]	Approximate Groundwater Elevation (ft amsl)[2]	Note	Maximum Drawdown at 3.08 days (ft)[3]	Note	Time of First Drawdown Response (min)	Minimum Pumping Groundwater Elevation (ft amsl)	Boundary Type (days)[4]
Ore Zone (lower Fall River Sandstone)										
DB 07-32-3C	Pumping Well	0	3626.3	3643.9	A	44.8		0.0	3599.1	
DB 07-32-05	Obs. Well #1	265	3622.2	3641.0	A	13.0		1.6 to 2.4	3628.0	Barrier (0.7)
DB 07-32-4C	Obs. Well #2	467	3626.3	3644.0	A	9.8		2.8	3634.2	Barrier (0.6)
DB 07-29-7	Obs. Well #3	2,400	3662.5	3659.3		1.5	a	140 to 850	3657.8	
Upper Fall River Sandstone										
DB 08-32-9C	Obs. Well	41	3625.9	3626.3	A	10.6		11.5	3615.7	
Lakota Sandstone Layer										
DB 08-32-10	Obs. Well	61	3625.2	3682.8	A	-0.1	N	No Response	NA	
Unkpapa Formation										
DB 07-32-11	Obs Well	50	3625.2	3761.0	A	-2.0	N	No Response	NA	
Additional Wells										
GW-49	Stock Well	1,433	3628	3652	A	9.0		40	3643.0	Barrier (1.9)

Notes: Screen completion information from diagrams prepared by Powertech, Appendix A
Radial distance informationprovided by Powertech.

[1] Ground Surface Elevations from Powertech

[2] Pressure or depth to water measurements relative to ground surface, Eric Krantz, RESPEC, personal communication.

[3] From table of processed drawdown data in Appendix B, or calculated visually from WinSituTM graph and table of data in non-responding wells.

[4] Boundary time estimated based on time of deviation from Theis type curve; 0.7 days used for weighting calculations.

A Artesian pressure surface above ground level.

N N response to pumping, water level rose slightly through drawdown phase of test

[a] Drawdown continued for about 1.5 days past pump shut-down to a maximum of 2.1 ft at about 3:00 AM on May 20, 2008.

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Table 4.3
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Summary of Aquifer Hydraulic Characteristics for the Dewey Pumping Test

Dewey Test Site Pumping Test Interpretations

Well I.D.	Well Type	Radial Dist. (ft)	Interpretation Method	Transmissivity (ft^2/day)	u or u' (unitless)	Storativity (unitless)	Note
Ore zone (lower Fall River Sandstone)							
32-3C	Pumping	0.25 (0.33)	Theis DD[1]	250	--	1.2E-06[d]	--
			CJ DD [3]	250	<0.01	--	--
Pumping Well Efficiency = 80%[3]							
			CJ Recovery [3]	270	<0.01	--	--
32-5	Obs #1	243	Theis DD[1]	294	--	3.3E-05	--
			Theis Recovery[1]	260	<0.01	--	--
			CJ Recovery[3]	280	<0.01	--	--
32-4C	Obs #2	467	Theis DD[1]	333	--	5.6E-05	--
			CJ Recovery [3]	120[a]	<0.01	--	
29-7	Obs #3	2,400	Theis DD[2]	178	--	2.0E-04	
			CJ Recovery [3]	Insufficient recovery for analysis			--
Fall River Aquifer Stock Well (Screened in top half of Fall River)							
GW-49	Stock	1,400	Theis DD[1]	177	--	2.3E-05	--
			CJ Recovery [3]	110	<0.05	--	--
Upper Fall River Sandstone							
32-9C	Obs	41	Theis DD[1]	217	--	1.6E-02	--
			CJ Recovery [3]	150	<0.05	--	--

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Table 4.3
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Summary of Aquifer Hydraulic Characteristics for the Dewey Pumping Test

Dewey Test Site Pumping Test Interpretations

Well I.D.	Well Type	Radial Dist. (ft)	Interpretation Method	Transmissivity (ft^2/day)	u or u' (unitless)	Storativity (unitless)	Note
Lakota Sandstone Layer							
32-10	Obs	61	No response during pumping test.				--
Unkpapa Formation							
32-11	Obs	50	No response during pumping test.				--
Distance Drawdown (32-5, 32-4C, 29-7, GW-49)[2]				218	<0.05	4.6E-05	r^2 = 0.78 (4 point line)
Pumping Well Efficiency = 93% to 95%							--
Summary:	Median			255		4.60E-05	
Average/Geometric Mean[4]				251		5.23E-05	

Notes/References: DD = drawdown, CJ = Cooper -Jacob, Obs = Observation Well
[1] Calculated by automated curve fitting in AquiferWin32™ software (ESI, 2003).
[2] Knight Piesold spreadsheet after methods in Driscoll (1986).
[3] Spreadsheet methods in U.S. Geol. Surv. Open File Rept. 02-197, Halford and Kuniansky (2002).
[4] Average value valculated for Transmissivity, Geometric Mean value calculated for Storativity.
[a] only slope satisfying u 'critereon occurs after intersection with barrier boundary.
[b] not accepted due to anomalous response at well, see text.
[d] storativity not valid at pumping well.
[ ] = accepted value based on conformance with theory discussed in the text.

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Table 5.1
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Burdock Pumping Test Completion Information

Well ID and Stratigraphic Interval	Well Type	Location	Radial Distance from pumping Well (ft)	Depth to top of Screen (ft bgs)	Depth to bottom of Screen (ft bgs)	Note
Ore Zone (lower Lakota Sandstone)						
DB 07-11-11C	Pumping Well	SWQ Sec. 11	0	426	436	
DB 07-11-15	Obs. Well #1	SWQ Sec. 11	243	418	428	
DB 07-11-14C	Obs. Well #2	SWQ Sec. 11	250	413	423	
DB 07-11-02	Obs. Well #3	NWQ Sec. 11	1,292	450	460	
Upper Lakota Sandstone						
DB 07-11-19	Obs. Well	SWQ Sec. 11	50	325	335	
Fall River (lower Sandstone layer)						
DB 07-11-17	Obs. Well	SWQ Sec. 11	50	245	255	
Unkpapa Formation						
DB07-11-18	Obs Well	SWQ Sec. 11	<100	621	631	
Additional Distant Wells						
	None					

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Table 5.2
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Burdock Pumping Test Drawdown and Response Summary

Well ID and Stratigraphic Interval	Well Type	Radial Distance from pumping Well (ft)	Approximate Ground Surface Elevation (ft amsl)[1]	Approximate Groundwater Elevation (ft amsl)[2]	Note	Maximum Drawdown at 3.0 days (ft)[3]	Note	Time of First Drawdown Response (min)	Minimum Pumping Groundwater Elevation (ft amsl)	Boundary Type (days)[4]
Ore Zone (lower Lakota Sandstone)										
DB 07-11-11C	Pumping Well	0	3700.5	NA		91.1		0.0	3529	
DB 07-11-15	Obs. Well #1	243	3691.5	3660.2		10.4		140.2	3649.8	
DB 07-11-14C	Obs. Well #2	250	3688.4	3660.9		17.0		3.6	3643.9	Recharge (1.1)
DB 07-11-02	Obs. Well #3	1,292	3717.9	3664.8		3.1		280	3661.7	Recharge (1.8)
Upper Lakota Sandstone										
DB 07-11-19	Obs. Well	50	3701.7	3662.1		3.4		160	3658.7	
Fall River (lower Sandstone layer)										
DB 07-11-17	Obs. Well	50	3700.1	3660.3		2.1	a	see note b	3657.2	
Unkpapa Formation										
DB07-11-18	Obs Well	35	3699.2	3728.4	A	-0.5	N	No Response	NA	
Additional Wells										
None										

Notes: Radial distance information from Autocad drawing provided by Powertech.

[1] Ground Surface Elevations from Powertech
[2] Pressure or depth to water measurements relative to ground surface, Eric Krantz, RESPEC, personal communication.
[3] From table of processed drawdown data in Appendix B, or calculated from WinSitu^{TM} graph and table of data in non-responding wells.
[4] Boundary time estimated based on time of deviation from Theis type curve; shortest time used for weighting calculations.
A Artesian pressure surface above ground level.
N N response to pumping, water level rose slightly through drawdown phase of test
(a)Drawdown continued for about 1 day past pump shut-down to a maximum of 3.1 ft at about 5:00 PM, May 22, 2008.
(b)First response was a 0.23 ft rise in water levels peaking at about 12:00 AM on May 19, 2008, interpreted as a possible Noordbergum effect.

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Table 5.3
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Summary of Aquifer Hydraulic Characteristics for the Burdock Pumping Test

Burdock Project Pumping Test Interpretations

Well I.D.	Well Type	Radial Dist. (ft)	Interpretation Method	Transmissivity (ft^2/day)	u or u' (unitless)	Storativity (unitless)	Note
Ore zone (lower Lakota Sandstone)							
11-11C	Pumping	0.25 (0.33)	Theis DD(1)	145	--	2.9E-09(a)	--
			CJ DD (3)	150	<0.01	--	--
Pumping Well Efficiency = 65%(3)							
			CJ Recovery (3)	140	<0.01	--	--
11-15	Obs #1	243	Theis DD(1)	67	--	1.3E-03	--
			CJ Recovery (3)	100	<0.1	--	--
11-14C	Obs #2	250	Theis DD(1)	128	--	6.8E-05	--
			H-J DD(1)	120	--	6.9E-05	--
			Theis Recovery(1)	174	<0.01	--	--
			CJ Recovery (3)	160	<0.01	--	--
11-02	Obs #3	1,292	Theis DD(1)	223	--	1.9E-04	--
			H-J DD(1)	185	--	1.7E-04	--
			CJ Recovery (3)	260	<0.15	--	--
Upper Lakota Sandstone							
11-19	Obs	50	Theis DD(2)	260	--	1.0E-01	--
			CJ Recovery (3)	190	<0.15	--	--
Fall River (lower sandstone layer)							
11-17	Obs	50	Noordbergum Effect and response cannot be interpreted analytically				

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Table 5.3
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Summary of Aquifer Hydraulic Characteristics for the Burdock Pumping Test

Burdock Project Pumping Test Interpretations

Well I.D.	Well Type	Radial Dist. (ft)	Interpretation Method	Transmissivity (ft^2/day)	u or u' (unitless)	Storativity (unitless)	Note
Unkpapa Formation							
11-18	Obs	35	No response during pumping test.				--
Distance Drawdown (11-14C, 11-15, 11-02)[2]				145	<0.08	2.2E-04	r^2 = 0.76 (3 point line)
Pumping Well Efficiency = 61% to 63%							
Summary:	Median			150		1.20E-04	
	Average/Geometric Mean[5]			158		1.12E-04	
	TVA[4]			190		1.8E-04	

Notes/References: DD = drawdown, CJ = Cooper-Jacob, HJ = Hantush-Jacob, Obs = Observation Well
[1] Calculated by automated curve fitting in AquiferWin32™ software (ESI, 2003).
[2] Knight Piesold spreadsheet after methods in Driscoll (1986).
[3] Spreadsheet methods in U.S. Geol. Surv. Open File Rept. 02-197, Halford and Kuniansky (2002).
[4] Summary values from p. 17 in Boggs and Jenkins (1980).
[5] Average value valculated for Transmissivity, Geometric Mean value calculated for Storativity.
(a) storativity not valid at pumping well.
(b) based on 6 inch casing (8 inch borehole).
[ ] = accepted value based on conformance with theory discussed in the text.

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Table 6.1
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Laboratory Core Analyses for Powertech USA Inc. at Dewey-Burdock Site

Sample Number	Depth (ft)	Confining Stress (psig)	Porosity (%)	Air Intrinsic Permeability[1] k_a (mD)	Particle Density (g/cm^3)	Notes	Water Hydraulic Conductivity[2][3] K_w (cm/s)	Core K_h (ft/day)	Core K_v (ft/day)
DB 07-11-11C	**Burdock**								
1H	252.20	600	10.50	1.040	2.356	Fuson Shale	8.0073E-07		
1V	252.35	600	10.15	0.228	2.356	Fuson Shale	1.7555E-07		
4H	412.30	600	9.68	0.041	2.511	Fuson Shale	3.1567E-08		
4V	412.45	600	9.59	0.015	2.514	Fuson Shale	1.1549E-08		
DB 07-29-1C	**Dewey**								
2H	480.70	600	8.90	0.078	2.613	Skull Creek shale	6.0055E-08		
2V	480.80	600	9.30	0.007	2.610	Skull Creek shale	5.3896E-09		
3H	609.10	600	12.26	0.073	2.603	Fuson Shale	5.6205E-08		
3V	609.10	600	10.84	0.008	2.793	Fuson Shale	6.1595E-09		
DB 07-11-14C	**Burdock**								
5H	423.60	600	29.56	3,207	2.645	Lakota Sand	2.4692E-03	7.0	
5V	423.35	600	30.34	1,464	2.645	Lakota Sand	1.1272E-03		3.2
6H	430.20	600	31.90	4,161	2.640	Lakota Sand	3.2037E-03	9.1	
6V	430.35	600	30.16	939	2.646	Lakota Sand	7.2297E-04		2.1
7H	453.50	600	10.86	1.000	2.519	Morrison Shale	7.6994E-07		
7V	453.45	600	11.82	0.043	2.543	Morrison Shale	3.3107E-08		

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Table 6.1
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Laboratory Core Analyses for Powertech USA Inc. at Dewey-Burdock Site

Sample Number	Depth (ft)	Confining Stress (psig)	Porosity (%)	Air Intrinsic Permeability[1] k_a (mD)	Particle Density (g/cm^3)	Notes	Water Hydraulic Conductivity[2][3] K_w (cm/s)	Core K_h (ft/day)	Core K_v (ft/day)
DB-07-11-16C	**Burdock**								
8H	420.40	600	30.50	2,697	2.643	Lakota Sand	2.0765E-03	5.9	
8V	420.10	600	30.17	1,750	2.651	Lakota Sand	1.3474E-03		3.8
9H	455.90	600	6.99	0.004	2.536	Morrison Shale	3.0797E-09		
9V	455.45	600	7.65	0.012	2.556	Morrison Shale	9.2392E-09		
10H	503.30	600	12.96	0.697	2.474	Morrison Shale	5.3665E-07		
10V	503.45	600	No data						
DB 07-32-4C	**Dewey**								
11H	573.25	600	29.15	2,802	2.641	Fall River Sand	2.1574E-03	6.1	
11V	573.40	600	29.04	619	2.645	Fall River Sand	4.7659E-04		1.4
Summary									
Average Lakota Sand K_h, K_v								7.4	3.0
Average Lakota Sand K_h/K_v								2.42	
Fall River Sand K_h, K_v								6.1	1.4
Fall River Sand K_h/K_v								4.53	
Dewey Skull Creek Shale K_h							6.01E-08	1.71E-04	
Dewey Skull Creek Shale K_v							5.39E-09		1.54E-05
Dewey Skull Creek Shale K_h/K_v							11.14		

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Table 6.1
Powertech (USA) Inc.
Dewey-Burdock Project
2008 Pumping Tests: Results and Analysis

Laboratory Core Analyses for Powertech USA Inc. at Dewey-Burdock Site

Sample Number	Depth (ft)	Confining Stress (psig)	Porosity (%)	Air Intrinsic Permeability[1] k_a (mD)	Particle Density (g/cm^3)	Notes	Water Hydraulic Conductivity[2][3] K_w (cm/s)	Core K_h (ft/day)	Core K_v (ft/day)
Average Burdock Fuson Shale K_h							4.16E-07	1.19E-03	
Average Burdock Fuson Shale K_v							9.35E-08		2.67E-04
Average Burdock Fuson Shale K_h/K_v							4.45		
Dewey Fuson Shale K_h							5.62E-08	1.60E-04	
Dewey Fuson Shale K_v							6.16E-09		1.76E-05
Dewey Fuson Shale K_h/K_v							9.13		
Average Burdock Morrison Shale K_h							4.37E-07	1.24E-03	
Average Burdock Morrison Shale K_v							2.12E-08		6.03E-05
Average Burdock Morrison Shale K_h/K_v							20.62		

Notes:

(1) Assumed air temperature = 70^{o}F.

(2) Assumed water temperature = 52.8^{o}F, water density = 0.999548 g/cm^3, and water dynamic viscosity = 0.012570 g/cm-s.

(3) $K_w = k_a$ x $(\rho_w g/\mu_w)$, and 1.0 mD = 0.987 x 10^{-11} cm^2

Constants: At 52.8 ^{o}F Water (11.5 ^{o}C)

Density = 0.999548 g/cm^3

Dynamic Viscosity = '0.01257 g/cm-s

1 mD = 9.87E-12 cm^2

gravity = 981 cm/s^2

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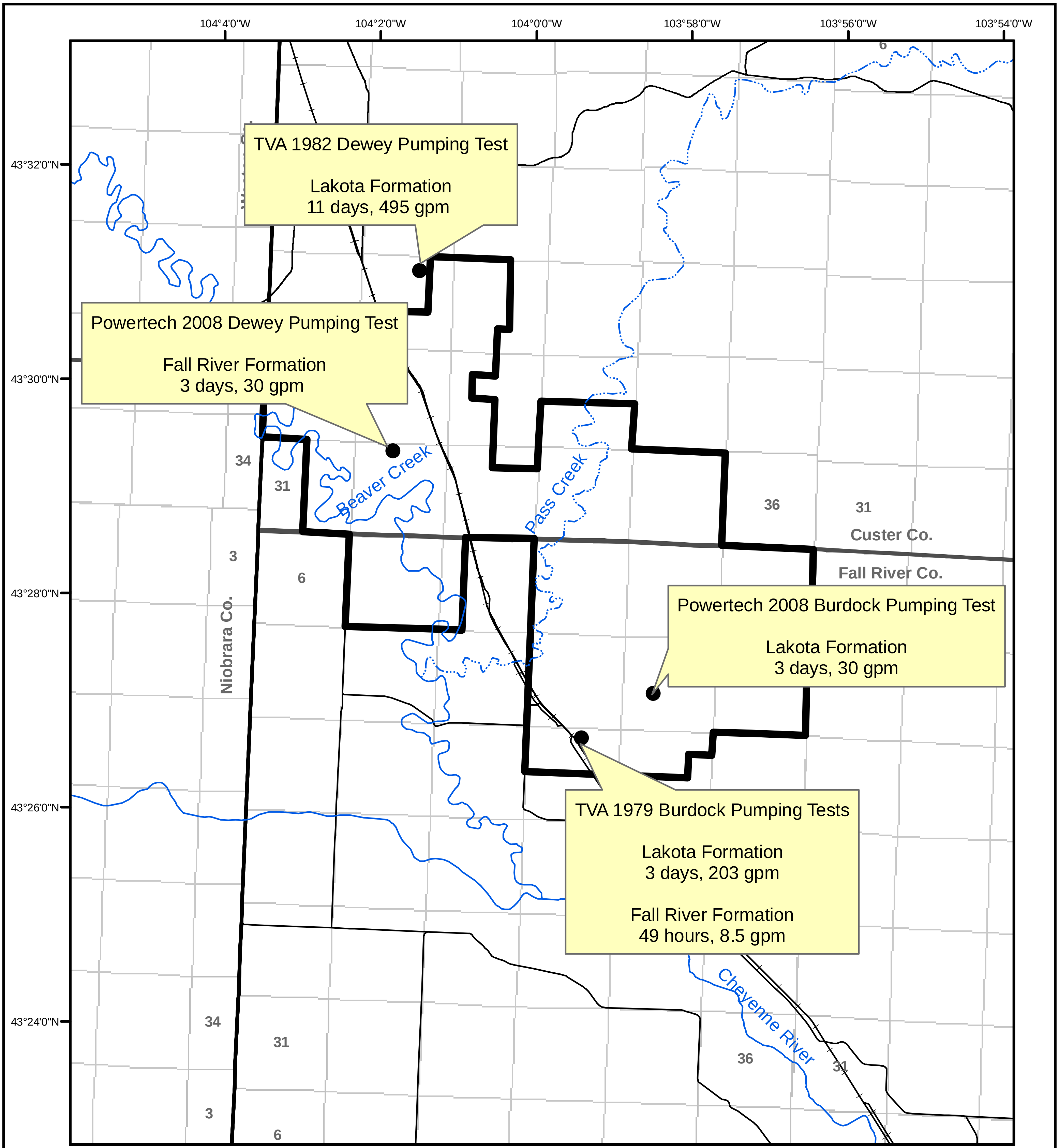
Figures



Legend

- Proposed Permit Boundary
- Sections
- Roads
- Railroad
- Perennial Streams
- Ephemeral Streams
- Pumping Test Wells

N

0 0.4 0.8 1.2 1.6 Miles

POWERTECH (USA) INC.

Figure 1.1

1979-1982 and 2008 Pumping Test Locations

Dewey-Burdock Project

NAD 1983 South Dakota South (ft)

Created By:	C. Hocking, RESPEC
Date:	11/11/08
Map File:	Figure_1_1.mxd

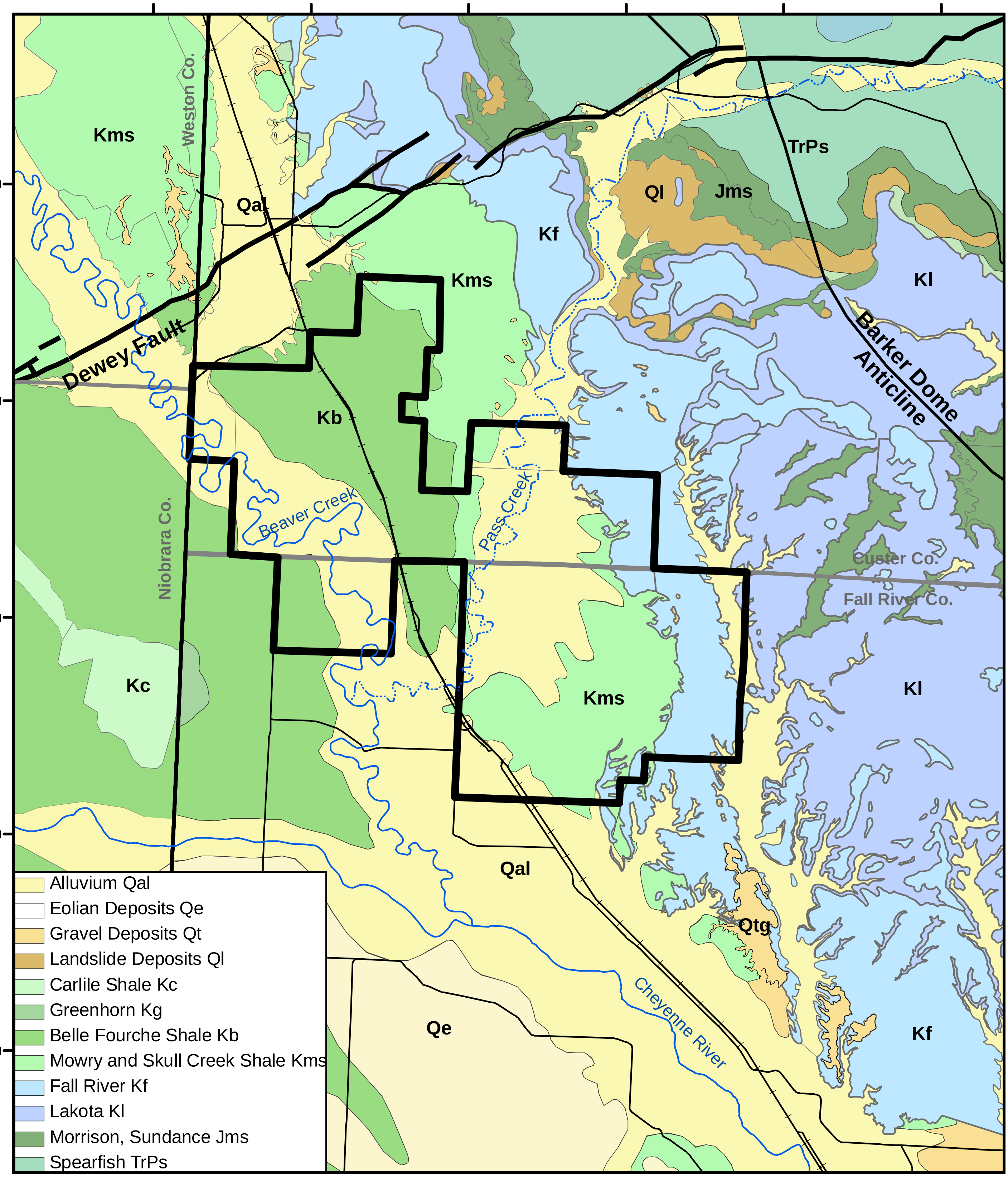
South Dakota

Wyoming

Nebraska

PERIOD	FORMATION	Sym-bol	COLUMN	LITHOLOGIC DESCRIPTION	Thickness	CORRELATION
Tertiary	**White River Fm.**	**Twr**		Volcanic Ash	0-500 ft	
Cretaceous	**Pierre Fm.**	**Kp**		Dark Gray Shale, weather brown, fossiliferous	0-1000 ft	
	Niobrara Fm.	**Kn**		Gray calcareous shale weathers yellow	0-225 ft	
	Carlile Fm.	**Kcr**		Gray shale w/ thin ss beds	0-540 ft	
	Greenhorn LS	**Kg**		Thin bed hard limestone, fossiliferous	0-50 ft	
	Belle Fourche Fm. Mowry Shale Newcastle SS Skull Creek Sh	**Kgs**		Lt gy shale, bentonite w/concretions Thin brn -yellow ss Black carbonaceous sh	0-870 ft	
	Fall River Fm.	**Kfr**		Interbed red-brn massive ss and carbonaceous shale	30-165 ft	**Uranium Zone**
	Fuson Sh.			Gy-purple sh, bentonite, concretions	0-160 ft	
	Minnewasta LS			Lt gy massive ls	0-25 ft	
	Lakota Fm.	**Klk**		Coarse massive ss, buff-gray coal near base	130-230 ft	**Uranium Zone**
Jurassic	**Morison Fm.**	**Jm**		Green maroon sh	0-125 ft	
	Unkapa Fm	**Ju**		fine gr massive ss	0-240 ft	
	Sundance Fm	**Jsd**		red ss interbeds and red to green marine sh	250-450 ft	

Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Site Stratigraphy	
	Project No: DV10200279.01	Date: 11/12/08	Figure 2.1



Legend

- Proposed Permit Boundary
- Roads
- Railroad
- Perennial Streams
- Ephemeral Streams

N

0 0.4 0.8 1.2 1.6 Miles

1:92,597

Figure 2.2

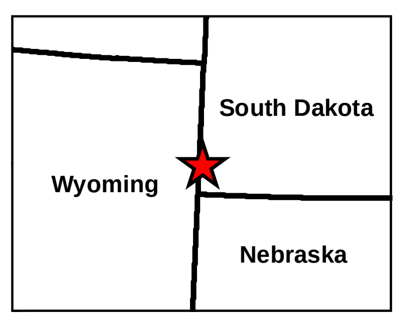
Site Surface Geology

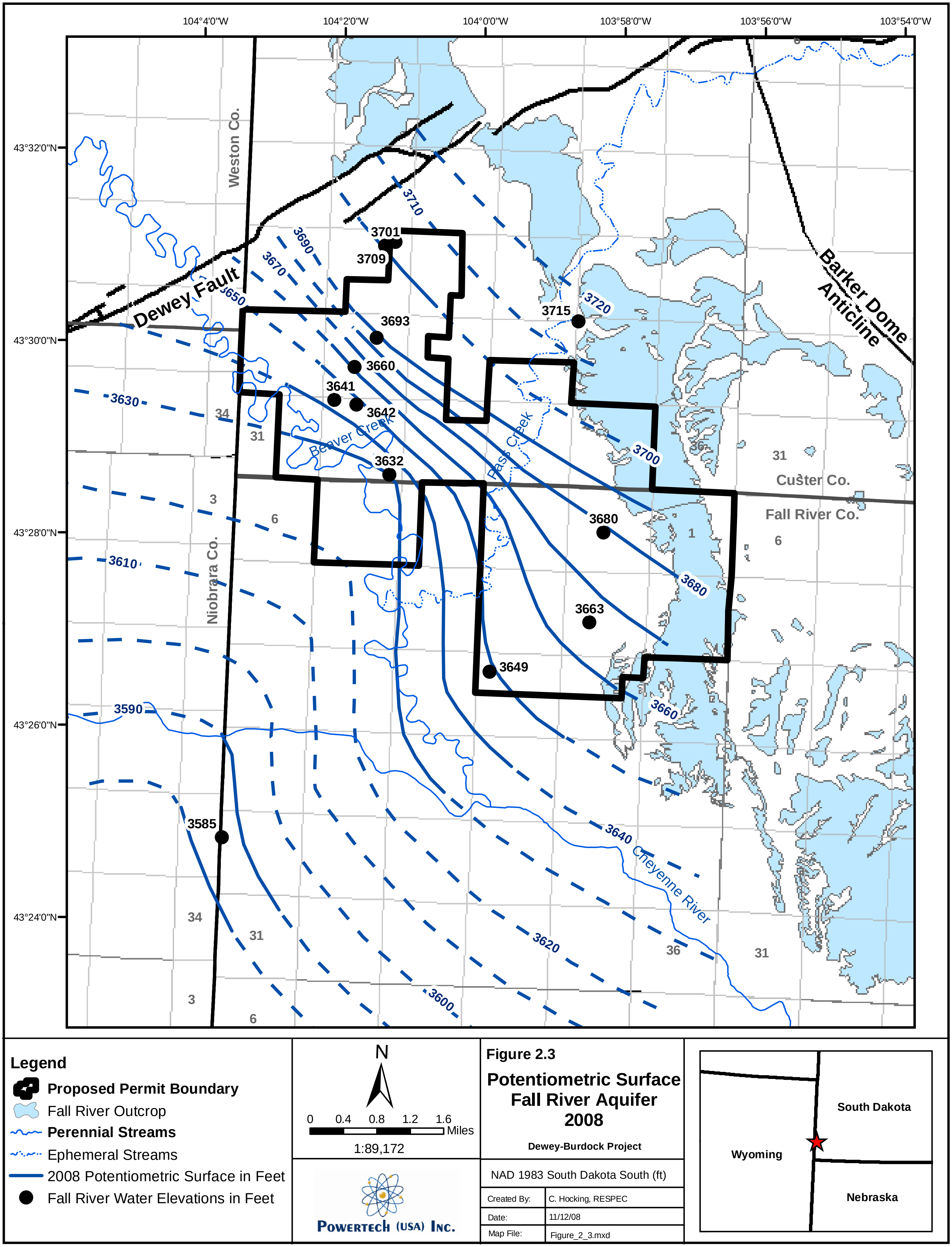
Dewey-Burdock Project

NAD 1983 South Dakota South (ft)

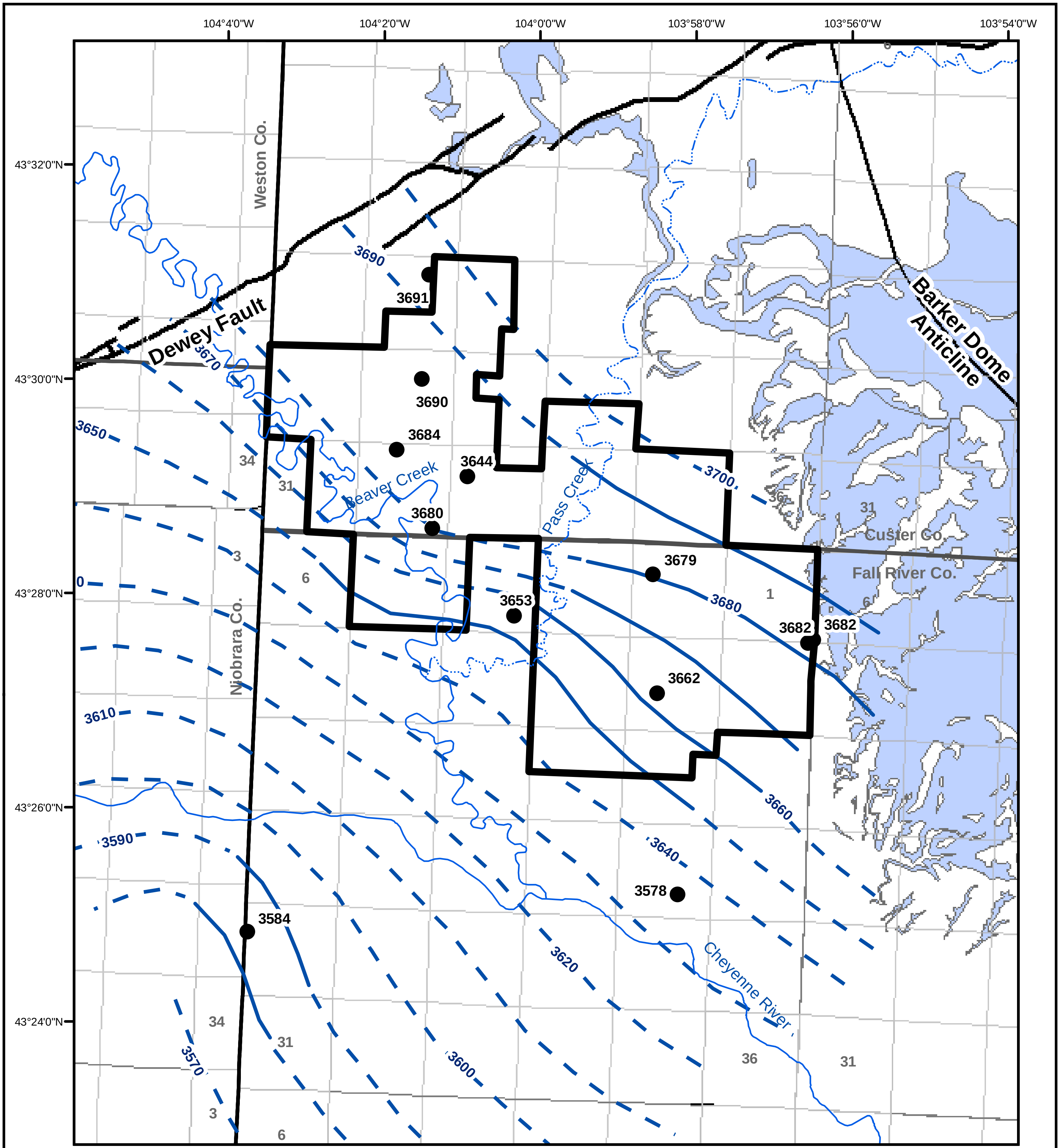
Created By:	C. Hocking
Date:	11/11/08
Map File:	Figure_2_2.mxd

POWERTECH (USA) INC.





104°4'0"W
104°2'0"W
104°0'0"W
103°58'0"W
103°56'0"W
103°54'0"W
43°32'0"N
43°30'0"N
43°28'0"N
43°26'0"N
43°24'0"N
Weston Co.
Niobrara Co.
Custer Co.
Fall River Co.
Dewey Fault
Barker Dome Anticline
Beaver Creek
Pass Creek
Cheyenne River
3701
3709
3693
3660
3641
3642
3632
3715
3680
3663
3649
3585
3710
3690
3670
3650
3720
3700
3630
3610
3590
3680
3660
3640
3620
3600
34
31
3
6
36
1
Legend
Proposed Permit Boundary
Fall River Outcrop
Perennial Streams
Ephemeral Streams
2008 Potentiometric Surface in Feet
Fall River Water Elevations in Feet
N
0 0.4 0.8 1.2 1.6
Miles
1:89,172
POWERTECH (USA) INC.
Figure 2.3
Potentiometric Surface
Fall River Aquifer
2008
Dewey-Burdock Project
NAD 1983 South Dakota South (ft)
Created By: C. Hocking, RESPEC
Date: 11/12/08
Map File: Figure_2_3.mxd
South Dakota
Wyoming
Nebraska



Legend

Proposed Permit Boundary
Lakota Outcrop
Perennial Streams
Ephemeral Streams
2008 Potentiometric Surface in Feet
Lakota Water Elevations in Feet

N
0 0.4 0.8 1.2 1.6 Miles
1:89,172

POWERTECH (USA) INC.

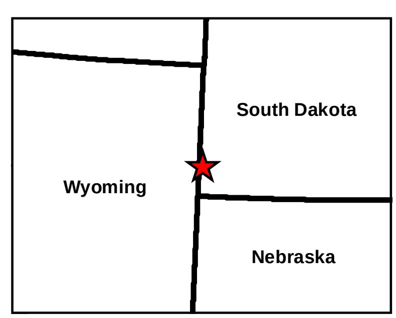
Figure 2.4

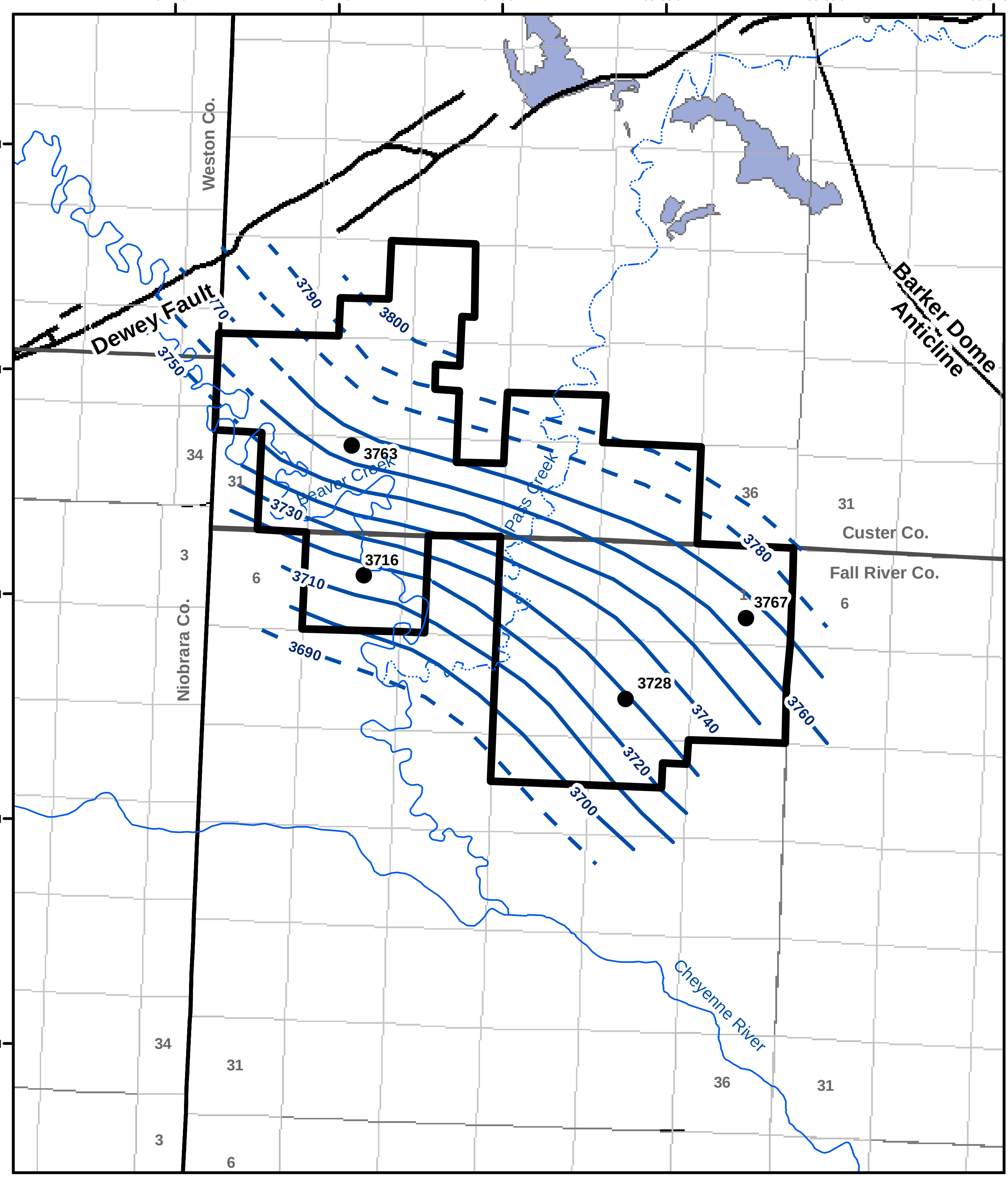
Potentiometric Surface
Lakota Aquifer
2008

Dewey-Burdock Project

NAD 1983 South Dakota South (ft)

Created By:	C. Hocking, RESPEC
Date:	11/12/08
Map File:	Figure_2_4.mxd





Legend

Proposed Permit Boundary
Sundance/Unkpapa Outcrop
Perrenial Streams
Ephemeral Streams
2008 Potentiometric Surface in Feet
Unkpapa Water Elevations in Feet

N

0 0.4 0.8 1.2 1.6 Miles

1:89,172

POWERTECH (USA) INC.

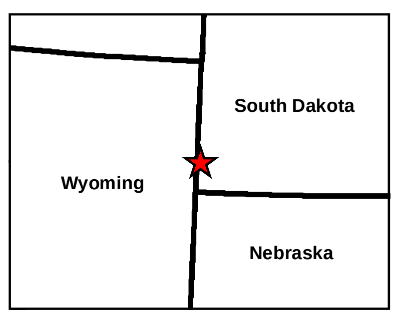
Figure 2.5

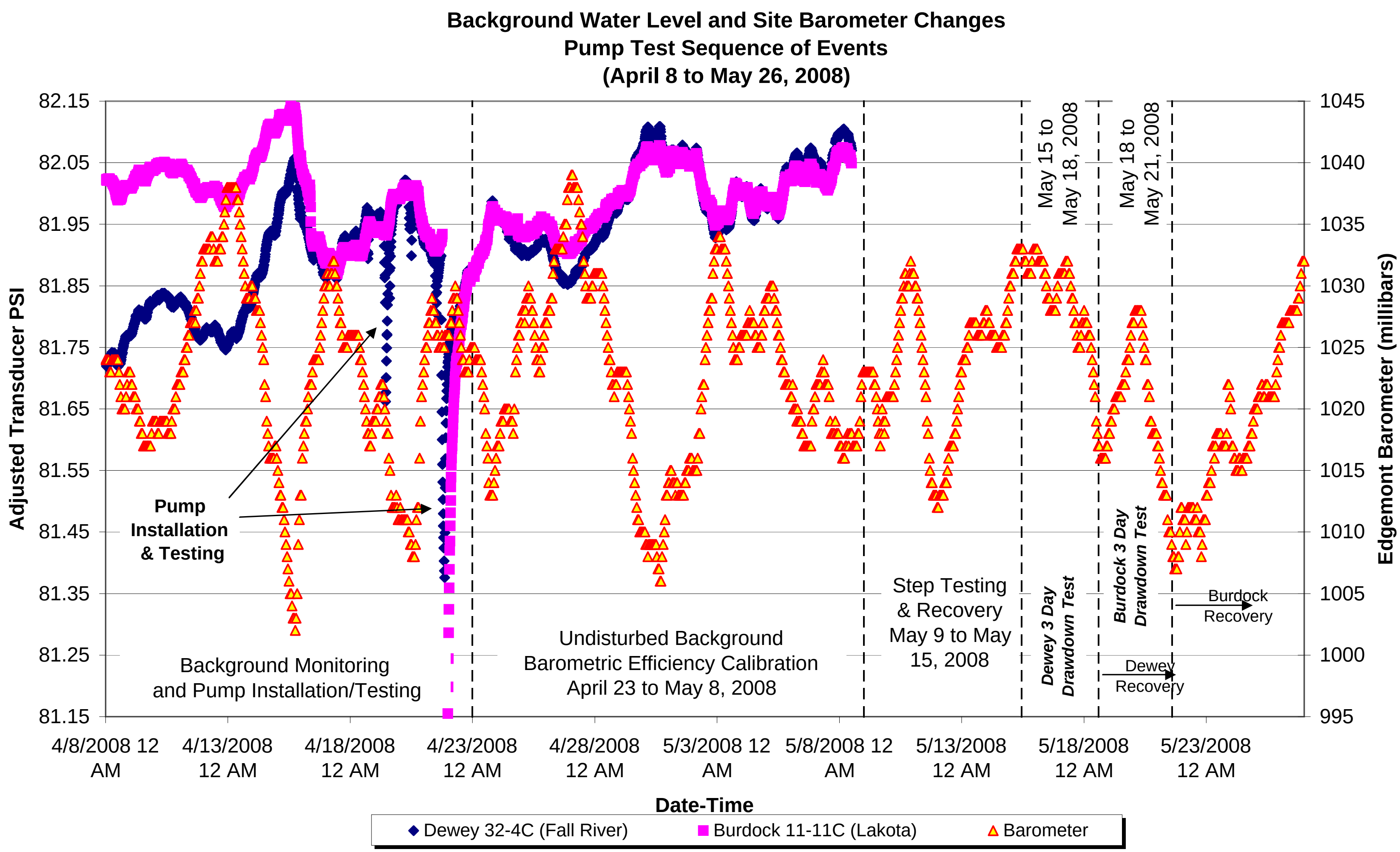
Potentiometric Surface Unkpapa Aquifer 2008

Dewey-Burdock Project

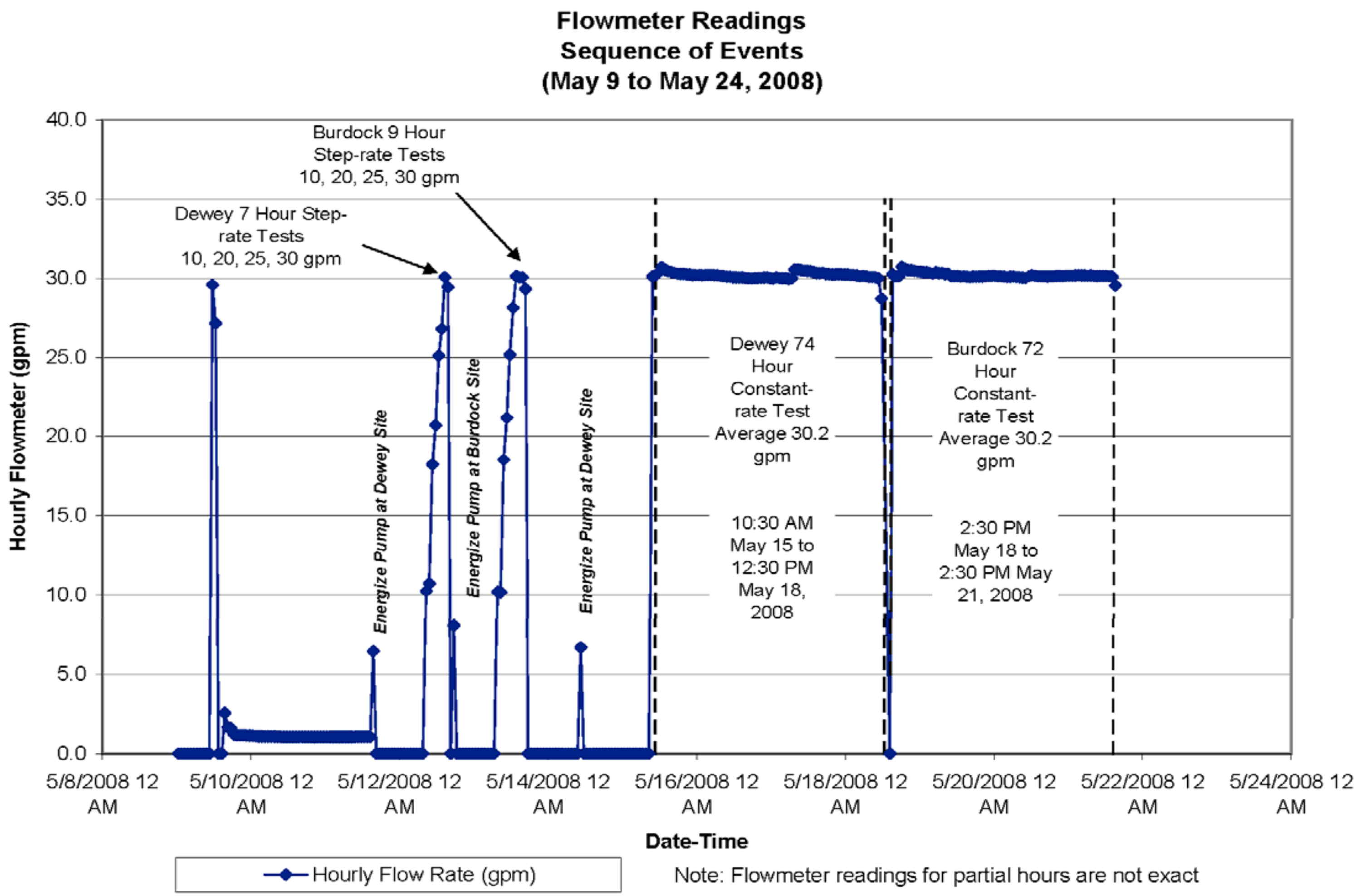
NAD 1983 South Dakota South (ft)

Created By:	C. Hocking, RESPEC
Date:	11/12/08
Map File:	Figure_2_5.mxd

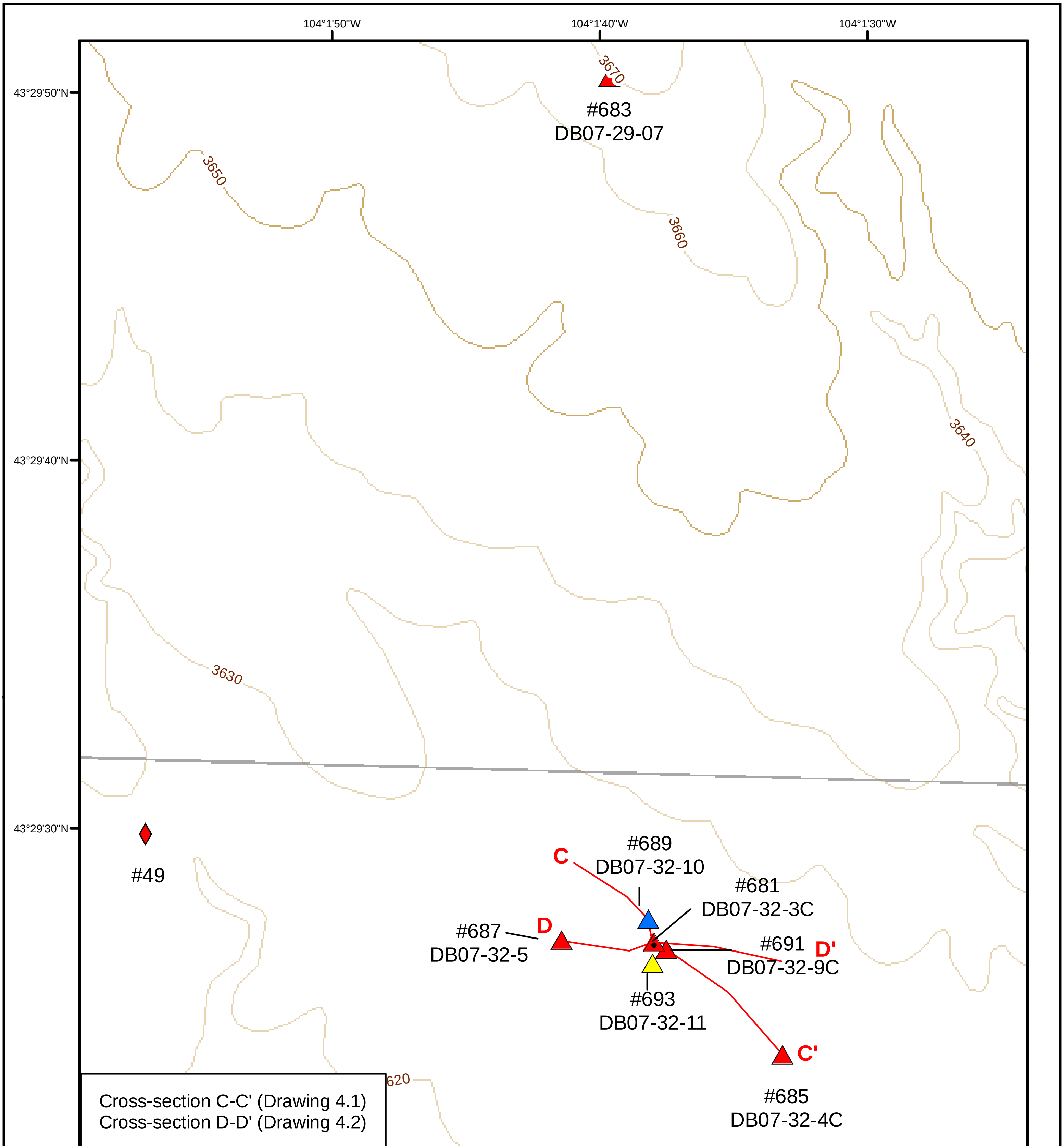




Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Background Monitoring (April 8 to May 26, 2008)	
	Project No: DV10200279.01	Date: 11/12/08	Figure 3.1



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Flowmeter Readings (May 9 to May 24 2008)	
	Project No: DV10200279.01	Date: 11/12/08	Figure 3.2



Legend

- Fall River Pump Well
- Fall River Monitor Well
- Fall River Stock Well
- Lakota Monitor Well
- Unkpapa Monitor Well

10 ft contour interval

N

0 100 200 300 400 Feet

POWERTECH (USA) INC.

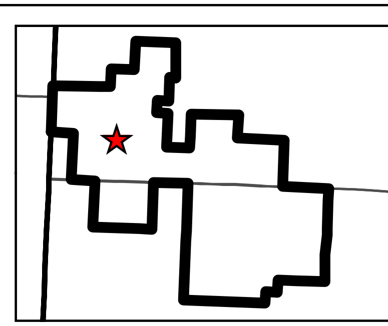
Figure 4.1

Dewey May 2008 Pumping Test Well Locations

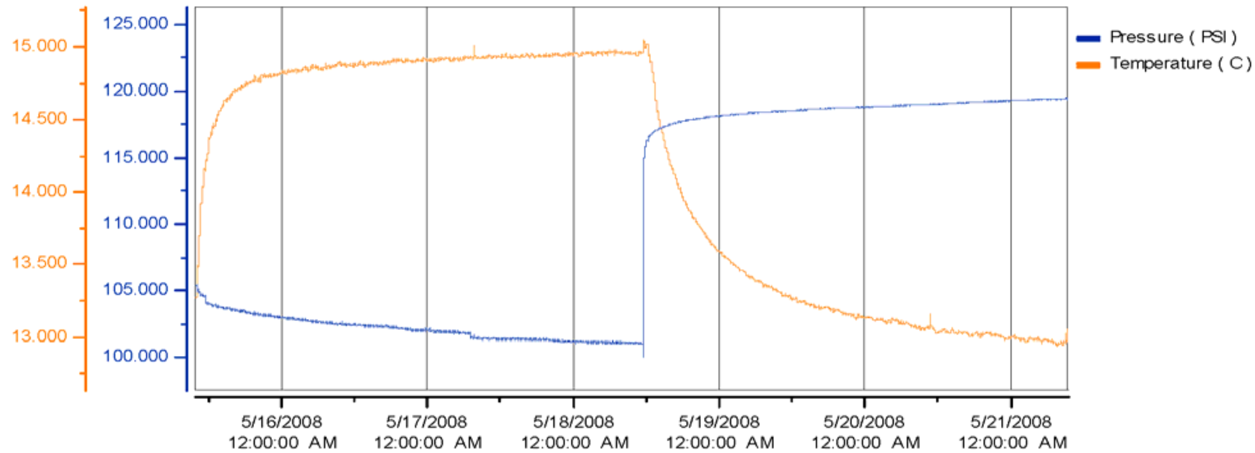
Dewey-Burdock Project

NAD 1983 South Dakota South (ft)

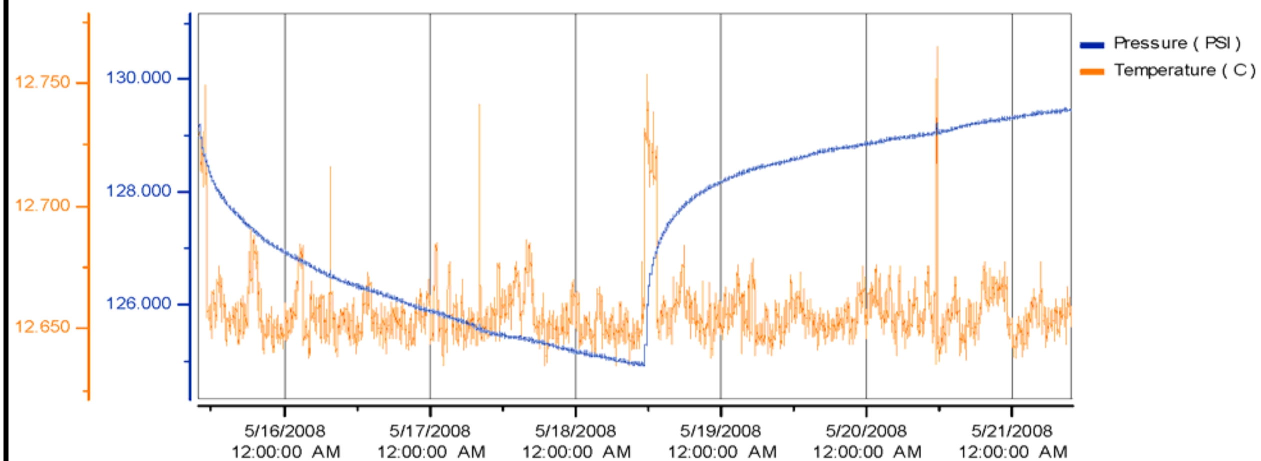
Created By:	C. Hocking, RESPEC
Date:	11/11/08
Map File:	Figure_4_1.mxd



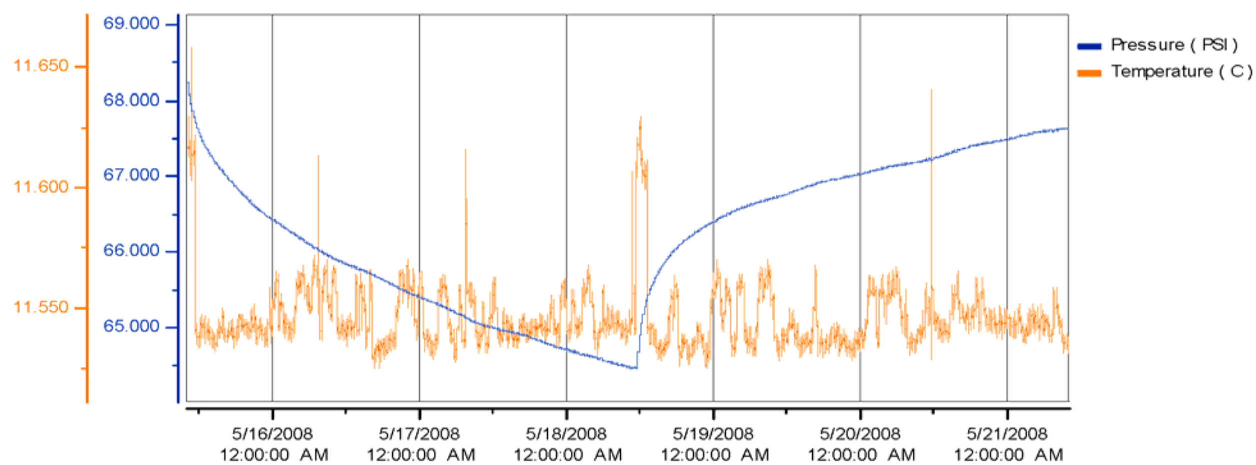
Dewey 32-3C (r = 0 Ft, Pumping Well @ 30.2 gpm)



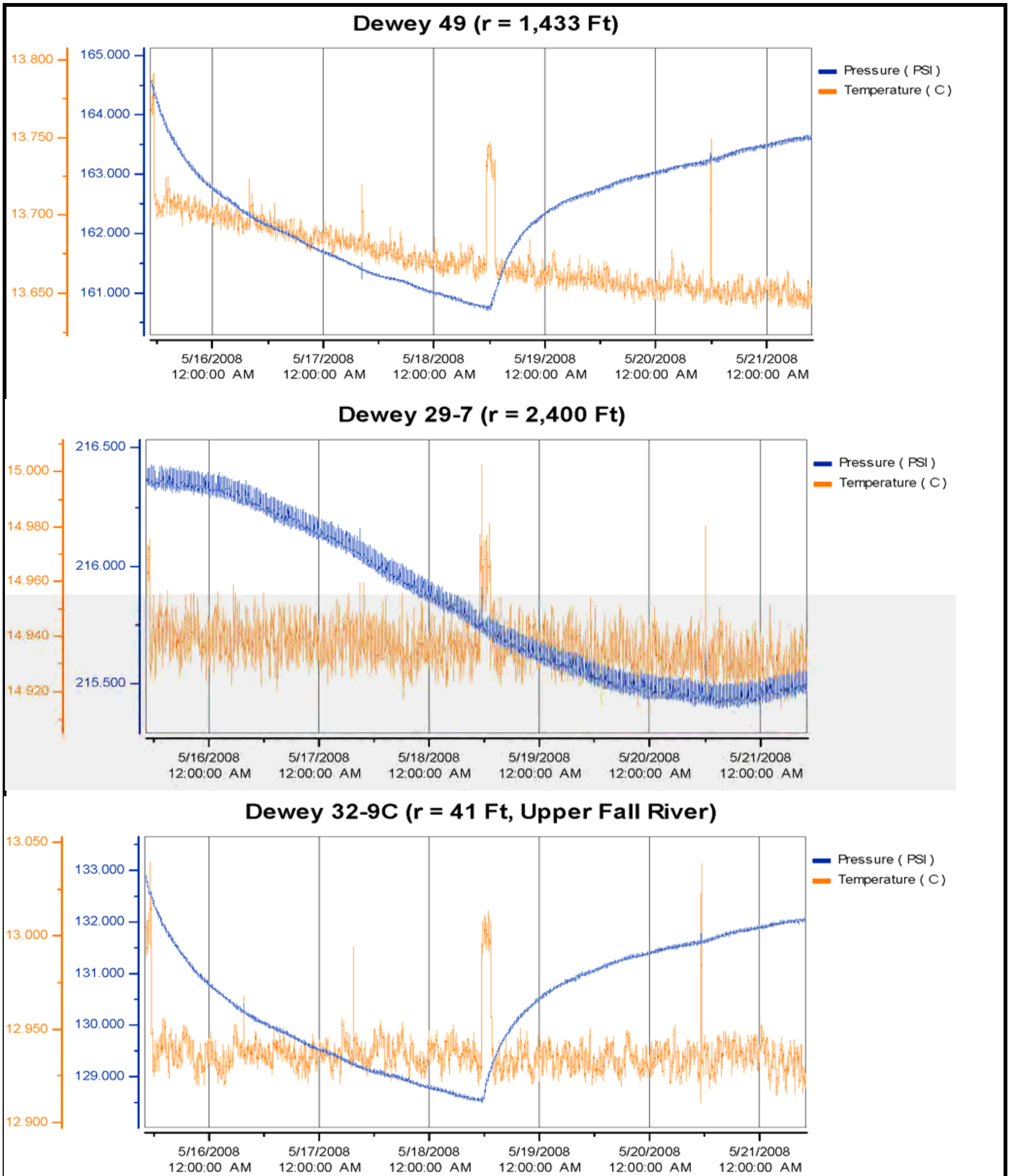
Dewey 32-5 (r = 265 Ft)



Dewey 32-4C (r = 467 Ft)

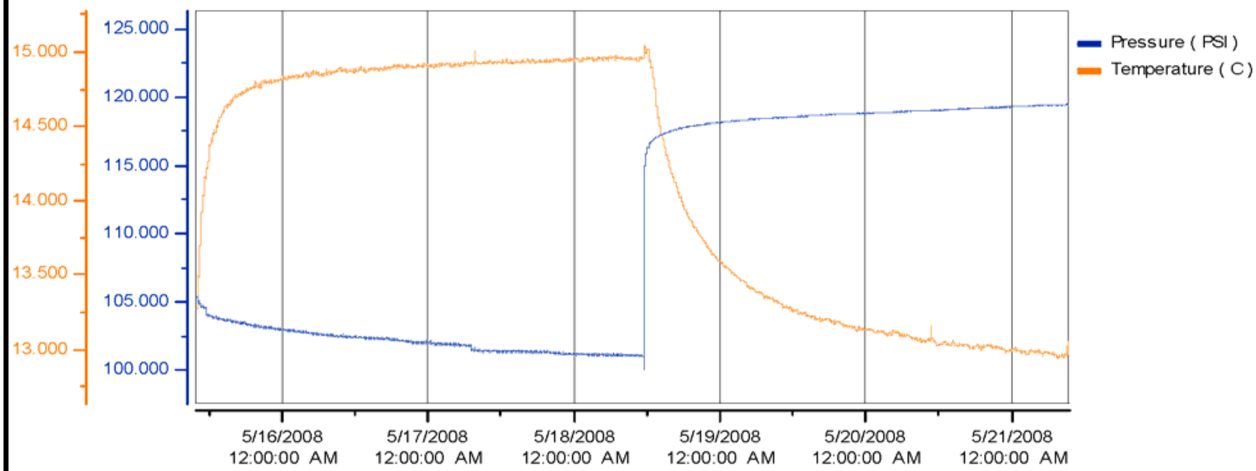


Client	Project		Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT		Transducer Response at Dewey Test Pumping Well 32-3C, Observation Wells 32-5 and 32-4C	
	Project No:	DV10200279.01	Date: 11/12/08	Figure 4.2

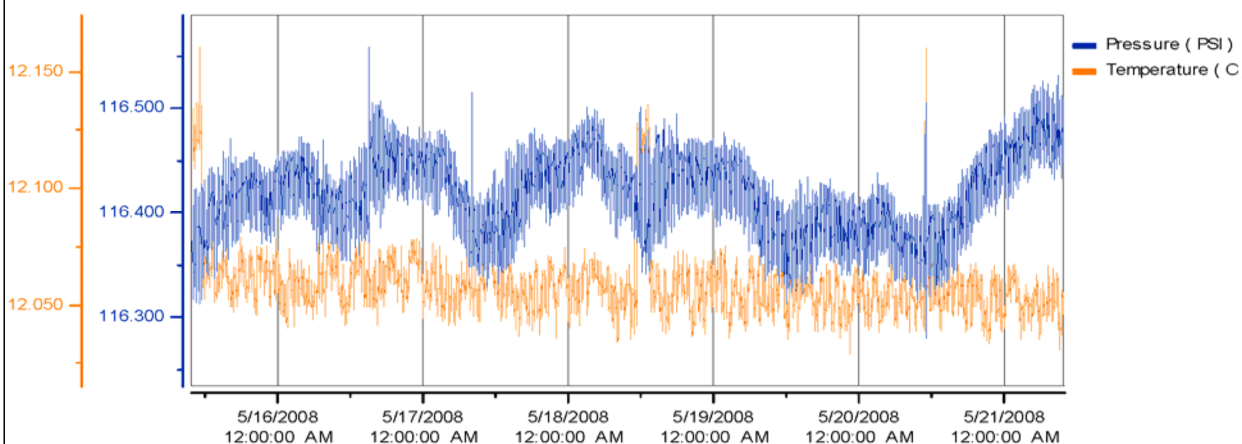


Client	Project		Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT		Transducer Response at Dewey Test Observation Wells GW-49, 29-7 and 32-9C	
	Project No:	DV10200279.01	Date: 11/12/08	Figure 4.3

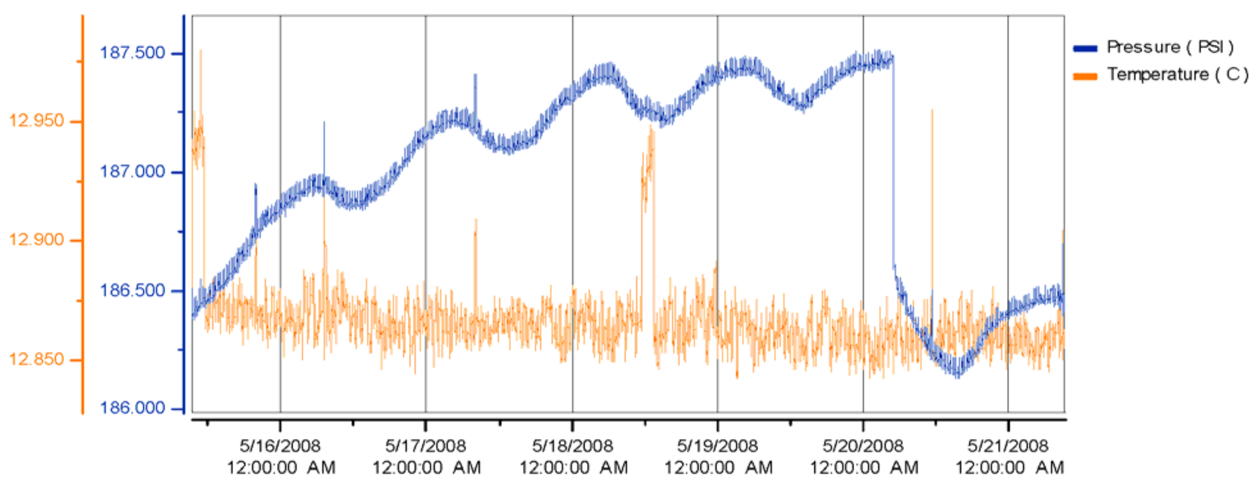
Dewey 32-3C (r = 0 Ft, Pumping Well @ 30.2 gpm)



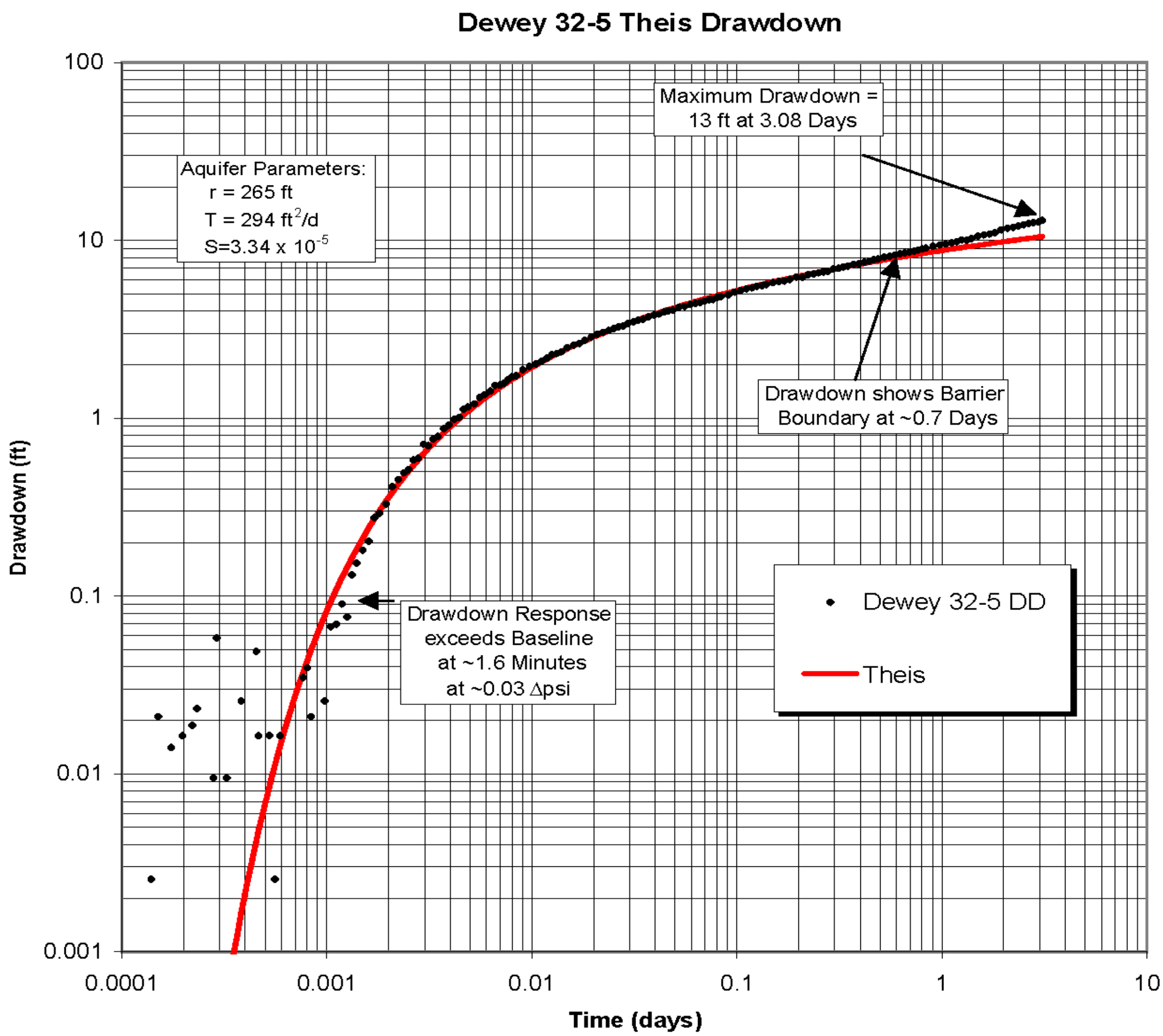
Dewey 32-10 (r = 61 Ft, Lakota)



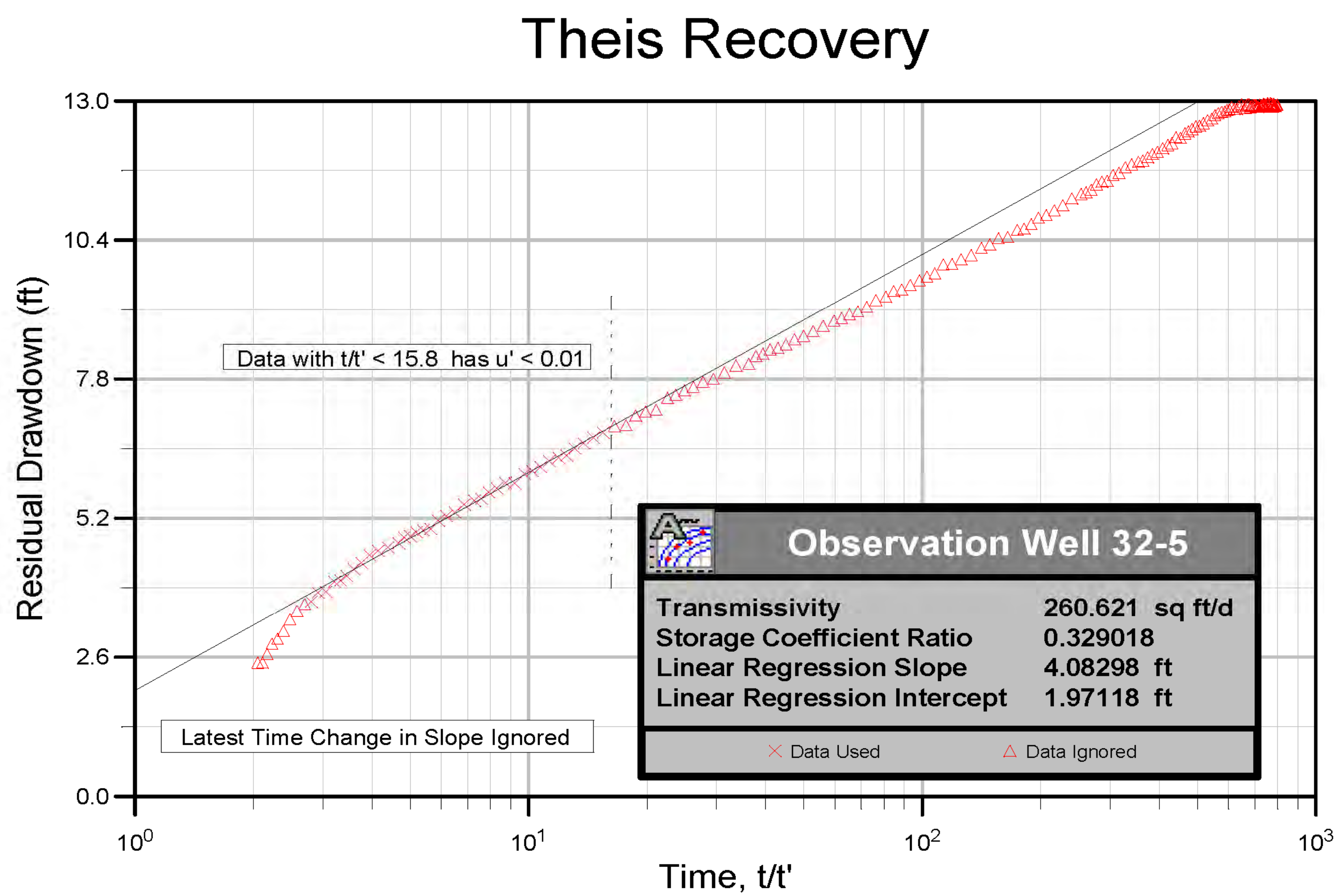
Dewey 32-11 (r = 50 Ft, Unkpapa)



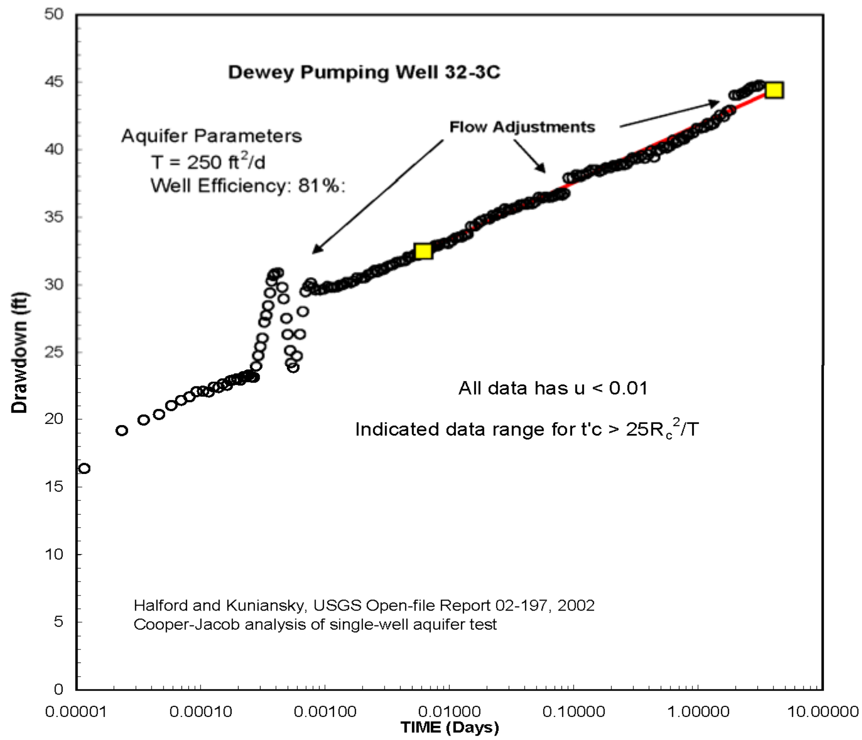
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Non-responding Dewey Test Observation Wells 32-10 (Lakota) and 32-11 (Unkpapa) compared to Pumping Well	
	Project No: DV10200279.01	Date: 11/12/08	Figure 4.4

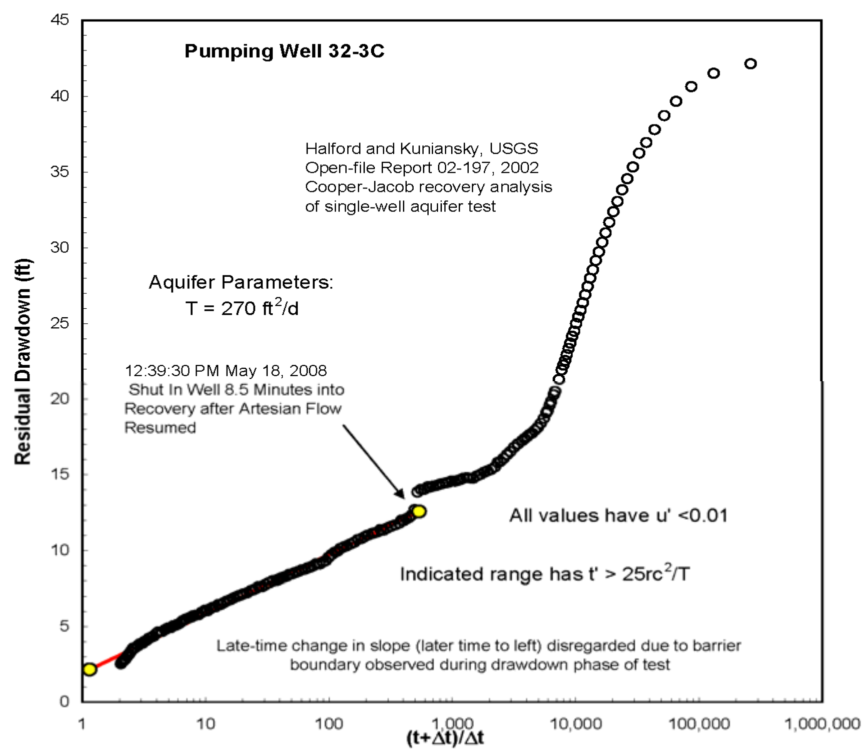


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Drawdown and Analysis at Dewey Test Observation Well 32-5	
	Project No: DV10200279.01	Date: 11/12/08	Figure 4.5

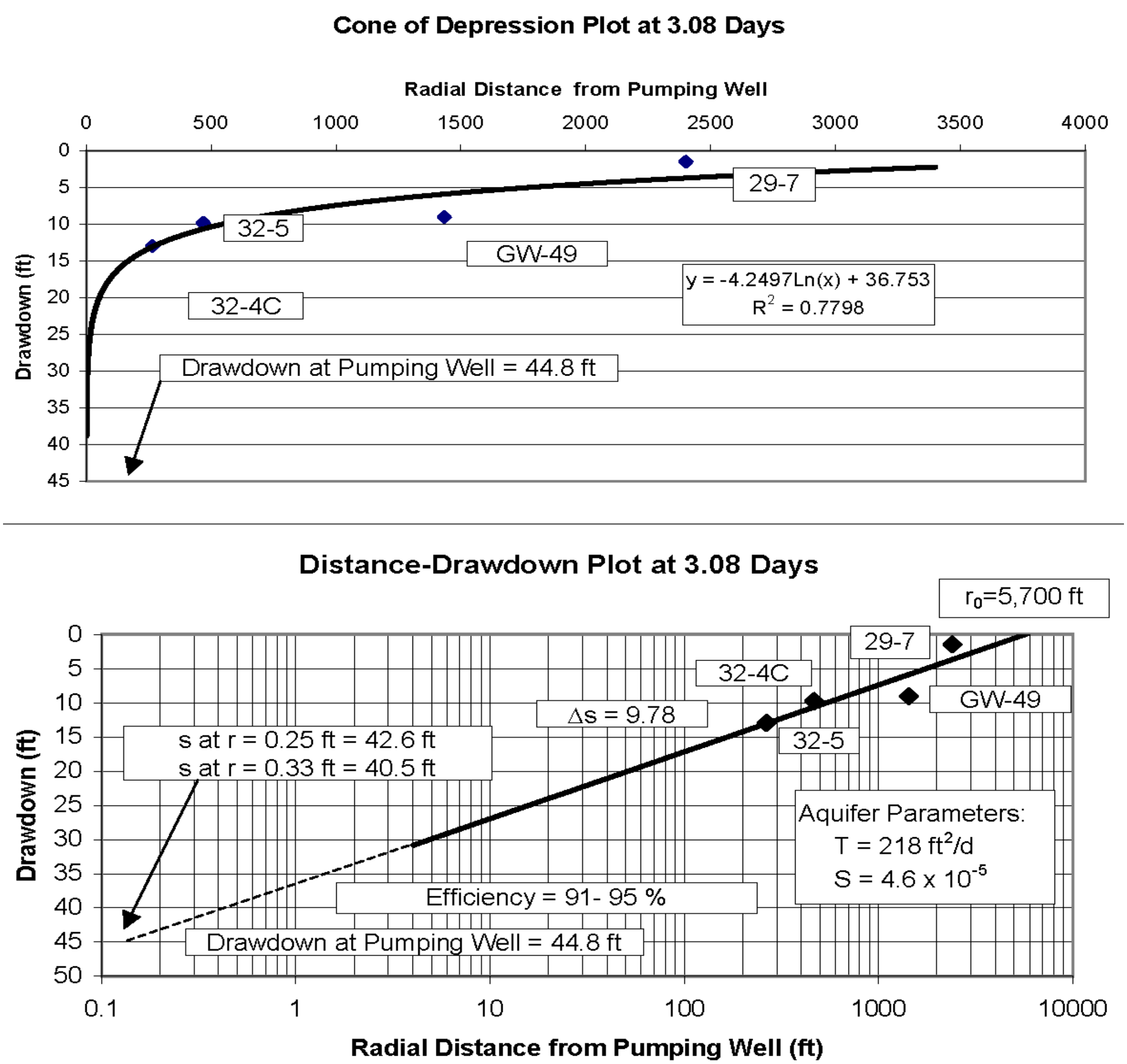


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Recovery Analysis at Dewey Observation Well 32-5	
	Project No: DV10200279.01	Date: 11/12/08	Figure 4-6

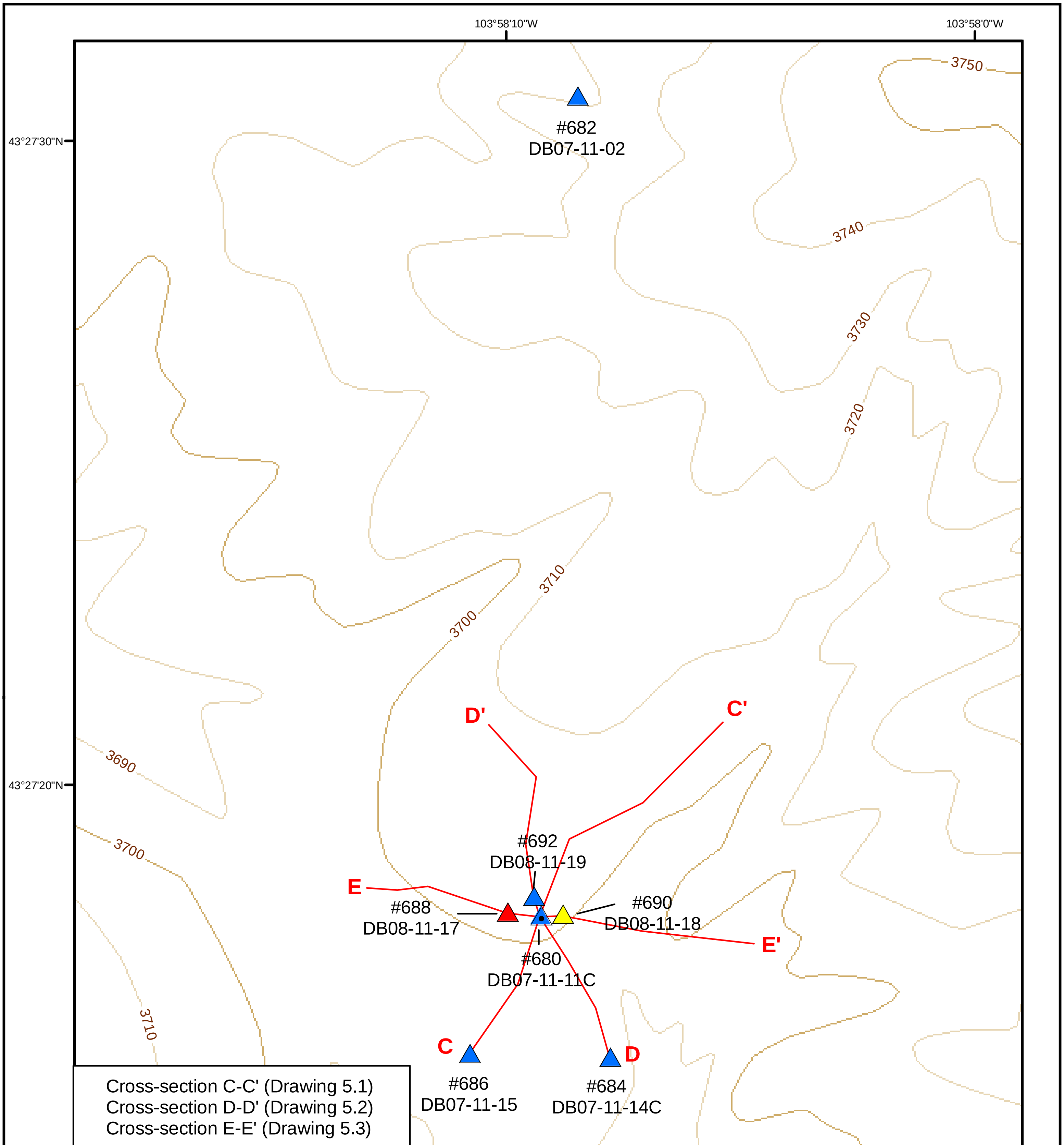




Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Straight-line Analyses of Drawdown and Recovery at Dewey Pumping Well 32-3C	
	Project No: DV10200279.01	Date: 11/14/08	Figure 4.7



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Distance Drawdown Analysis, Dewey Pumping Test	
	Project No: DV10200279.01	Date: 11/12/08	Figure 4.8



Legend

- Lakota Pump Well
- Lakota Monitor Well
- Fall River Monitor Well
- Unkpapa Monitor Well

10 ft contour interval

N

0 50 100 150 200 Feet

POWERTECH (USA) INC.

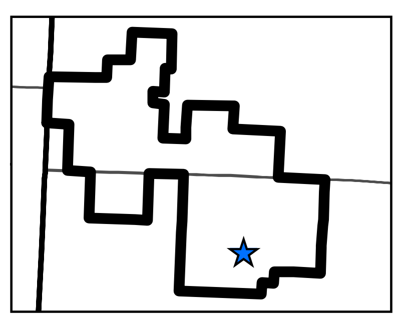
Figure 5.1

Burdock May 2008 Pumping Test Well Locations

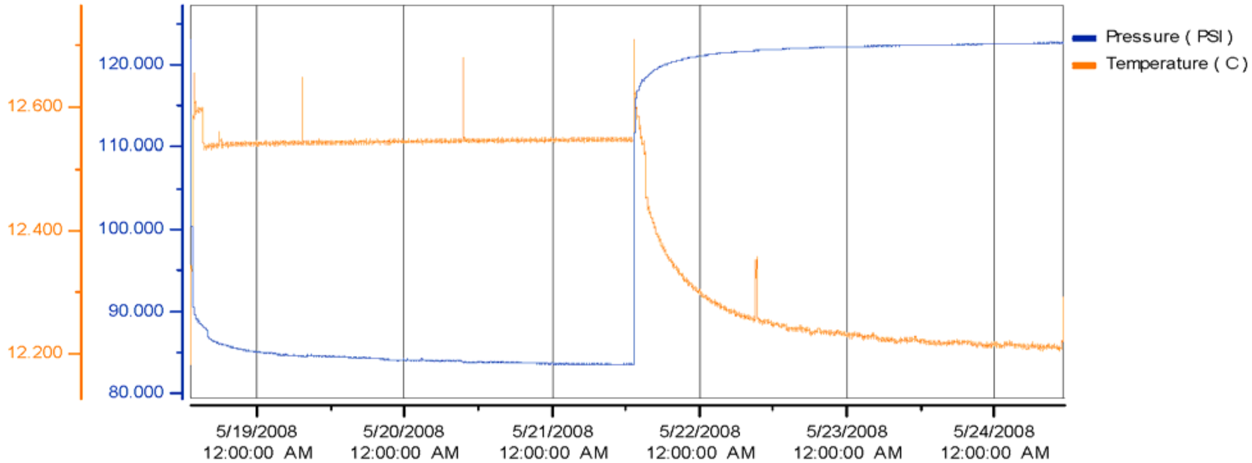
Dewey-Burdock Project

NAD 1983 South Dakota South (ft)

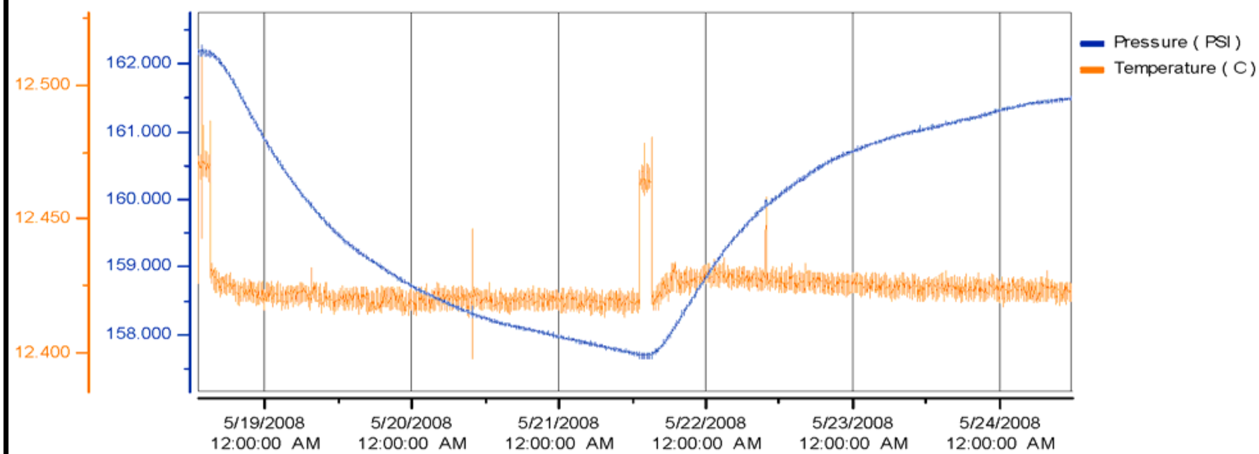
Created By:	C. Hocking, RESPEC
Date:	11/11/08
Map File:	Figure_5_1.mxd



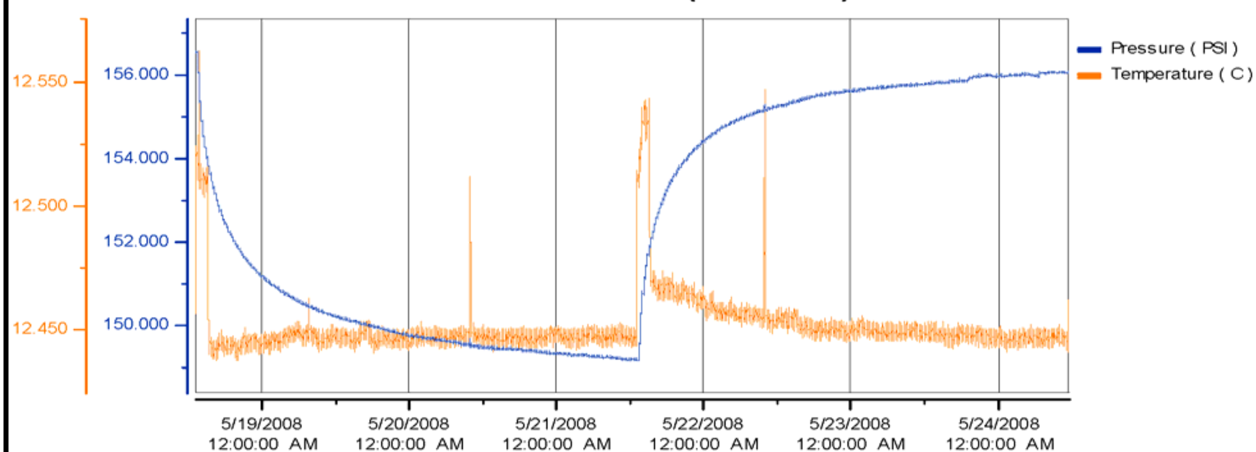
Burdock 11-11C (r = 0 Ft, Pumping Well @ 30.2 gpm)



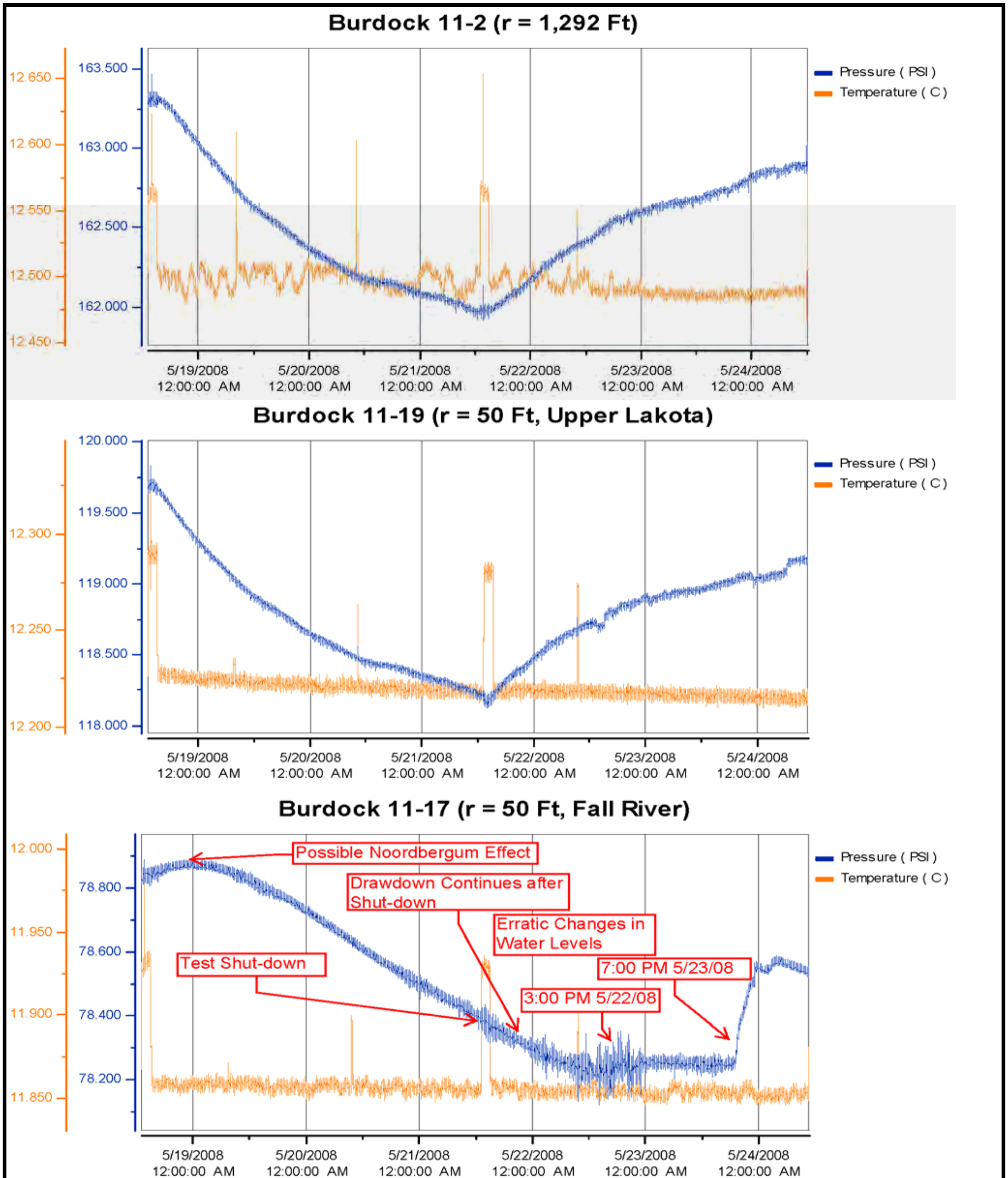
Burdock 11-15 (r = 243 Ft)



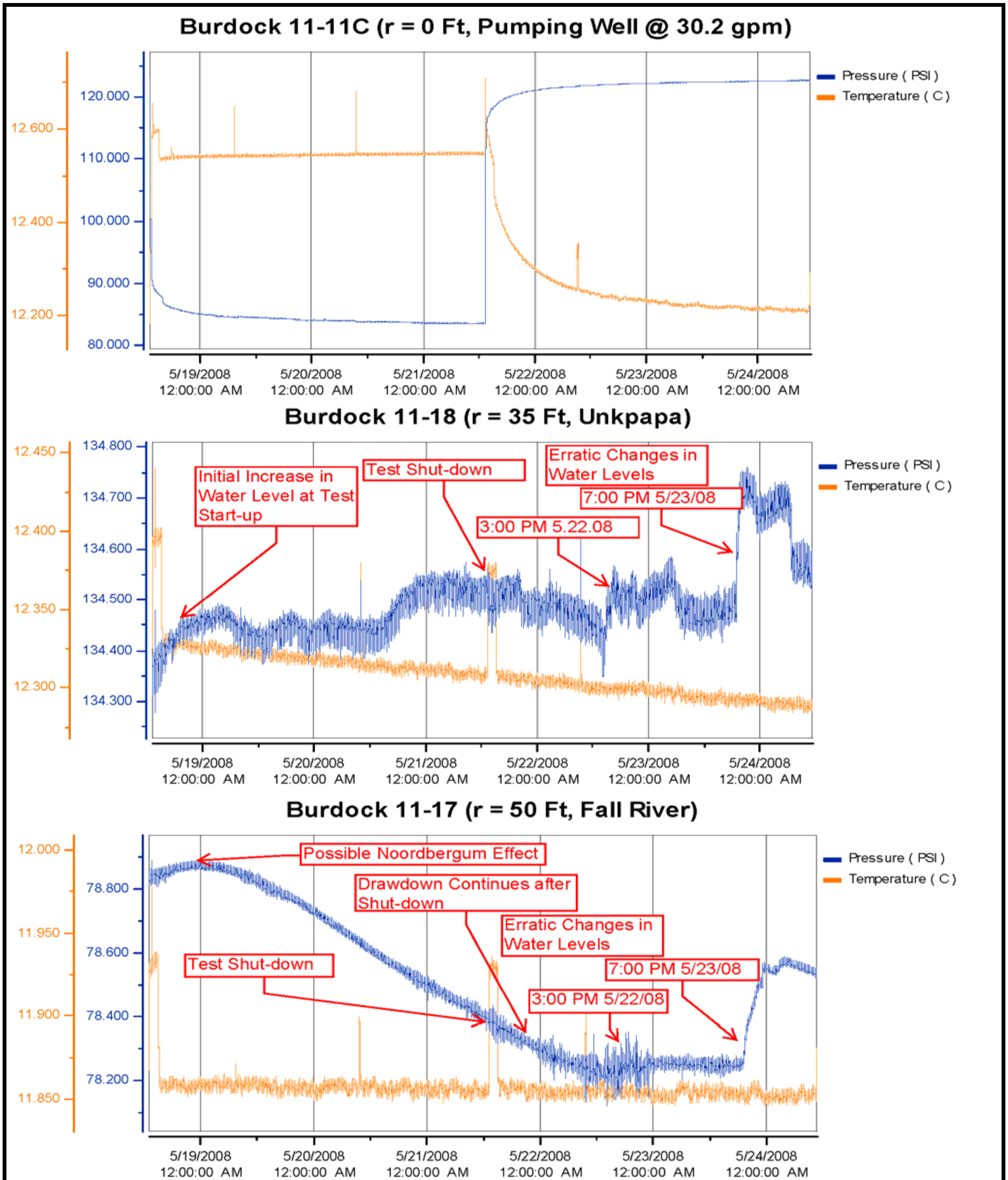
Burdock 11-14C (r = 250 Ft)



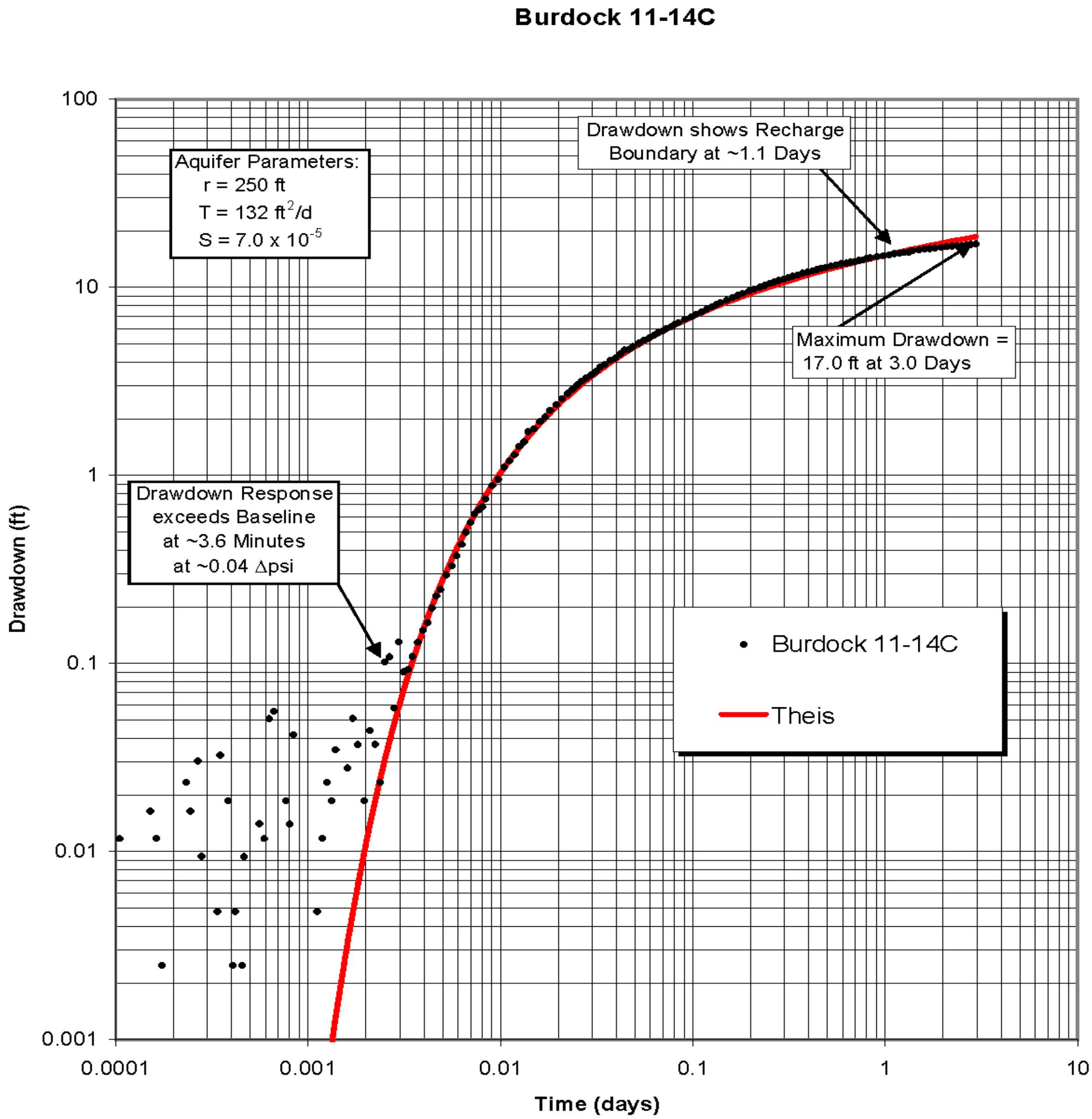
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Transducer Response at Burdock Test Pumping Well 11-11C, Observation Wells 11-15, and 11-14C	
	Project No: DV10200279.01	Date: 11/12/08	Figure 5.2



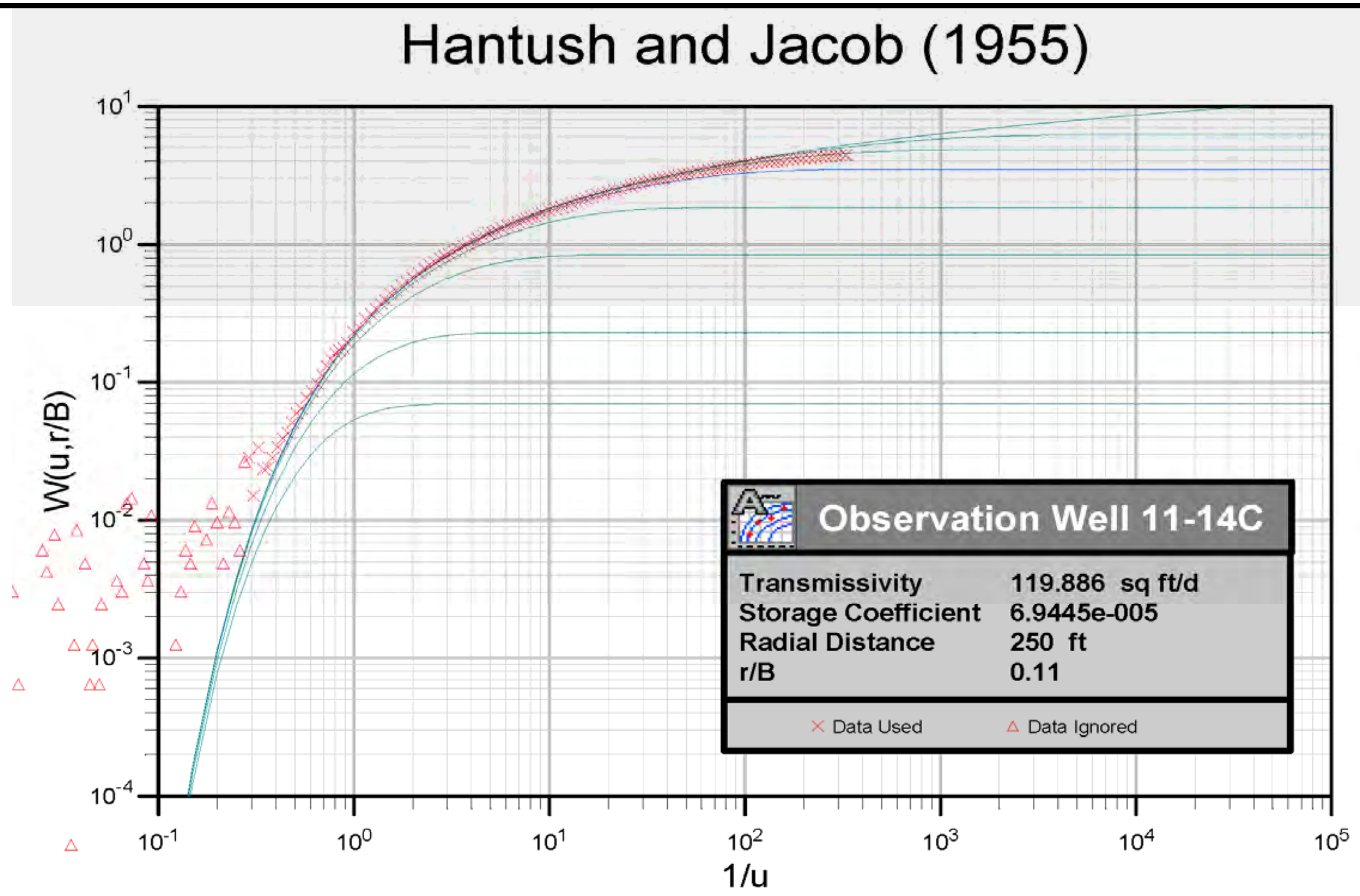
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Transducer Response at Burdock Test Observation Wells 11-2, 11-19 and 11-17	
	Project No: DV10200279.01	Date: 11/12/08	Figure 5.3



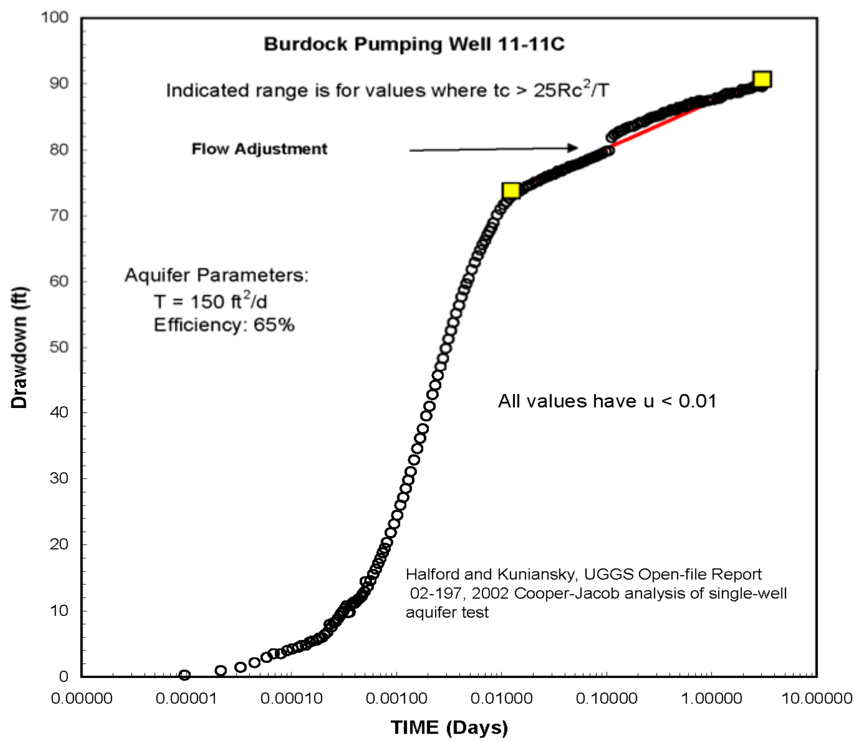
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Non-responding Burdock Test Observation Well 11-18 (Unkpapa) compared to Pumping Well and Observation Well 11-17 (Fall River)	
	Project No: DV10200279.01	Date: 11/12/08	Figure 5.4

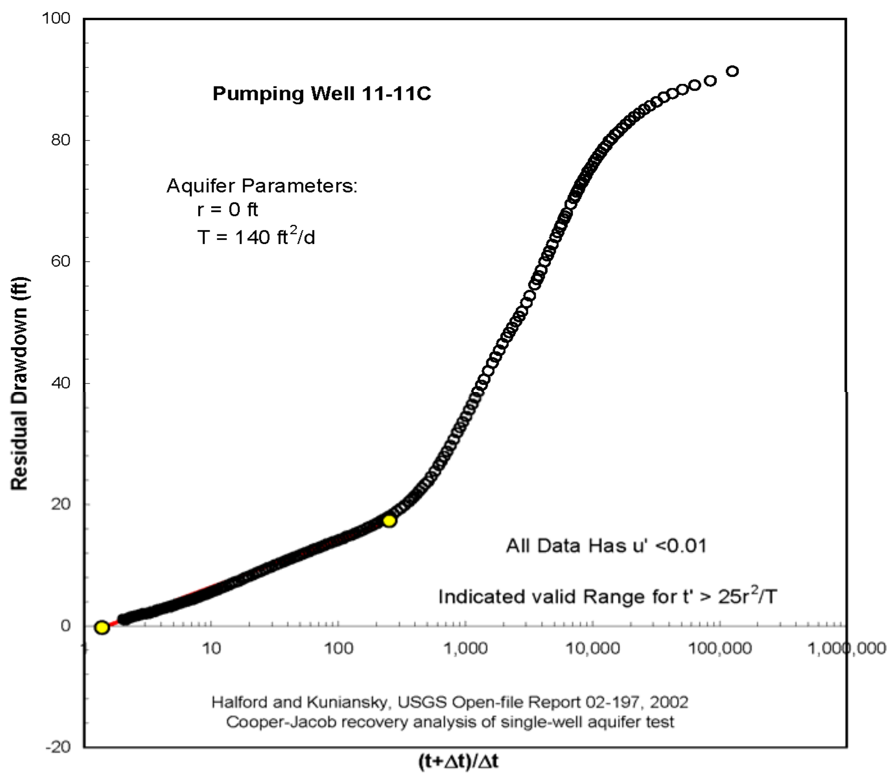


Client	Project		Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT		Drawdown and Analysis at Burdock Test Observation Well 11-14C	
	Project No:	DV10200279.01	Date: 11/12/08	Figure 5.5



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Hantush-Jacob Leaky Confined Aquifer Analysis at Burdock Observation Well 11-14C	
	Project No: DV10200279.01	Date: 11/12/08	Figure 5.6





Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Straight-line Analyses of Drawdown and Recovery at Burdock Pumping Well 11-11C	
	Project No: DV10200279.01	Date: 11/12/08	Figure 5.7

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Drawings

Legend

Screen

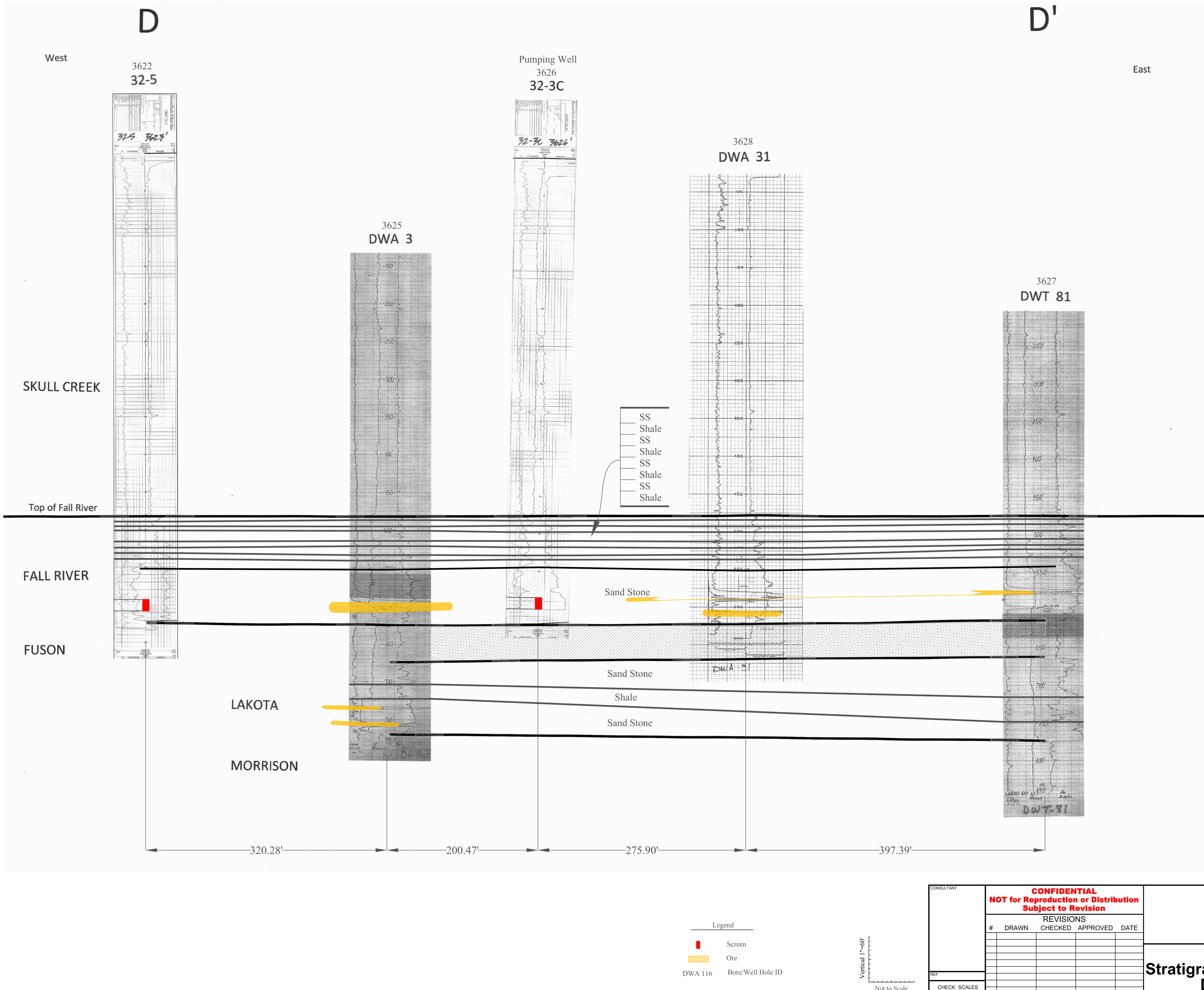
Ore

DWA 116 Bore/Well Hole ID

Vertical 1"=60'

Not to Scale

CONSULTANT	CONFIDENTIAL NOT for Reproduction or Distribution Subject to Revision	POWERTECH (USA) INC.
REF	REVISIONS # DRAWN CHECKED APPROVED DATE	DRAWING 4.1 Stratigraphic Cross-Section C-C' Dewey Pump Test
CHECK SCALES If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 12-Nov-2008 / DATE 11-November-2008	PROJECT Dewey Pump Test Drawing 4.1
	DRAWN / CHEDKED F. Lichnovsky	COORDS
Arch D 24" x 36"	SCALE 1"=60' / FILENAME c:\powertech\dewey-burdocks cross-sections 11-11-08\dewey pump test c-c' 11-11-08.dwg	1 OF 5



CONSULTANT	CONFIDENTIAL NOT for Reproduction or Distribution Subject to Revision	POWERTECH (USA) INC.
REF	REVISIONS: # / DRAWN / CHECKED / APPROVED / DATE	DRAWING 4.2 Stratigraphic Cross-Section D-D' Dewey Pump Test
CHECK SCALES If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 12-Nov-2008 / DATE 11-November-2008	PROJECT Dewey Pump Test
	DRAWN / CHEDKED F. Lichnovsky	COORDS
Arch D 24" x 36"	SCALE 1"=60' / FILENAME c:\powertech\dewey-burdocks cross-sections 11-11-08\dewey pump test d-d' 11-11-08.dwg	2 OF 5

Legend

Screen

Ore

DWA 116 Bore/Well Hole ID

Vertical 1"=50'

Not To Scale

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REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

POWERTECH (USA) INC.

DRAWING 5.1
Stratigraphic Cross-Section C-C'
Burdock Pump Test

REF

CHECK SCALES

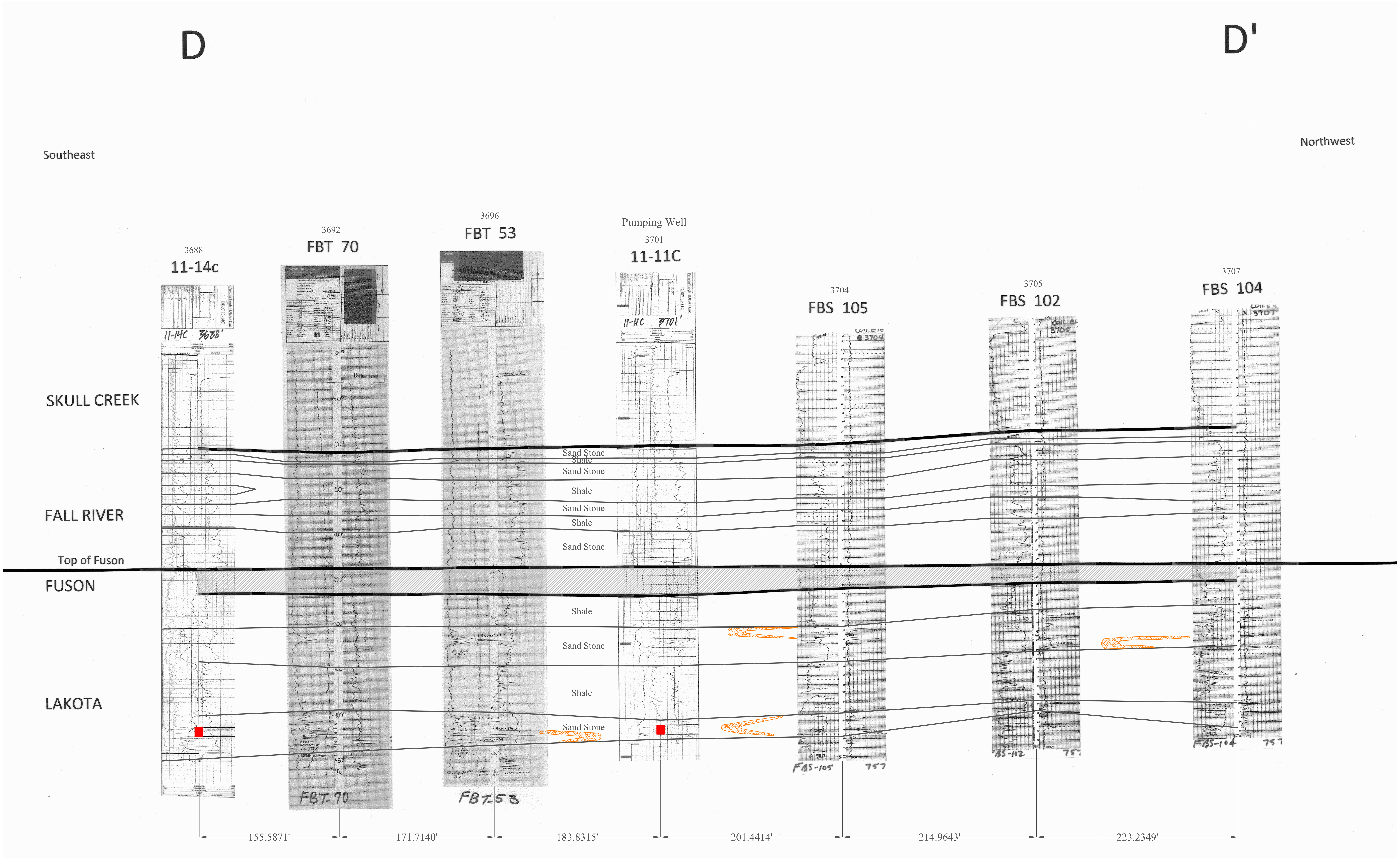
If this bar does not measure 1 inch this map is not at its original scale

PLOT DATE 12-Nov-2008 DATE 12-November-2008 PROJECT Burdock Pump Test

DRAWN CHECKED F. Lichnovsky COORDS

SCALE 1"=50' FILENAME c:\powertech\in south dakota\dewey-burdock\dew_burd x-sections\burd_pump_test strat c-c'.dwg 3 OF 5

Arch D 24" x 36"



Legend

Screen

Ore

11-14c Bore/Well Hole ID

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REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

POWERTECH (USA) INC.

DRAWING 5.2
Stratigraphic Cross-Section D-D'
Burdock Pump Test

REF

CHECK SCALES

If this bar does not measure 1 inch this map is not at its original scale

Arch D 24" x 36"

PLOT DATE 12-Nov-2008	DATE 12-November-2008	PROJECT Burdock Pump Test	
DRAWN	CHEDKED F. Lichnovsky	COORDS	
SCALE 1"=50'	FILENAME c:\powertech\dewey-burdocks cross-sections 11-11-08\burdock pump test d-d' 11-12-08.dwg		4 OF 5

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REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

DRAWING 5.3
Stratigraphic Cross-Section E-E'
Burdock Pump Test

PLOT DATE	12-Nov-2008	DATE	12-November-2008	PROJECT	Burdock Pump Test
DRAWN		CHECKED	F. Lichnovsky	COORDS	
SCALE	1"=60'	FILENAME	c:\powertech\dewey-burdocks cross-sections 11-11-08\burdock pump test e-e' 11-12-08.dwg		5 OF 5

REF
CHECK SCALES
If this bar does not measure 1 inch this map is not at its original scale
Arch D 24" x 36"

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Appendix A
Additional Information and Analysis Procedures

Appendix A-1:	**Background Monitoring and Barometric Efficiency Calculations**
Appendix A-2	**Overview of Aquifer Test Analysis Procedures and Tools Used**

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Appendix A-1

Background Monitoring and Barometric Efficiency Calculations

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Background Monitoring and Barometric Efficiency Calculations

Pressure transducers were installed in both wells at both sites by April 2, 2008 in order to obtain background ground water level measurements. At the Burdock test site, a transducer was installed in the designated pumping well (DB07-11-11C) in the lower Lakota Formation. At the Dewey test site, a transducer was installed in observation well (DB07-32-4C), screened in the same zone as the pumping well in the lower Fall River Formation.

Figure 3.1 in the text illustrates background measurements before the pumping tests and also the sequence of subsequent test events. The left axis of the figure indicates a narrow range of 1 psi. The background measurements shown on the figure fluctuate over a range of about 0.4 psi.

Converting Pressure Measurements to Head

Pressure transducer psi coverts directly to head [feet of water overlying the transducer] according to the relationship:

$$\begin{aligned} \text{Head } [\text{ft}_{H20}] &= P\,[_{PSI}] \times 144\ \text{in}^2/\text{ft}^2 \div \gamma_{H20}\,[\text{pounds per cubic foot}] \\ &= P\,[_{PSI}] \times 144/62.48 \\ &= P\,[_{PSI}] \times 2.31 \end{aligned}$$

Where γ H_2O [pounds per cubic foot] is the unit weight of water, ignoring temperature effects.

Therefore, a change in transducer pressure (Δpsi) corresponds to a change in water level of about 2.31 [ft $_{H20}$] x Δpsi with the same sense of increase or decrease. Total variations in background changes in groundwater levels over the one month period of record on Figure 3.1 (in the text) thus correspond to about 0.9 feet of water, which could be significant, although it will be established that such background variations over the time of a pump test do not significantly affect interpretations of the tests.

As indicated on Figure 3.1 (in the text), more than one month of background measurements were obtained from April 8 to May 9, 2008. However, this was also a period when pump installation and testing produced temporary drawdowns where the psi readings dropped below the scale of the figure.

The right hand axis on Figure 3.1 (in the text) illustrates hourly barometric pressure measurements in millibars obtained from the meteorological station installed at the site. The site station is maintained by South Dakota State University (SDSU) at the following URL: "http://climate.sdstate.edu/awdn/edgemont/archive3.asp". Barometric pressure reported by SDSU data is available only in the hourly dataset.

Barometric and Other Water Level Corrections

A period of about two weeks (April 23 to May 8, 2008) after pump installation and initial testing was designated as a period for undisturbed background water level monitoring in order to obtain data for possible barometric corrections. Inspection of Figure 3.1 (in the text) finds the expected inverse relationship between site barometer readings and increases or decreases in ground water levels. There are also smaller order cyclic sinusoidal variations which occur twice daily attributable to lunar tidal cycles.

Two types of barometric and other water level corrections were employed as described separately below.

Manual Barometric Efficiency Corrections

The first correction was manually evaluating the data based on total head (i.e., the transducer psi reading) and correcting the values to the barometric pressure (i.e., barometer millibars converted to psi) trends throughout the test. Kruseman and de Ridder (1991) and Gontheir (2007) state that the barometric efficiency (BE) can be defined as the change in water level in a well versus a change in atmospheric pressure, as follows:

$$BE = \gamma \ H_2O \text{ [pounds per cubic foot] x } \Delta h_w \div \Delta P_a$$

Where Δh_w is the change in elevation in the well associated with atmospheric pressure change (exclusive of other simultaneous effects that may also induce a change) and ΔP_a is the change in atmospheric pressure at the top of the well and land surface. By convention, the BE is dimensionless and ranges from zero to one.

Measurable water level changes in a well may also be due to a number of other factors in addition to changes induced during a pumping test. These are chiefly long-term seasonal trends and earth tides (Halford, 2006). Gontheir (2007) describes the historical methods of determining barometric efficiency. The methods can generally be said to determine an average response with selective application of corrections depending on the overall trends. The methods employ best fit lines to graphical displays of data and numerical analysis of the data sequence with sign tests to determine when a change is significant and should be applied.

The Site barometer readings were interpolated to the 15 minute background water level data using a custom FORTRAN computer method described in Section 1.3, below. A spreadsheet calculation was used to determine BE corrections throughout the background measurement period from April 23 to May 26. The results for the Dewey Site/Fall River aquifer are shown in Figure A.1-1 and the Burdock Site/Lakota aquifer in Figure A.1-2. The empirical method also determines a trend of rising water levels throughout the calibration period. Corrections for earth tides were not employed because these have demonstrably small amplitudes (i.e., 0.05 psi = 0.1 ft) below the limit of transducer accuracy. The figures illustrate that, after correction for the seasonal increase in water levels, BE's of 0.48 and 0.42 are determined for the Dewey and Burdock sites, respectively. It is noted that the barometer data on the right hand side of Figures A.1-1 and A.1-2 are scaled in reverse order to invert the data and allow superimposition of air pressure trends with ground water levels, as presented in Kruseman and de Ridder (1991).

Computer Applications

Two public domain computer applications were used to analyze the barometric and background water level data collected prior to the pumping tests. However, it was determined that use of either method for correction of actual test drawdown data could introduce more error than working with uncorrected data because background water level variations in the same aquifer at the same time as the test (but at great enough distance to be unaffected by the tests) were not available to validate the correction methods.

The first is a spreadsheet developed by the U.S. Geological Survey (USGS – Halford, 2006). The USGS spreadsheet empirically factors the overall water level response into multiple synthetically generated time series with adjustments to both phase and amplitude of each component (Figure A.1-3). The USGS spreadsheet was used to verify that the Dewey background water level data from April 23 to May 8, 2008, could be closely matched as a series of four components: (1) water level increase at a liner rate [i.e., slope], (2) variation in air pressure as measured with the site barometer, (3) two earth tide components (Figure A.1-4).

The second computer method used is BETCO (Sandia Corporation, 2005), which is publically available at "http://www.sandia.gov/betco/". To correct data, water level, time and barometric pressure are input and BETCO calculates corrected water level values. As described under Section 1.3 “Data Processing” below, the hourly site barometer data were interpolated to the 15 minute water level measurement frequency. Figure A.1-1 compares the BETCO corrected water levels (as equivalent psi) with the manual BE calculations, and the two methods yield equivalent results, generally within about ± 0.01 psi, except that BETCO did not fully correct the water level for the peak (actually a trough with the vertical axis reversed) in barometric pressure at the middle of the calibration period (i.e., about April 30, 2008, Figure A.1-1).

Summary

As shown in Figure A.1-1, the manual BE method was better than the BETCO computer method for the background calibration period examined. Similar to the USGS method, a difficulty with applying BETCO corrections to the Dewey or Burdock tests is that background wells with similar construction to the pumping test wells are not available to validate the corrections. This would have required drilling a well at each site specifically for background measurements. A further difficulty with the available computer methods is that they do not easily accommodate variable measurement times as input data.

To examine the possible importance of BE corrections, the drawdown phase of the Dewey test (10:30 AM, May 15, 2008 through 12:30 PM May 18, 2008, see Figure 3.1 in the text) was selected for manual correction with a BE of 0.48 relative to the Site barometer over the test period. The corrections were applied after Site barometer data were interpolated to the logarithmically-space time-drawdown data using a custom FORTRAN computer program as described in Section 1.3, below. The maximum effect of the BE correction was to add about 0.2 ft to the water levels at the end of the drawdown phase due to an overall barometric pressure decline of about 15 millibars (i.e., from about 1,030 to 1,015 millibars).

Test interpretations (Theis drawdown, Section 4 in the text) were made with and without the BE corrections for the data at all wells screened in the Fall River aquifer for the Dewey test, and the corrections were found to have no discernable effect on the visual fits to type curves. Because the changes in barometric pressure during the three day constant rate tests at Burdock and Dewey were similar (Figure 3.1 in the text), the above analysis indicates the magnitude of the BE corrections would be no greater for the Burdock test compared to the Dewey test. Therefore, corrections to water level data were not further performed and the test interpretations rely on uncorrected time-drawdown data.

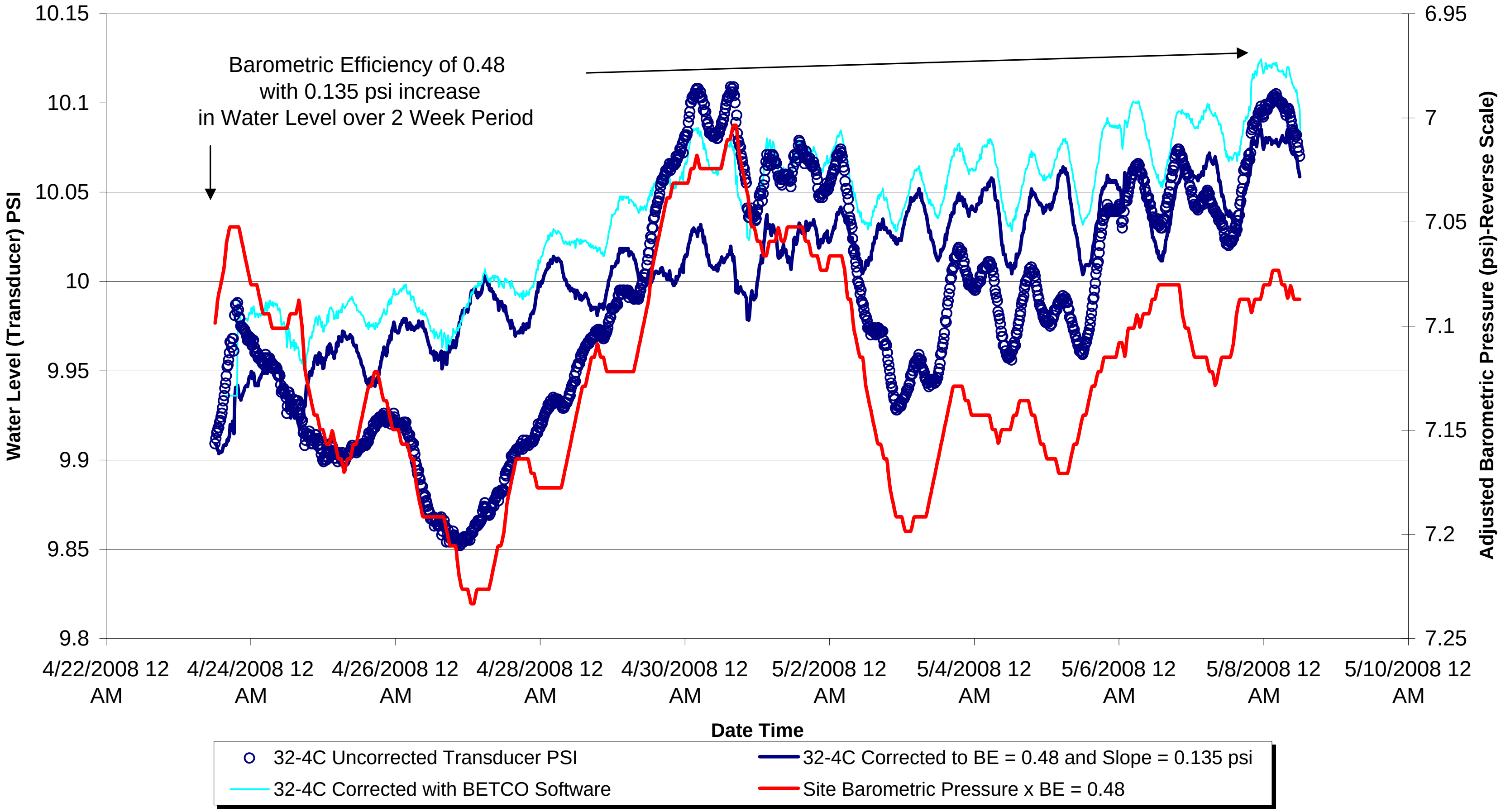
Time-drawdown and Barometer Data Processing

The time-drawdown data from the data loggers consisted of two hours of data at one second intervals followed by 72 or 74 hours of data collected at 10-second intervals, with the sequence repeated for the recovery phase. The WinSitu™ software exported transducer data logger records to ".csv" files with approximately 60,000 to 70,000 records for each well. The time-drawdown data were processed using a custom FORTRAN program employing a template file specifying which date-time records would be written to an output file. The program cycled through the raw data input file and wrote data records to the output file. The template file was prepared to produce logarithmically spaced data with about 30 records per log cycle (in seconds). Due to slight variations in transducer output and the precision of the Microsoft Excel date-time format, there are some ± 1 second variations in the sequences of records from well to well.

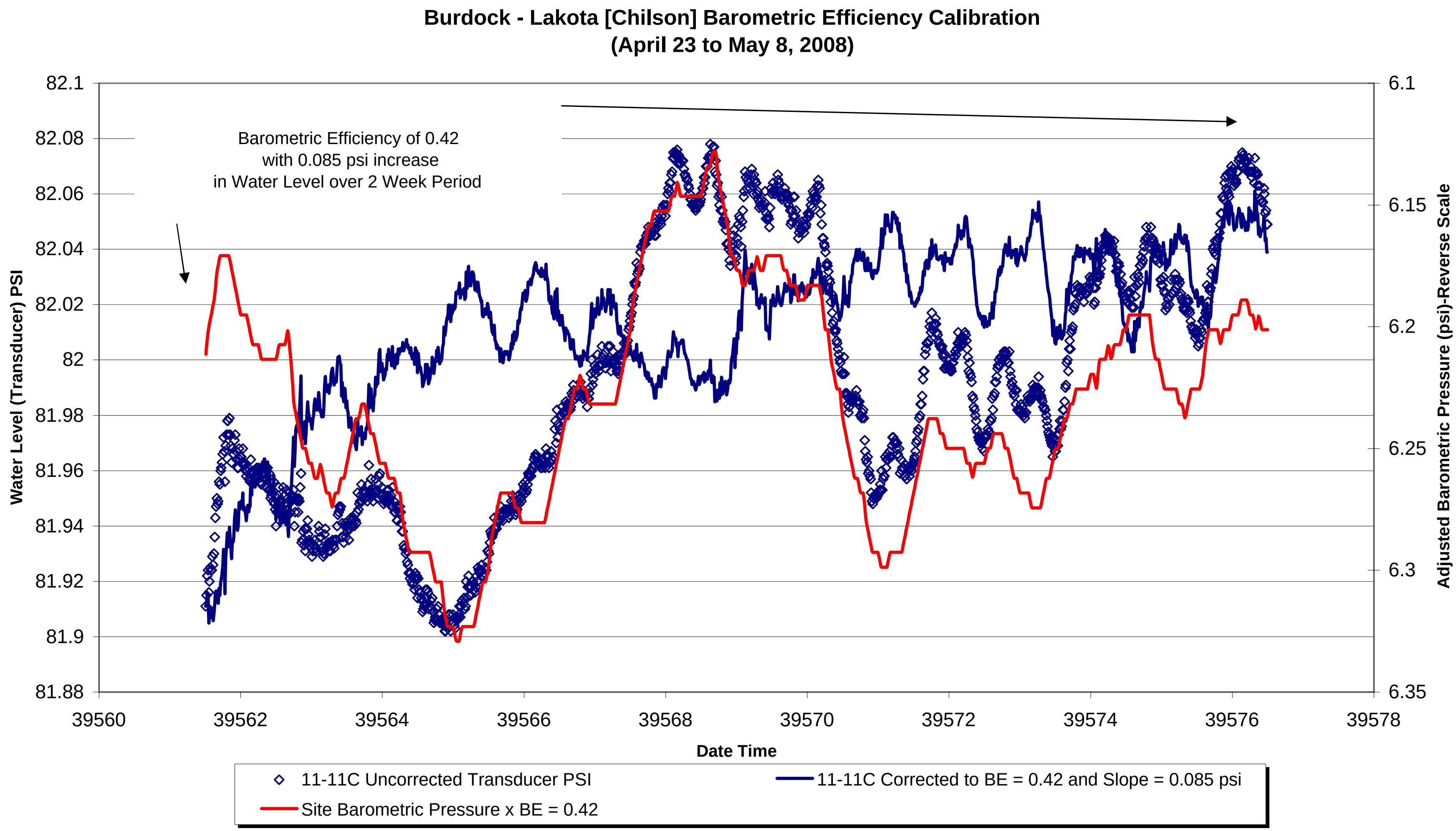
The FORTRAN program for drawdown data also converted transducer psi to drawdown in feet using formulas presented in Section 1.1. The reference value for zero drawdown was set to be the average of all psi readings from the start of the data log to the time just prior to test startup.

Two custom FORTRAN programs were also used to interpolate hourly site barometer readings to (1) the evenly spaced background transducer measurements described in Section 1.2.2 and (2) the logarithmically spaced drawdown data described in Section 1.2.3.

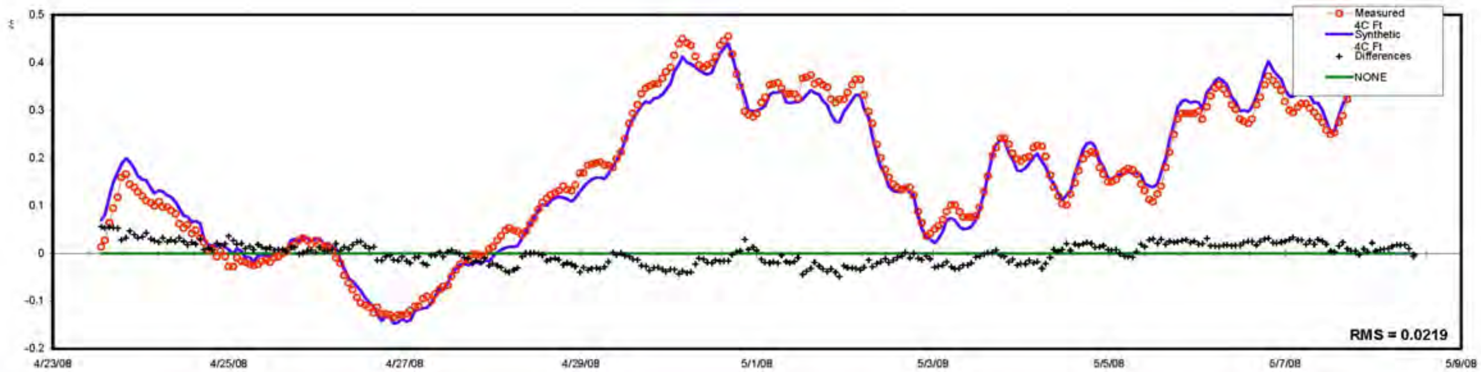
Dewey - Fall River Ore Zone Barometric Efficiency Calibration
(April 23 to May 8, 2008)



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Background Water Level and Site Barometer Readings Dewey/Fall River Barometric Efficiency Calculations (April 23 to May 8 2008)	
	Project No: DV10200279.01	Date: 10/14/08	Appendix A, Figure A.1-1



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Background Water Level and Site Barometer Readings Burdock/Lakota Barometric Efficiency Calculations (April 23 to May 8 2008)	
	Project No: DV10200279.01	Date: 10/14/08	Appendix A, Figure A.1-2



Series Comparison

Time Overview

Phase Increment: 50
Phase Limit: 48:00
Moving Average: 24:00

AVERAGE = 0.000
RMS = 0.022
Save Solutions on Estimation
Initialize parameters on LOAD

NEW

Result: TIME SERIES
Analyze: 4C Ft

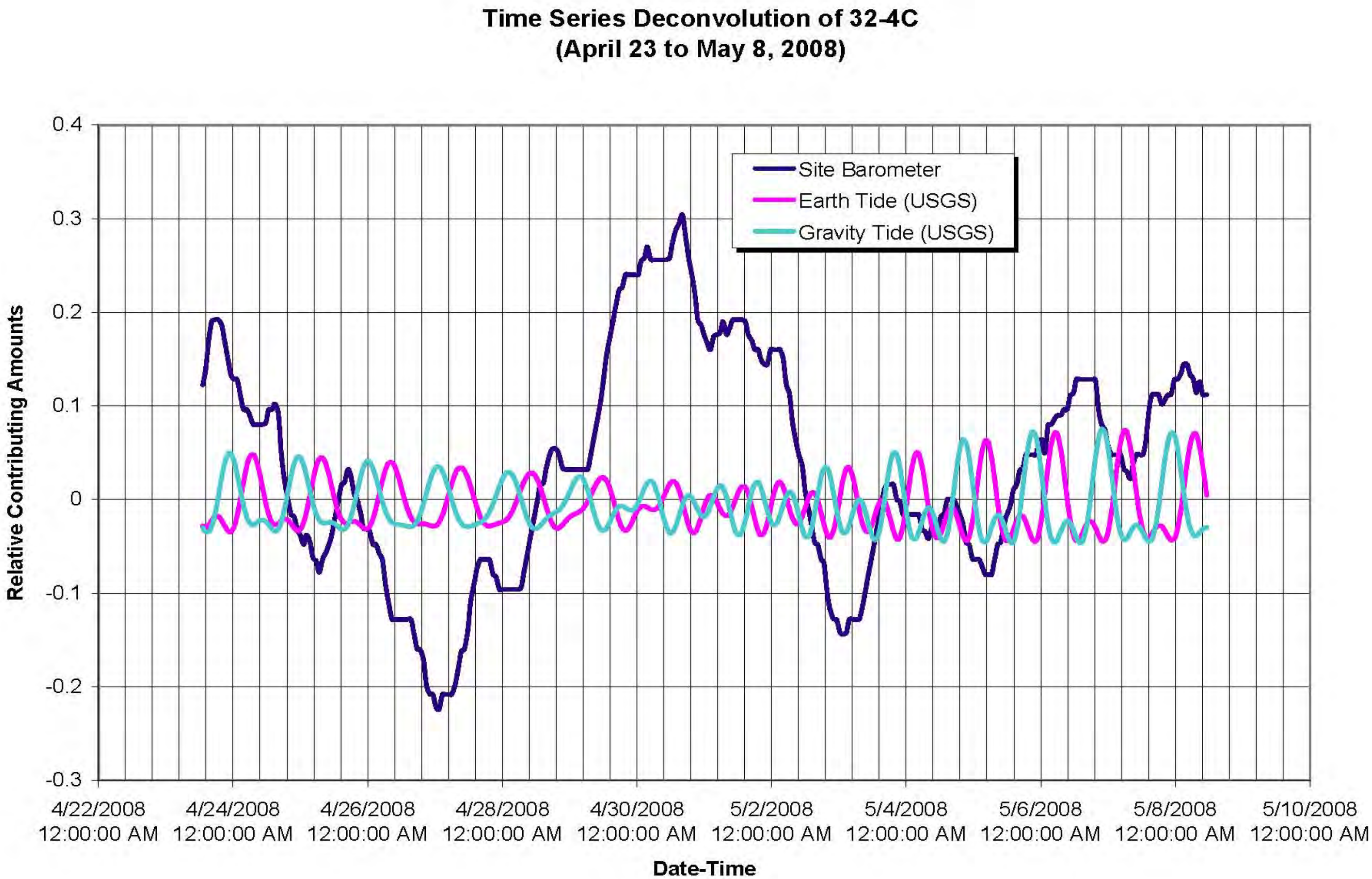
FIT

Offset: 0.0054
Slope: 0.0193

LOAD	FITTING	ESTIMATION	FEEL GOOD
Begin:	04/23/2008 12:25	04/23/2008 12:25	04/23/2008 12:25
End:	05/08/2008 11:55	05/08/2008 11:55	05/08/2008 11:55
Interval:	01:00	01:00	01:00
Samples:	359	359	359
Phase Shift:	0.0191	-0.1390	0.1979
Multiplier:	-0.0160	0.0013	-0.0005

DATE-time	Measured 4C Ft	Synthetic 4C Ft	Differences	NONE	Baro2(Raw)	Earth Tide	Gravity Tide	NONE
04/23/2008 13:10:45	0.014	0.070	0.056	0	0.12	-0.028283855	-0.030282086	
04/23/2008 14:10:45	0.028	0.081	0.053	0	0.14	-0.030098538	-0.034381662	
04/23/2008 15:25:45	0.065	0.119	0.055	0	0.17	-0.02676559	-0.034150371	

Client	Project	Title
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Time-series from USGS Spreadsheet Method (Halford, 2006) for Dewey Observation Well 32-4C Background Measurements and Site Barometer Readings (April 23 to May 8 2008)
	Project No: DV10200279.01	Date: 10/14/08 — Appendix A, Figure A.1-3



Client	Project		Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT		Plotted Time-series Output for Dewey Observation Well 32-4C Background Measurements and Site Barometer Readings (April 23 to May 8 2008)	
	Project No:	DV10200279.01	Date: 11/12/08	Appendix A, Figure A.1-4

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Appendix A-2

Overview of Aquifer Test Analysis Procedures and Tools Used

Overview of Aquifer Test Analysis Procedures and Tools Used

This section describes the methods used to analyze the pump test data from both the Dewey and Burdock tests.

Determining Response

Water levels in each well were measured and recorded with vented In-Situ™ Level TROLL™ pressure transducers with built in data loggers. The pressure ratings for the transducers range from 100 to 300 pounds per square inch (psi). Transducer accuracy (in comparison to known pressure or other pressure reading devices) is stated by the manufacturer to be ±0.1 percent of full-scale reading (i.e., 100 to 300 psi), so the limit of accuracy varies from 0.1 to 0.3 psi, or about 0.2 to 0.7 ft. Transducer sensitivity is stated to be ±0.01 percent of full-scale, resulting in sensitivity limits of about 0.01 to 0.03 psi, or 0.02 to 0.07 ft.

Transducer response figures in the text (Figures 4.2 through 4.4 at Dewey and Figures 5.2 through 5.4 at Burdock) were made from graphs displaying raw transducer data produced directly from Win-Situ™ software provided by In-Situ with the rental transducers. The software should be publically available and can be used to read the binary data files that are provided on CD-ROM in Appendix E. The WinSitu™ software exported transducer data logger records to ".csv" text files with approximately 60,000 to 70,000 records for each well.

The Win-Situ graphs display complete drawdown and recovery data files that exceed the capacity of individual spreadsheets for display and storage. The pumping well data are repeated on some figures for reference as timing marks for the phases of the tests. The data at observation wells also exhibit spikes in the transducer temperature measurements when the data logging shifted from 10 second to 1 second intervals; these can be used to judge within ± 2 hours when the pump was shut off and recovery began at the pumping well.

Precise timing of responses is more clearly analyzed on spreadsheet log-log plots after the data are reduced to 30 points per log cycle (in seconds). The computer method to reduce the large text file to manageable time-drawdown data files is described in Section A.1-3 (above).

Theis Drawdown and Recovery Analysis

Drawdown data collected from all wells were graphically analyzed to determined aquifer properties of transmissivity and storativity using the Theis method (Driscoll, 1986, and numerous other references).

Assumptions for the Theis Method

At observation wells, the Theis method is mathematically valid for all distances and times during the drawdown phase of a test, and there is general agreement about interpretation of deviations of drawdown data from Theis type curves in terms of features such as barrier boundaries and leakage from an overlying leaky aquifer (Kruseman and de Ridder, 1991).

The following simplifying assumptions underlie the Theis analysis (Driscoll, 1986):

- The water-bearing materials have uniform hydraulic conductivity (i.e., are isotropic) within the radius of influence of the well (i.e., the aquifer has infinite extent for the analysis).
- The aquifer is confined and not stratified.
- The aquifer thickness is constant.
- The pumping well is 100 percent efficient.
- The intake portion of the well penetrates the entire aquifer; well diameter is small so well bore storage is negligible.
- The potentiometric surface has no slope (perfectly horizontal).
- Laminar flow exists throughout the radius of influence of the well.

These assumptions are rarely completely satisfied in any pumping test. A first-order violation of the ideal test assumptions for the Powertech pumping test is partial penetration: at Dewey, the lower Fall River pumping and observation wells have 15-foot well screens within an approximate 85-foot sandstone zone within an approximately 160-foot thick sandstone-shale formation; at Burdock the lower Lakota pumping and observation wells have 10-foot well screens within an approximate 35-foot sandstone zone within an approximately 170-foot thick sandstone-shale formation

Secondly, the variegated sandstone-shale lithology clearly responds hydraulically in an anisotropic manner both laterally and vertically. It was determined with Powertech during the test design that an investigation of lateral aquifer anisotropy using four-well triangulation was not warranted. The test design did investigate vertical anisotropy within each aquifer.

Pumping Test Design and Objectives

As noted in the pumping test work plan, (Knight Piesold, 2008), interpretation of test results with the above non-ideal conditions may result in uncertainties in the estimated transmissivity and storativity values. Reasons for conducting the 2008 tests with conditions contrary to the Theis assumptions were as follows:

- Powertech expects that the operational well field screens will be completed in ore, and the thickness of the ore determines the screen interval.
- The pump test was designed to see what flow could be expected in the wellfield.
- There are multiple ore zones (e.g., three ore zones in the Fall River at Dewey) and each one will have its own well screens, so one ore zone was picked to test.
- At new mines there are usually two pump tests, one to get regional aquifer characteristics and a second one to test the ore zone characteristics.
- The previous TVA tests constitute regional tests and had already been successfully conducted using pumping and observation wells more closely fully penetrating the entire aquifer.
- In comparison with the TVA tests, these newer tests would offer valuable differential diagnostic information.

Theis Analysis Methods

Theis analysis was initially performed in spreadsheets developed by Knight Piesold that allow interactive entry of transmissivity and storativity to calculate the dimensional version of the type curve that matches time-drawdown data (e.g., Figures 4.5 and 5.5 in the text). Theis analysis was expanded to use using automated curve matching in commercial AquiferWin32™ software (ESI, 2003). The software also performed Hantush-Jacob drawdown analysis as described in the text. In automated drawdown analysis samples are weighted as follows: samples before the first response are ignored, and samples after the first occurrence of the barrier or leakage boundary are ignored.

The AquiferWin32™ software was also used to analyze recovery data with the straight-line Theis recovery procedures, with theoretical considerations described in greater detail below. Samples are weighted according to (1) the theoretical criterion that u’ be < 0.01, which restricts the data to later-time (to the left on the t/t’ axis); and (2) the portion of the recovery before the change in slope due to a barrier or recharge boundary is used. Data not satisfying u' < 0.01 or obtained after a boundary was encountered were weighted to be ignored.

The analysis of data from the pumping wells is complicated by well losses due to well inefficiency, partial penetration effects, and drawdown modified by borehole storage. This is accounted for in Theis drawdown analyses by fitting just the later time data (at pumping wells) to the type curve. This is done with the AquiferWin32™ software by assigning sample weights to data after the time at which borehole storage becomes negligible.

Driscoll (1986) provides an empirical formula for determining the time at which borehole storage effect become negligible, as follows:

$$tc = 0.6\ (dc^2 - dp^2) \text{ divided by } Q/s$$

Where tc is time in minutes, dc is the inside diameter of the well casing in inches, dp is the outside diameter of the pump column pipe in inches, and Q/s is the specific capacity of the well in gpm per foot of drawdown at time tc. Calculated times were 21 minutes for the pumping well at Dewey and 50 minutes at Burdock.

Theis-Cooper-Jacob Straight-line Analysis

Spreadsheets are published by the U.S. Geological Survey (USGS) with sophisticated programming for the analysis of aquifer test data (Halford and Kuniansky, 2002). These were used for most straight-line analyses of the tests.

Straight-line Drawdown Analysis

A USGS spreadsheet for drawdown analysis with the Cooper-Jacob straight-line approximation was used for the drawdown phase at the pumping wells. Another USGS spreadsheet programmed for Theis Recovery analysis with the straight-line approximation was used to analyze the recovery data at all wells.

The Theis method is linearized with the Cooper-Jacob straight-line approximation (Halford and Kuniansky, 2002). The approximation is only valid at later times as determined by u or u', the relationship of aquifer parameters with distance from the pumping well (r) and elapsed time t or t' (where t and u refer to the time from the start of pumping and t' and u' to the time from the cessation of pumping), as follows:

$$u \text{ or } u' = (r^2 \times S) \div [4 \times T \times (t \text{ or } t')] \text{ and } \qquad u \text{ or } u' < 0.01.$$

For a pumping well the distance becomes the radius of the casing (r_c) which is small, and to obtain a time criterion (t_c or t_c' where the straight-line approximation is theoretically valid), the above relationship is inverted by setting u or u' <= 0.01 and S = 1 x 10^{-4}, yielding (Halford and Kuniansky, 2002):

$4 \times (t \text{ or } t') \times 0.01 >= r_c^2 \times 10^{-4} \div T$
$t_c \text{ or } t_c' >= 100 \times r_c^2 \div (4 \times T)$
$t_c \text{ or } t_c' >= 25 \times r_c^2 \div T$

The calculation of t_c or t_c' gives a criterion for theoretically valid data at the pumping well in terms of time, and similarly for u or u' for observation wells. In this report only transmissivity is determined by the straight-line methods. The drawdown phase and Theis or Hantush-Jacob type-curve analysis are used to determine storativity. To calculate u or u' at observation wells, the storativity result from the drawdown phase is used. At the pumping wells, a storativity of 1 x 10^{-4} is assumed.

The USGS spreadsheet allows interactive determination of transmissivity by moving the yellow endpoints of the red line to match the desired slope (see red lines between yellow endpoints on Figures 4.7 and 5.7 in the text). The USGS spreadsheet has been modified to also calculate the value of u or u' and t_c or t_c', and the length of the straight line has been manually set on the figures to approximately correspond to data ranges where the critical values are met. The figures thus indicate the data where the straight-line solutions are theoretically valid, which aids in visually determining which portions of the plots to use for analysis.

The analysis of data from the pumping well is complicated by well losses due to well inefficiency, partial penetration effects, and drawdown modified by borehole storage. The straight-line approximation with the t_c criterion described above is used in the USGS spreadsheet to select the late-time data during the drawdown phase at pumping wells. This is because at later times borehole storage and partial penetration effects are eliminated and change in drawdown and the straight-line slope are due to aquifer transmissivity rather than the fixed offset due to well losses (Halford and Kuniansky, 2002). The USGS spreadsheet determines transmissivity and well efficiency, with the efficiency based on the theoretical drawdown with the assumed storativity of 1.0 x 10^{-4}.

Straight-line Recovery Analysis

The analysis of recovery data involves the measurement of the rise in water levels referred to as residual drawdown. The method determines the Δs', the change in residual drawdown over one log cycle of t/t', where t is the time from the start of pumping and t' is the time from the cessation of pumping. Figures 4.7 and 5.7 in the text illustrate the Theis recovery analysis at the pumping wells. On each recovery analysis figure the data range where the t_c' or u' criteria is satisfied (see red lines between yellow endpoints on Figures 4.7 and 5.7 in the text) are indicated together with the transmissivity reported by the USGS spreadsheet.

Distance Drawdown Analysis

Distance-drawdown analysis (Driscoll, 1986) was performed to determine average aquifer parameters using all appropriate observation wells simultaneously and also to determine a pumping well efficiency. The distance drawdown analysis relies on the same Cooper-Jacob straight-line approximation as described above, although according to Driscoll (1986) the value of u can be as great as 0.05. The value of u is calculated using the storativity of the observation wells determined in the Theis drawdown analysis. The aquifer parameters are determined by calculating Δs, the change in drawdown along the straight line over one log cycle, and r_0 which is the intercept at zero drawdown.

On a linear graph (see top portions of Figures 4.8 and 5.8 in the text), plotting the maximum drawdown in observation wells at the same time should map a profile of the cone of depression surrounding the pumped well. On a semi-log graph (bottom portions of Figures 4.8 and 5.8 in the text) there should theoretically be a straight line through the data points, except at the greatest distance from the pumping well where u is likely to be > 0.05 (Driscoll, 1986).

Appendix B
Dewey Test Supplemental Information

Appendix B-1: **Well Completion Diagrams**

Appendix B-2: **Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data**

Appendix B-3: **Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recover Data**

Appendix B-4: **Additional Aquifer Parameter Determinations**

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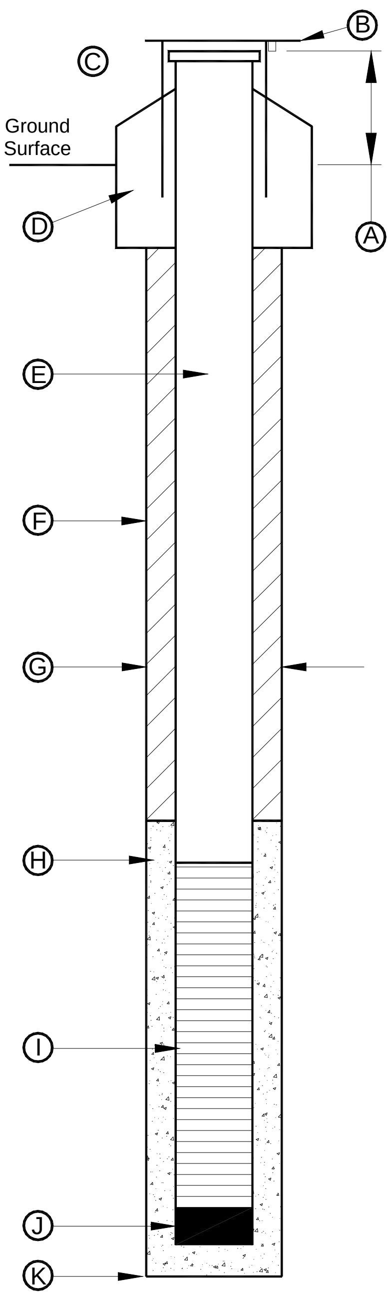
Appendix B-1
Well Completion Diagrams

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-3C
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 600'
LAT 4815593N	LONG 578732E	Elevation 3635"	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'
B. Key No. *NA*
C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 587'
- Weight SCH 40
- Depth to Bottom 585'

F. Grout cement Date 11/29/07
- Depth to Top 0'
- Depth to Bottom 587'
- Material sulfate resis. cement
- Density 15.1 lb/gal
- Volume 21.5 bbls
- % Excess 70
- Method of Installation displacement
- Depth to Cement in Casing 505'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 8.75" 11/28/07

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 1/27/08
- Depth to Top 585-600"
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 630"

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	1/25/08
Time Beginning of Test	800	Time End of Test	1000
Initial Pressure	35.0 PSIG	Initial Fluid Level	4.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4.0inches

Method of Drilling Date: 11/27/07

- ☐ Cabel Tool ☐ Hollow Rod
- ☒ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump

Date Installed Type
Manufacturer Model No.
H.P. Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
☐ Oil ☐ Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting Impellors
Bowl Diameter
Column Pipe Diameter Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 11/27/07

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed?

Date well completed 1/27/08

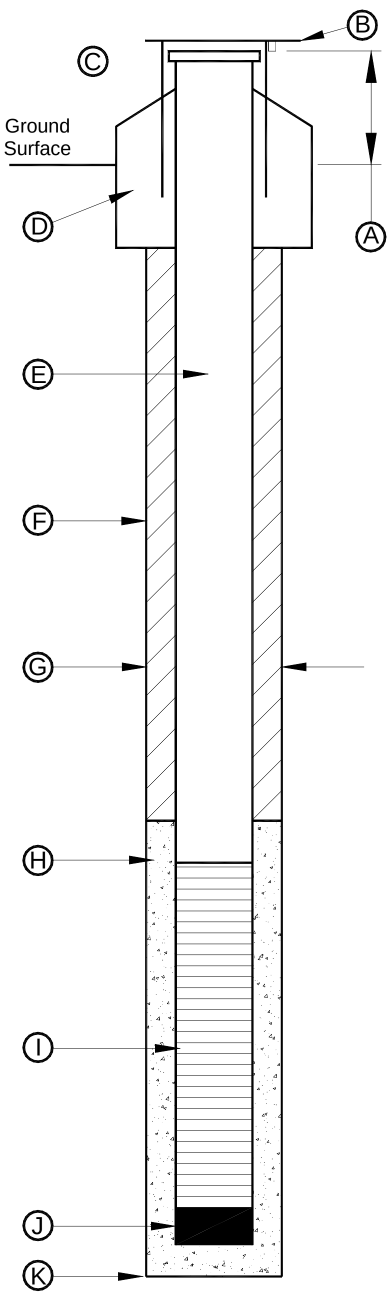
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-3C	1400						appears cl.	1/27/08 well developed
	1425							water cleared up within 5 minutes
								approx 50 gpm while pumping

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-5
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 608'
LAT 4815588N	LONG 578650E	Elevation 3628'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 595'
- Weight SCH 40
- Depth to Bottom 593'

F. Grout cement Date 11/17/07
- Depth to Top 0'
- Depth to Bottom 593'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 13.4 bbls
- % Excess 60
- Method of Installation displacement
- Depth to Cement in Casing 520'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.25" 11/17/07

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/6/08
- Depth to Top 593-608'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 634'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	2/5/08
Time Beginning of Test	0900	Time End of Test	1100
Initial Pressure	35.0 PSIG	Initial Fluid Level	5.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	5.0inches

Method of Drilling Date: 11/17/07

- ☐ Cabel Tool
- ☐ Hollow Rod
- ☒ Direct Rotary
- ☐ Air Rotary
- ☐ Bucket Auger
- ☐ Reverse Rotary
- ☐ Flight Auger
- ☐ Jetted
- ☐ Dug
- ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic
- ☐ Public Supply
- ☐ Industrial
- ☐ Irrigation
- ☐ Municipal
- ☐ Commercial
- ☐ Test Well
- ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water

Water Level (TIC)

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed	Type
Manufacturer	Model No.
H.P.	Volts
Capacity	
Depth of Pump Intake Setting	
No. of Stages	
☐ Oil	☐ Water Lubrication
Power Source	
Material of drop pipe	
Bowls	
Shafting	Impellors
Bowl Diameter	
Column Pipe Diameter	Length
Modification	

Geophysical Logs Run Gamma, Resistivity, SP, ran 11/17/07

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 2/6/08

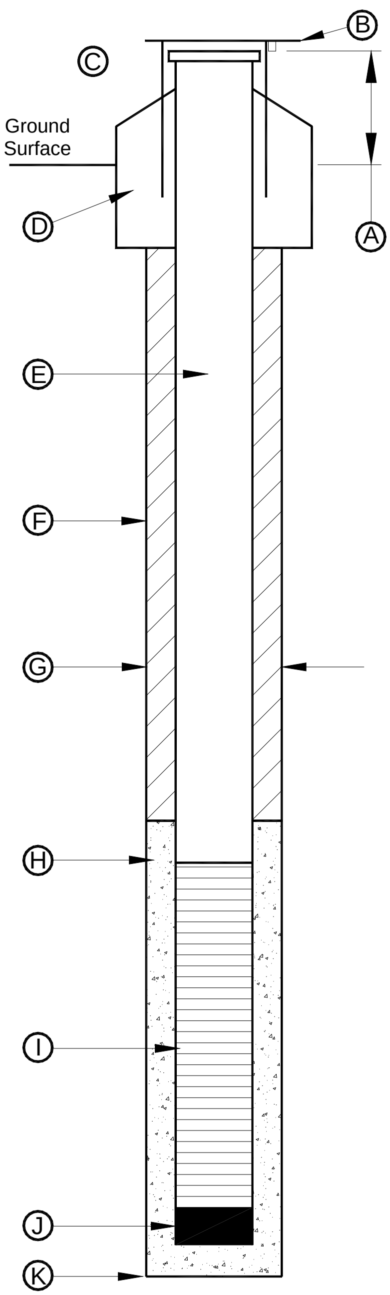
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-5	1500						appears cl.	2/6/08 well developed
	1535							water cleared up within 5 minutes
								approx 20 gpm while pumping
								220psi kickoff, 130psi sustained

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-4C
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 595'
LAT 4815507N	LONG 578846E	Elevation 3640'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 582'
- Weight SCH 40
- Depth to Bottom 580'

F. Grout cement Date 12/5/07
- Depth to Top 0'
- Depth to Bottom 582'
- Material sulfate resis. cement
- Density 15.1 lb/gal
- Volume 17.4 bbls
- % Excess 70
- Method of Installation displacement
- Depth to Cement in Casing 480'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.25" 12/4/07

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/4/08
- Depth to Top 580-595'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 630'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	1/28/08
Time Beginning of Test	1000	Time End of Test	1200
Initial Pressure	35.0 PSIG	Initial Fluid Level	6.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	6.0inches

Method of Drilling Date: 12/4/07

- ☐ Cabel Tool
- ☐ Hollow Rod
- ☒ Direct Rotary
- ☐ Air Rotary
- ☐ Bucket Auger
- ☐ Reverse Rotary
- ☐ Flight Auger
- ☐ Jetted
- ☐ Dug
- ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic
- ☐ Public Supply
- ☐ Industrial
- ☐ Irrigation
- ☐ Municipal
- ☐ Commercial
- ☐ Test Well
- ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water

Water Level (TIC)

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed — Type

Manufacturer — Model No.

H.P. — Volts

Capacity

Depth of Pump Intake Setting

No. of Stages

☐ Oil ☐ Water Lubrication

Power Source

Material of drop pipe

Bowls

Shafting — Impellors

Bowl Diameter

Column Pipe Diameter — Length

Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 12/4/07

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 2/4/08

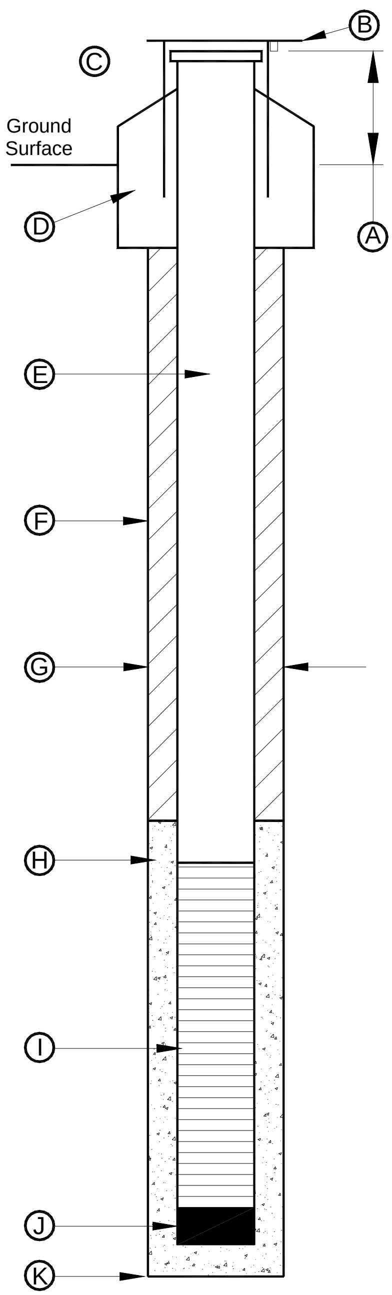
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-4C	1400						appears cl.	2/4/08 well developed
	1425							water cleared up within 5 minutes
								approx 30 gpm while pumping

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-29-7
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 650'
LAT 4816313N	LONG 578652E	Elevation 3703'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. *NA*

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 637'
- Weight SCH 40
- Depth to Bottom 635'

F. Grout cement Date 11/20/07
- Depth to Top 0'
- Depth to Bottom 593'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 17.2 bbls
- % Excess 70
- Method of Installation displacement
- Depth to Cement in Casing 550'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.25" 11/20/07

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/8/08
- Depth to Top 635-650'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tony

Boring Depth 660'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	2/7/08
Time Beginning of Test	0930	Time End of Test	1130
Initial Pressure	35.0 PSIG	Initial Fluid Level	5.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	5.0inches

Method of Drilling Date: 11/20/07

☐ Cabel Tool ☐ Hollow Rod
☒ Direct Rotary ☐ Air Rotary
☐ Bucket Auger ☐ Reverse Rotary
☐ Flight Auger ☐ Jetted
☐ Dug ☐ Driven
☐ Other mud rotary

Use

☐ Domestic ☐ Public Supply
☐ Industrial ☐ Irrigation
☐ Municipal ☐ Commercial
☐ Test Well ☐ Heating or Cooling
☒ Monitoring
☐ Other

One well volume (V) = gallons

Initial Development Water
- Water Level (TIC)
- Well Depth
- Color
- Odor
- Clarity
- Developed By
- Date

Well Development Date

Description of Development Technique

Pump
- Date Installed
- Type
- Manufacturer
- Model No.
- H.P.
- Volts
- Capacity
- Depth of Pump Intake Setting
- No. of Stages
- ☐ Oil ☐ Water Lubrication
- Power Source
- Material of drop pipe
- Bowls
- Shafting
- Impellors
- Bowl Diameter
- Column Pipe Diameter
- Length
- Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 11/20/07

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 2/8/08

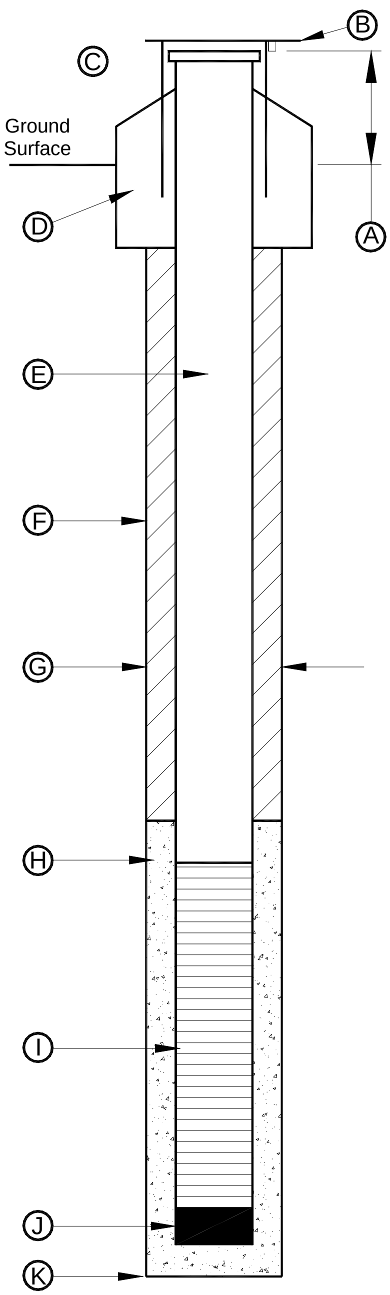
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
29-7	1500						appears cl.	2/8/08 well developed
	1530							water cleared up within 3 minutes
								less than 1 gpm while pumping
								100psi kickoff, 50psi sustained
								v. slow recharge

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-9C
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 505'
LAT 4815586N	LONG 578744E	Elevation 3683"	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 492'
- Weight SCH 40
- Depth to Bottom 490'

F. Grout cement Date 2/20/08
- Depth to Top 0'
- Depth to Bottom 491'
- Material sulfate resis. cement
- Density 15.2 lb/gal
- Volume 24.8 bbls
- % Excess 50
- Method of Installation displacement
- Depth to Cement in Casing 370'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 8 bbls

G. Borehole Diameter
- Drilling Dates 6.25" 1/15/08

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 3/10/08
- Depth to Top 490-505"
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth "

Additional Information Dewey pump test site - upper Fall River sand lens (not in pumped lens)

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	3/9/08
Time Beginning of Test	0800	Time End of Test	1000
Initial Pressure	35.0 PSIG	Initial Fluid Level	4.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4.0inches

Method of Drilling Date: 1/15/08

☐ Cabel Tool ☐ Hollow Rod
☒ Direct Rotary ☐ Air Rotary
☐ Bucket Auger ☐ Reverse Rotary
☐ Flight Auger ☐ Jetted
☐ Dug ☐ Driven
☐ Other mud rotary

Use

☐ Domestic ☐ Public Supply
☐ Industrial ☐ Irrigation
☐ Municipal ☐ Commercial
☐ Test Well ☐ Heating or Cooling
☒ Monitoring
☐ Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump
Date Installed Type
Manufacturer Model No.
H.P. Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
☐ Oil ☐ Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting Impellors
Bowl Diameter
Column Pipe Diameter Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 1/15/08

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed?

Date well completed 3/10/08

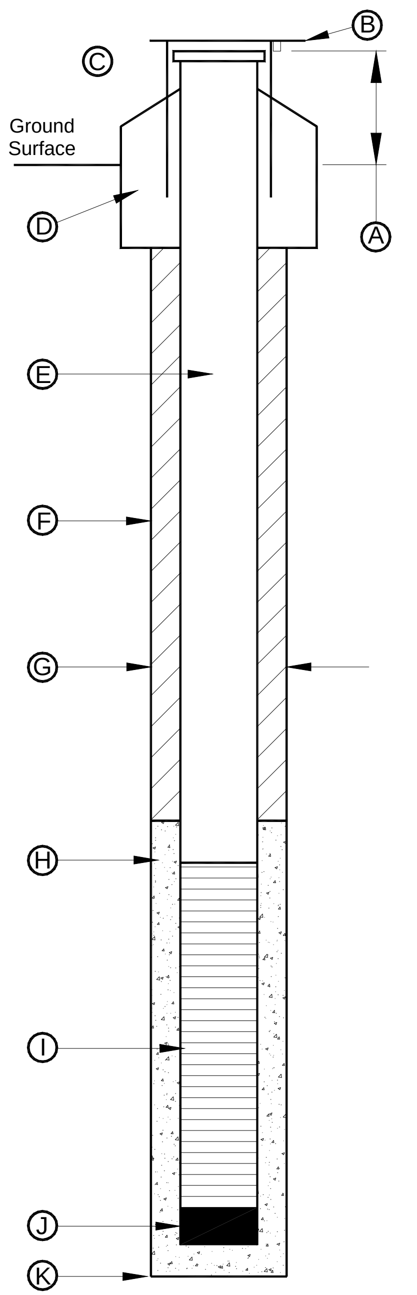
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-9C	1400						dirty-clear.	3/10/08 well developed
	1430							water cleared up after 20 minutes very black water and sand coming out
								approx 40-45 gpm while pumping
								220psi kickoff 90psi sustained
								6gpm flow by itself
								screened interval in Fall River formation

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-10
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 730'
LAT 4815611N	LONG 578729E	Elevation 3655"	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. *NA*

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 717'
- Weight SCH 40
- Depth to Bottom 715'

F. Grout cement Date 1/28/08
- Depth to Top 0'
- Depth to Bottom 730'
- Material sulfate resis. cement
- Density 15.3 lb/gal
- Volume 19.1 bbls
- % Excess 70
- Method of Installation displacement
- Depth to Cement in Casing 615'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 1 bbls

G. Borehole Diameter
- Drilling Dates 8.75" ream 1/28/08

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 3/11/08
- Depth to Top 715-730"
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth "

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	3/10/08
Time Beginning of Test	1200	Time End of Test	1405
Initial Pressure	35.0 PSIG	Initial Fluid Level	6.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	6.0inches

Method of Drilling Date: 1/26/08

- ☐ Cabel Tool
- ☒ Direct Rotary
- ☐ Bucket Auger
- ☐ Flight Auger
- ☐ Dug
- ☐ Other mud rotary
- ☐ Hollow Rod
- ☐ Air Rotary
- ☐ Reverse Rotary
- ☐ Jetted
- ☐ Driven

Use

- ☐ Domestic
- ☐ Industrial
- ☐ Municipal
- ☐ Test Well
- ☒ Monitoring
- ☐ Other
- ☐ Public Supply
- ☐ Irrigation
- ☐ Commercial
- ☐ Heating or Cooling

One well volume (V) = gallons

Initial Development Water

Water Level (TIC)

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed Type

Manufacturer Model No.

H.P. Volts

Capacity

Depth of Pump Intake Setting

No. of Stages

☐ Oil ☐ Water Lubrication

Power Source

Material of drop pipe

Bowls

Shafting Impellors

Bowl Diameter

Column Pipe Diameter Length

Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 1/26/08

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 3/11/08

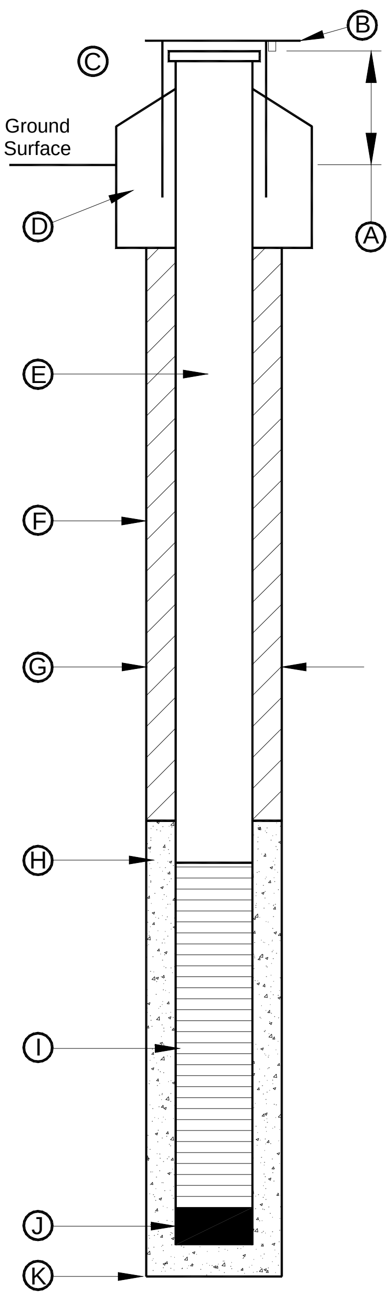
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-10	1600						v. dirty	3/11/08 well developed
	1630							water v. sl. dirty at end of test
								approx 2 gpm while pumping
								110psi kickoff decreases quickly to 2gpm at 50psi
								well recharges quickly when pump shut off
								screened interval in Lakota formation

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-32-11
County Custer	Type of Rig	Drilling Fluid mud	Well Depth 930'
LAT 4815572N	LONG 578734E	Elevation 3664"	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 912'
- Weight SCH 40
- Depth to Bottom 910'

F. Grout cement Date 2/12/08
- Depth to Top 0'
- Depth to Bottom 911'
- Material sulfate resis. cement
- Density 15.2 lb/gal
- Volume 55.0 bbls
- % Excess 70
- Method of Installation displacement
- Depth to Cement in Casing 760'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 8 bbls

G. Borehole Diameter
- Drilling Dates 6.25" 2/7/08

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 3/8/08
- Depth to Top 910-930"
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth "

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	3/5/08
Time Beginning of Test	0830	Time End of Test	1000
Initial Pressure	35.0 PSIG	Initial Fluid Level	4.0 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4.0inches

Method of Drilling Date: 2/7/08

- ☐ Cabel Tool ☐ Hollow Rod
- ☒ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water

Water Level (TIC)

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed Type

Manufacturer Model No.

H.P. Volts

Capacity

Depth of Pump Intake Setting

No. of Stages

☐ Oil ☐ Water Lubrication

Power Source

Material of drop pipe

Bowls

Shafting Impellors

Bowl Diameter

Column Pipe Diameter Length

Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 2/8/08

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 3/8/08

WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
32-11	1200						appears cl.	3/8/08 well developed
	1230							water cleared up within 5 minutes
								approx 5 gpm while pumping
								110psi kickoff slowly decreases to 2gpm at 75psi
								well recharges quickly when pump shut off
								screened interval in Unkpapa formation

Knight Piésold
CONSULTING

Appendix B-2
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data

Table B.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data

32-3C		GW-49		29-7		32-4C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.000012	16.362759	0.000012	-0.008329	0.000012	0.045472	0.000012	-0.002208	0.000000	-0.048216	0.000012	-0.025243
0.000023	19.161989	0.000023	-0.001406	0.000023	-0.000681	0.000023	0.004715	0.000012	-0.022831	0.000023	0.027834
0.000035	19.948912	0.000035	0.007825	0.000035	0.029319	0.000035	0.007023	0.000023	0.000246	0.000035	0.034757
0.000046	20.355066	0.000046	-0.001406	0.000046	-0.023758	0.000046	0.009331	0.000035	0.002553	0.000046	-0.009089
0.000058	21.017374	0.000058	0.035517	0.000058	0.013165	0.000058	0.007023	0.000046	0.000246	0.000058	0.011680
0.000069	21.402758	0.000069	-0.012944	0.000069	-0.012220	0.000069	0.002408	0.000058	0.004861	0.000069	0.009372
0.000081	21.651989	0.000081	-0.008329	0.000081	0.052395	0.000081	0.013946	0.000069	-0.011293	0.000081	0.023219
0.000093	22.035067	0.000093	-0.036021	0.000093	0.057011	0.000093	0.002408	0.000081	-0.020523	0.000093	0.013988
0.000104	22.071989	0.000104	0.007825	0.000104	0.001626	0.000104	0.016254	0.000093	0.004861	0.000104	-0.002166
0.000116	22.016603	0.000116	0.014748	0.000116	-0.028374	0.000116	0.000100	0.000104	-0.015908	0.000116	0.037065
0.000127	22.381220	0.000127	-0.006021	0.000127	-0.000681	0.000127	0.000100	0.000116	0.000246	0.000127	0.013988
0.000139	22.337374	0.000139	-0.001406	0.000139	-0.005297	0.000139	0.009331	0.000127	-0.002062	0.000139	-0.006781
0.000150	22.618912	0.000150	-0.008329	0.000150	0.045472	0.000150	0.009331	0.000139	0.002553	0.000150	-0.004474
0.000162	22.508142	0.000162	0.005517	0.000162	0.006242	0.000162	0.007023	0.000150	0.021015	0.000162	-0.018320
0.000174	22.847374	0.000174	-0.019867	0.000174	-0.021451	0.000174	0.011639	0.000162	-0.008985	0.000174	0.018603
0.000185	22.914297	0.000185	-0.008329	0.000185	-0.026066	0.000185	-0.004515	0.000174	0.014092	0.000185	0.000142
0.000197	22.999681	0.000197	-0.017559	0.000197	0.024703	0.000197	0.000100	0.000185	-0.018216	0.000197	0.013988
0.000208	22.893528	0.000208	-0.029098	0.000208	0.003934	0.000208	0.013946	0.000197	0.016400	0.000208	0.000142
0.000220	23.131220	0.000220	-0.003713	0.000220	0.020088	0.000220	0.013946	0.000208	-0.013600	0.000220	0.002449
0.000231	23.131220	0.000231	0.010133	0.000231	0.006242	0.000231	0.013946	0.000220	0.018707	0.000231	-0.013704
0.000243	23.271988	0.000243	-0.012944	0.000243	-0.014528	0.000243	0.011639	0.000231	0.023323	0.000243	0.011680
0.000255	23.121988	0.000255	0.017056	0.000255	0.031626	0.000255	0.004715	0.000243	-0.004370	0.000255	-0.011397
0.000266	23.101219	0.000266	0.005517	0.000266	0.038549	0.000266	0.023177	0.000255	-0.002062	0.000266	0.011680
0.000278	23.934296	0.000278	-0.022175	0.000278	0.006242	0.000278	0.009331	0.000266	-0.011293	0.000278	-0.002166
0.000289	24.737373	0.000289	-0.026790	0.000289	-0.032989	0.000289	0.007023	0.000278	0.009477	0.000289	0.009372
0.000301	25.408913	0.000301	0.007825	0.000301	-0.009912	0.000301	0.009331	0.000289	0.057938	0.000301	-0.009089
0.000312	26.036604	0.000312	-0.001406	0.000312	0.020088	0.000312	0.002408	0.000301	-0.008985	0.000312	0.002449
0.000324	27.222757	0.000324	-0.022175	0.000324	0.020088	0.000324	0.013946	0.000312	-0.018216	0.000324	-0.013704
0.000336	27.725836	0.000336	-0.008329	0.000336	-0.021451	0.000336	-0.004515	0.000324	0.009477	0.000336	-0.016012
0.000347	28.452759	0.000347	-0.029098	0.000347	0.010857	0.000347	0.007023	0.000336	-0.002062	0.000347	-0.043704
0.000359	29.391989	0.000359	0.017056	0.000359	0.006242	0.000359	0.002408	0.000347	-0.011293	0.000359	0.037065
0.000370	30.266603	0.000370	-0.017559	0.000370	-0.005297	0.000370	-0.002208	0.000359	0.000246	0.000370	-0.004474
0.000382	30.670450	0.000382	-0.012944	0.000382	0.013165	0.000382	0.013946	0.000370	0.000246	0.000382	0.018603
0.000394	30.815834	0.000394	-0.038329	0.000394	-0.000681	0.000394	0.004715	0.000382	0.025630	0.000394	0.002449
0.000417	30.891989	0.000405	-0.010636	0.000417	0.015472	0.000417	0.009331	0.000394	0.000246	0.000417	-0.004474
0.000451	29.811989	0.000417	-0.006021	0.000451	-0.035297	0.000451	0.013946	0.000417	-0.006677	0.000451	0.030142
0.000463	28.955835	0.000451	0.000902	0.000463	0.057011	0.000463	0.000100	0.000451	0.048707	0.000463	-0.022935
0.000486	27.504297	0.000463	-0.017559	0.000486	-0.014528	0.000486	0.002408	0.000463	0.016400	0.000486	-0.013704
0.000498	26.318142	0.000486	0.000902	0.000498	-0.000681	0.000498	-0.002208	0.000486	0.000246	0.000498	-0.011397
0.000521	25.127373	0.000498	0.014748	0.000521	0.017780	0.000521	0.007023	0.000498	-0.027447	0.000521	-0.025243
0.000532	24.181219	0.000521	0.012441	0.000532	-0.007605	0.000532	0.011639	0.000521	0.016400	0.000532	-0.004474
0.000556	23.816605	0.000532	-0.019867	0.000556	0.033934	0.000556	0.013946	0.000532	-0.004370	0.000556	-0.029858
0.000590	24.716604	0.000556	0.010133	0.000590	-0.014528	0.000590	-0.002208	0.000556	0.002553	0.000590	-0.048320
0.000625	26.325066	0.000590	0.042441	0.000625	0.003934	0.000625	0.011639	0.000590	0.016400	0.000625	-0.020628
0.000660	28.007374	0.000625	0.007825	0.000660	0.010857	0.000660	0.007023	0.000625	0.000246	0.000660	0.013988
0.000694	29.479681	0.000660	-0.022175	0.000694	-0.019143	0.000694	0.011639	0.000660	-0.002062	0.000694	0.011680
0.000729	29.885836	0.000694	-0.017559	0.000729	0.010857	0.000729	0.016254	0.000694	-0.029754	0.000729	0.023219
0.000764	30.118912	0.000729	0.005517	0.000764	0.045472	0.000764	0.000100	0.000729	-0.018216	0.000764	0.000142
0.000799	29.791220	0.000764	-0.012944	0.000799	0.020088	0.000799	-0.004515	0.000764	0.034861	0.000799	0.020911
0.000833	29.622759	0.000799	0.010133	0.000833	-0.012220	0.000833	0.000100	0.000799	0.039477	0.000833	0.025526

Table B.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data

32-3C		GW-49		29-7		32-4C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.000903	29.613527	0.000833	-0.008329	0.000903	-0.026066	0.000903	0.007023	0.000833	0.021015	0.000903	-0.018320
0.000972	29.675835	0.000903	-0.022175	0.000972	-0.005297	0.000972	0.030100	0.000903	-0.008985	0.000972	0.020911
0.001042	29.874296	0.000972	0.021671	0.001042	-0.028374	0.001042	0.004715	0.000972	0.025630	0.001042	-0.016012
0.001111	29.814297	0.001042	0.023979	0.001111	-0.014528	0.001111	0.011639	0.001042	0.067169	0.001111	0.018603
0.001181	29.823526	0.001111	0.012441	0.001181	-0.005297	0.001181	0.013946	0.001111	0.069477	0.001181	0.018603
0.001250	29.851219	0.001181	0.010133	0.001250	-0.030681	0.001250	0.011639	0.001181	0.090246	0.001250	-0.013704
0.001319	29.989681	0.001250	-0.015252	0.001319	0.027011	0.001319	0.016254	0.001250	0.076400	0.001319	0.064757
0.001389	30.010450	0.001319	-0.040636	0.001389	-0.056066	0.001389	0.002408	0.001319	0.131784	0.001389	-0.041397
0.001493	30.190451	0.001389	0.007825	0.001493	0.001626	0.001493	0.016254	0.001389	0.152553	0.001493	-0.025243
0.001597	30.144297	0.001493	0.014748	0.001597	-0.032989	0.001597	0.023177	0.001493	0.180246	0.001597	-0.025243
0.001701	30.280451	0.001597	-0.019867	0.001701	-0.012220	0.001701	0.016254	0.001597	0.203323	0.001701	-0.032166
0.001806	30.506603	0.001701	-0.022175	0.001806	-0.000681	0.001806	0.030100	0.001701	0.274861	0.001806	0.013988
0.001944	30.497374	0.001806	-0.026790	0.001944	-0.035297	0.001944	0.041639	0.001806	0.291015	0.001944	-0.004474
0.002083	30.527374	0.001944	0.060902	0.002083	-0.014528	0.002083	0.030100	0.001944	0.330246	0.002083	-0.041397
0.002222	30.758142	0.002083	0.007825	0.002222	0.031626	0.002222	0.037023	0.002083	0.411015	0.002222	-0.029858
0.002361	30.873528	0.002222	-0.029098	0.002361	-0.009912	0.002361	0.039331	0.002222	0.452553	0.002361	-0.016012
0.002500	31.071989	0.002361	0.007825	0.002500	0.015472	0.002500	0.055485	0.002361	0.494092	0.002500	-0.009089
0.002639	30.954296	0.002500	-0.008329	0.002639	-0.012220	0.002639	0.050869	0.002500	0.512553	0.002639	-0.022935
0.002778	31.159681	0.002639	0.014748	0.002778	-0.012220	0.002778	0.048562	0.002639	0.581784	0.002778	-0.009089
0.002951	31.143528	0.002778	0.000902	0.002951	0.024703	0.002951	0.067023	0.002778	0.595630	0.002951	-0.013704
0.003125	31.323526	0.002951	-0.022175	0.003125	-0.026066	0.003125	0.071639	0.002951	0.713323	0.003125	-0.025243
0.003299	31.420450	0.003125	-0.006021	0.003299	0.006242	0.003299	0.080869	0.003125	0.701784	0.003299	-0.052935
0.003472	31.475836	0.003299	0.003210	0.003472	-0.005297	0.003472	0.080869	0.003299	0.761784	0.003472	-0.004474
0.003704	31.637373	0.003472	-0.006021	0.003704	0.015472	0.003704	0.099331	0.003472	0.791784	0.003704	0.009372
0.003935	31.695066	0.003704	0.010133	0.003935	-0.005297	0.003935	0.103946	0.003704	0.872553	0.003935	-0.046012
0.004167	31.757374	0.003935	0.007825	0.004167	0.050088	0.004167	0.143177	0.003935	0.916400	0.004167	-0.013704
0.004398	31.796604	0.004167	-0.019867	0.004398	-0.000681	0.004398	0.133946	0.004167	0.983323	0.004398	-0.004474
0.004630	32.068913	0.004398	0.005517	0.004630	0.010857	0.004630	0.143177	0.004398	1.011015	0.004630	-0.092166
0.004861	32.036606	0.004630	0.000902	0.004861	0.010857	0.004861	0.166254	0.004630	1.119477	0.004861	-0.006781
0.005208	32.232758	0.004861	0.000902	0.005208	0.017780	0.005208	0.187023	0.004861	1.158707	0.005208	-0.032166
0.005556	32.179680	0.005208	-0.008329	0.005556	0.043165	0.005556	0.196254	0.005208	1.204861	0.005556	0.030142
0.005903	32.373528	0.005556	-0.006021	0.005903	-0.012220	0.005903	0.221639	0.005556	1.304092	0.005903	0.041680
0.006250	32.382759	0.005903	-0.015252	0.006250	-0.014528	0.006250	0.244715	0.005903	1.357169	0.006250	0.000142
0.006597	32.398911	0.006250	-0.015252	0.006597	-0.021451	0.006597	0.260869	0.006250	1.421784	0.006597	0.023219
0.006944	32.641220	0.006597	0.007825	0.006944	0.008549	0.006944	0.283946	0.006597	1.530246	0.006944	0.048603
0.007292	32.781990	0.006944	-0.029098	0.007292	-0.009912	0.007292	0.309331	0.006944	1.534861	0.007292	0.041680
0.007639	32.922756	0.007292	-0.033713	0.007639	-0.002989	0.007639	0.309331	0.007292	1.567169	0.007639	0.080911
0.007986	32.874298	0.007639	-0.015252	0.007986	-0.000681	0.007986	0.339331	0.007639	1.645630	0.007986	0.083219
0.008333	32.980450	0.007986	0.019364	0.008333	-0.026066	0.008333	0.371639	0.007986	1.714861	0.008333	0.055526
0.009028	33.077374	0.008333	0.019364	0.009028	0.022395	0.009028	0.401639	0.008333	1.728707	0.009028	0.090142
0.009722	33.061218	0.009028	0.030902	0.009722	0.010857	0.009722	0.436254	0.009028	1.876400	0.009722	0.073988
0.010417	33.261990	0.009722	-0.006021	0.010417	0.010857	0.010417	0.480100	0.009722	1.954861	0.010417	0.099372
0.011111	33.460449	0.010417	-0.012944	0.011111	-0.007605	0.011111	0.521639	0.010417	2.024092	0.011111	0.133988
0.011806	33.536606	0.011111	-0.022175	0.011806	0.047780	0.011806	0.558562	0.011111	2.079477	0.011806	0.145526
0.012500	33.552757	0.011806	-0.036021	0.012500	0.010857	0.012500	0.581639	0.011806	2.178707	0.012500	0.131680
0.013194	33.728142	0.012500	-0.017559	0.013194	0.006242	0.013194	0.611639	0.012500	2.277938	0.013194	0.166296
0.013889	33.753529	0.013194	0.000902	0.013889	0.045472	0.013889	0.657792	0.013194	2.317169	0.013889	0.187065
0.014931	34.346603	0.013889	-0.015252	0.014931	-0.000681	0.014931	0.699331	0.013889	2.361015	0.014931	0.196296
0.015972	34.362759	0.014931	0.007825	0.015972	0.015472	0.015972	0.747792	0.014931	2.499476	0.015972	0.267834
0.017014	34.570450	0.015972	-0.012944	0.017014	0.001626	0.017014	0.796254	0.015972	2.568707	0.017014	0.288603

Table B.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data

32-3C		**GW-49**		**29-7**		**32-4C**		**32-5**		**32-9C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.018056	34.745834	0.017014	-0.008329	0.018056	0.024703	0.018056	0.844715	0.017014	2.637938	0.018056	0.353219
0.019444	34.872757	0.018056	0.040133	0.019444	0.013165	0.019444	0.911639	0.018056	2.734861	0.019444	0.392449
0.020833	34.872757	0.019444	0.051671	0.020833	0.008549	0.020833	0.967023	0.019444	2.868707	0.020833	0.417834
0.022222	35.149681	0.020833	0.026287	0.022222	-0.012220	0.022222	1.022408	0.020833	2.961015	0.022222	0.487065
0.023611	35.149681	0.022222	0.030902	0.023611	-0.012220	0.023611	1.066254	0.022222	3.037169	0.023611	0.549372
0.025000	35.355064	0.023611	0.049364	0.025000	0.020088	0.025000	1.123946	0.023611	3.113323	0.025000	0.600142
0.026389	35.320450	0.025000	0.053979	0.026389	0.010857	0.026389	1.156254	0.025000	3.194092	0.026389	0.553988
0.027778	35.645836	0.026389	0.053979	0.027778	0.027011	0.027778	1.204715	0.026389	3.256400	0.027778	0.556296
0.029514	35.567375	0.027778	0.077056	0.029514	-0.026066	0.029514	1.285485	0.027778	3.300246	0.029514	0.616296
0.031250	35.588142	0.029514	0.083979	0.031250	0.036242	0.031250	1.315485	0.029514	3.408707	0.031250	0.623219
0.032986	35.680450	0.031250	0.134748	0.032986	0.036242	0.032986	1.363946	0.031250	3.482553	0.032986	0.690142
0.034722	35.735836	0.032986	0.100133	0.034722	-0.014528	0.034722	1.423946	0.032986	3.544861	0.034722	0.745526
0.037037	35.950451	0.034722	0.141671	0.037037	-0.016835	0.037037	1.481639	0.034722	3.607169	0.037037	0.784757
0.039352	35.978142	0.037037	0.125517	0.039352	0.024703	0.039352	1.532408	0.037037	3.713323	0.039352	0.863219
0.041667	35.952759	0.039352	0.164748	0.041667	0.001626	0.041667	1.587792	0.039352	3.807938	0.041667	0.865526
0.043981	36.153526	0.041667	0.201671	0.043981	0.006242	0.043981	1.645485	0.041667	3.863323	0.043981	0.890911
0.046296	36.012756	0.043981	0.208594	0.046296	0.001626	0.046296	1.696254	0.043981	3.953323	0.046296	0.960142
0.048611	36.144295	0.046296	0.247825	0.048611	0.010857	0.048611	1.735485	0.046296	4.015630	0.048611	0.999372
0.052083	36.488144	0.048611	0.289364	0.052083	-0.021451	0.052083	1.827792	0.048611	4.061784	0.052083	1.091680
0.055556	36.432758	0.052083	0.303210	0.055556	-0.016835	0.055556	1.887792	0.052083	4.200246	0.055556	1.147065
0.059028	36.527374	0.055556	0.402441	0.059028	0.033934	0.059028	1.940869	0.055556	4.253323	0.059028	1.243988
0.062500	36.478912	0.059028	0.471671	0.062500	-0.000681	0.062500	2.003177	0.059028	4.368707	0.062500	1.315526
0.065972	36.508911	0.062500	0.476287	0.065972	-0.000681	0.065972	2.056254	0.062500	4.426400	0.065972	1.313219
0.069444	36.580452	0.065972	0.584748	0.069444	0.015472	0.069444	2.107023	0.065972	4.481784	0.069444	1.324757
0.072917	36.688911	0.069444	0.573210	0.073021	0.059319	0.072917	2.157792	0.069444	4.548707	0.072917	1.382449
0.076389	36.806602	0.072917	0.653979	0.076493	0.057011	0.076389	2.231638	0.072917	4.647938	0.076389	1.474757
0.079861	36.647373	0.076389	0.716287	0.079965	0.033934	0.079861	2.273177	0.076389	4.650246	0.079965	1.564757
0.083368	36.778912	0.079861	0.711671	0.083438	0.070857	0.083449	2.317023	0.079931	4.777169	0.083438	1.513988
0.090312	37.895836	0.083449	0.771671	0.090382	0.084703	0.090394	2.409331	0.083403	4.807169	0.090382	1.668603
0.097257	37.900452	0.090394	0.799364	0.097326	0.084703	0.097338	2.510869	0.090347	4.936399	0.097326	1.693988
0.104201	38.121990	0.097338	0.972441	0.104271	-0.060681	0.104282	2.598562	0.097292	5.116400	0.104271	1.843988
0.111147	38.013527	0.104282	1.080902	0.111215	0.050088	0.111227	2.667792	0.104236	5.215631	0.111215	1.998603
0.118091	38.108143	0.111227	1.159364	0.118160	0.057011	0.118171	2.743946	0.111181	5.340246	0.118160	1.931680
0.125035	38.172756	0.118171	1.307056	0.125104	0.047780	0.125116	2.815485	0.118125	5.411784	0.125104	2.077065
0.131979	38.331989	0.125116	1.327825	0.132049	0.068549	0.132060	2.880100	0.125069	5.524861	0.132049	2.139373
0.138924	38.493526	0.132060	1.413210	0.138993	0.077780	0.139005	2.949331	0.132014	5.566400	0.138993	2.210911
0.149340	38.484295	0.139005	1.533210	0.149410	0.075472	0.149421	3.032408	0.138958	5.633323	0.149410	2.416296
0.159757	38.350449	0.149421	1.637056	0.159826	0.022395	0.159838	3.110869	0.149375	5.794861	0.159826	2.510911
0.170174	38.484295	0.159838	1.747825	0.170243	0.082395	0.170255	3.198562	0.159792	5.875630	0.170243	2.476295
0.180590	38.627373	0.170255	1.881671	0.180660	0.031626	0.180671	3.265485	0.170208	5.907938	0.180660	2.713988
0.194479	38.631989	0.180671	1.976287	0.194549	0.061626	0.194560	3.364715	0.180625	6.007169	0.194549	2.843219
0.208368	38.811989	0.194560	2.096287	0.208437	0.070857	0.208449	3.452408	0.194514	6.221784	0.208437	2.877834
0.222257	38.763527	0.208449	2.267056	0.222326	0.103165	0.222338	3.540100	0.208403	6.184861	0.222326	2.986295
0.236146	38.920452	0.222338	2.336287	0.236215	0.054703	0.236227	3.572408	0.222292	6.406400	0.236215	3.247065
0.250035	38.839680	0.236227	2.465518	0.250104	0.057011	0.250116	3.697023	0.236181	6.473323	0.250104	3.251680
0.263924	38.908913	0.250116	2.583210	0.263993	0.027011	0.264005	3.784715	0.250069	6.581784	0.263993	3.427065
0.277812	39.130451	0.264005	2.652441	0.277882	0.066242	0.277894	3.853946	0.263958	6.655631	0.277882	3.463988
0.295174	39.375065	0.277894	2.781671	0.295243	0.073165	0.295255	3.950869	0.277847	6.711015	0.295243	3.683219
0.312535	39.285065	0.295255	2.931671	0.312604	0.036242	0.312616	4.045485	0.295208	6.893322	0.312604	3.747834
0.329896	39.349682	0.312616	3.000902	0.329965	0.073165	0.329977	4.133177	0.312569	6.967169	0.329965	3.883988

Table B.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Drawdown Data

32-3C		**GW-49**		**29-7**		**32-4C**		**32-5**		**32-9C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.347257	39.538914	0.329977	3.118594	0.347326	0.093934	0.347338	4.211638	0.329931	7.096400	0.347326	4.006296
0.370405	39.342758	0.347338	3.263979	0.370475	0.063934	0.370486	4.331638	0.347292	7.179477	0.370475	4.140141
0.393553	39.598911	0.370486	3.407056	0.393623	0.084703	0.393634	4.442408	0.370440	7.308707	0.393623	4.333988
0.416701	39.898911	0.393634	3.510902	0.416771	0.077780	0.416782	4.548562	0.393588	7.401015	0.416771	4.453988
0.439965	39.430450	0.416782	3.647056	0.440035	0.066242	0.440046	4.650100	0.416736	7.537169	0.440035	4.562449
0.462998	39.878143	0.440046	3.753210	0.463067	0.061626	0.463079	4.765485	0.440000	7.645630	0.463067	4.772449
0.486146	39.965836	0.463079	3.912441	0.486215	0.080088	0.486227	4.857792	0.463032	7.784092	0.486215	4.832449
0.520868	40.173527	0.486227	4.004748	0.520938	0.084703	0.520949	4.970869	0.486181	7.864861	0.520938	5.026296
0.555590	40.101990	0.520949	4.136287	0.555660	0.082395	0.555671	5.095485	0.520903	8.028708	0.555660	5.208603
0.590312	40.249680	0.555671	4.283979	0.590382	0.114703	0.590394	5.213177	0.555625	8.107169	0.590382	5.317065
0.625035	40.685837	0.590394	4.424748	0.625104	0.114703	0.625116	5.337792	0.590347	8.259477	0.625104	5.483219
0.659757	40.494297	0.625116	4.523979	0.659826	0.114703	0.659838	5.420869	0.625069	8.423323	0.659826	5.653988
0.694479	40.639683	0.659838	4.678595	0.694549	0.135472	0.694560	5.522408	0.659792	8.527169	0.694549	5.836296
0.729549	40.833527	0.694560	4.768594	0.729618	0.123934	0.729630	5.635485	0.694514	8.571015	0.729618	5.974757
0.763924	40.755066	0.729630	4.826287	0.763993	0.147011	0.764005	5.700100	0.729583	8.702554	0.763993	6.064757
0.798646	41.034298	0.764005	4.937056	0.798715	0.181626	0.798727	5.808562	0.763958	8.827168	0.798715	6.212450
0.833368	41.082760	0.798727	5.098594	0.833438	0.200088	0.833449	5.947023	0.798681	8.944861	0.833438	6.332449
0.902814	41.218910	0.833449	5.190902	0.902882	0.234703	0.902893	6.161639	0.833403	9.046400	0.902882	6.581680
0.972951	41.555836	0.902893	5.433210	0.973021	0.204703	0.973032	6.307023	0.902847	9.254092	0.973021	6.800911
1.041701	41.576603	0.973032	5.627056	1.041771	0.276242	1.041782	6.487023	0.972986	9.424861	1.041771	6.907065
1.111146	41.629681	1.041782	5.779364	1.111215	0.310857	1.111227	6.620869	1.041736	9.572554	1.111215	7.170142
1.180590	41.911221	1.111227	5.890133	1.180660	0.340857	1.180671	6.722408	1.111181	9.699476	1.180660	7.343219
1.250035	41.809681	1.180671	6.007825	1.250104	0.391626	1.250116	6.844716	1.180625	9.821784	1.250104	7.516295
1.319479	41.920452	1.250116	6.148594	1.319549	0.417011	1.319560	7.010870	1.250069	10.041015	1.319549	7.650142
1.388924	42.229683	1.319560	6.298594	1.388993	0.430857	1.389005	7.167792	1.319514	10.024861	1.388993	7.786295
1.493090	42.545834	1.389005	6.467056	1.493160	0.463165	1.493171	7.389331	1.388958	10.255630	1.493160	8.090911
1.597257	42.432758	1.493171	6.704748	1.597326	0.557780	1.597338	7.603946	1.493125	10.532554	1.597326	8.335526
1.701424	42.813526	1.597338	6.898594	1.701493	0.580857	1.701505	7.770100	1.597292	10.733323	1.701493	8.522449
1.805590	42.917374	1.701505	7.087825	1.805660	0.627011	1.805671	7.989331	1.701458	10.841784	1.805660	8.739372
1.944479	44.018143	1.805671	7.272440	1.944549	0.735472	1.944560	8.307793	1.805625	11.028708	1.944549	9.013988
2.083368	44.029682	1.944560	7.604748	2.083437	0.830088	2.083449	8.510869	1.944514	11.467169	2.083437	9.277064
2.222257	44.138142	2.083449	7.805518	2.222326	0.807011	2.222338	8.670100	2.083403	11.667938	2.222326	9.452450
2.361146	44.244297	2.222338	7.997056	2.361215	0.996242	2.361227	8.845485	2.222292	11.787938	2.361215	9.558603
2.500035	44.426605	2.361227	8.121672	2.500104	1.086242	2.500116	9.090100	2.361181	11.997938	2.500104	9.870142
2.638924	44.592758	2.500116	8.357056	2.638993	1.217780	2.639005	9.244716	2.500070	12.251784	2.638993	10.087065
2.777813	44.657372	2.639005	8.516287	2.777882	1.210857	2.777894	9.413177	2.638958	12.422553	2.777882	10.220911
2.951423	44.666603	2.777894	8.696287	2.951493	1.381626	2.951505	9.646254	2.777847	12.574862	2.951493	10.474757
3.083843	44.781990	2.951505	8.933979	3.083843	1.480857	3.083843	9.766253	2.951458	12.708707	3.083843	10.599373
		3.083843	9.033210					3.083843	12.953322		

General Methodology: PSI, temperature, and time readings from Win-Situ™ digital data log were exported to Excel ".csv" file.
Drawdown was calculated as PSI at time after pumping minus average PSI before pumping; therefore, at small or zero changes in PSI negative drawdowns may be calculated.
A FORTRAN program was written to read the ".csv" file and produce a second file by extracting the records at a frequency of 40 per log-time cycle (in minutes) in order achieve equal representation of data throughout the pumping and drawdown phases of the test.

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Appendix B-3
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

Table B.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

32-3C		49		324C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
3.083866	42.133311	3.083866	9.035518	3.083889	9.763947	3.083866	12.934861	3.083889	10.606296
3.083877	41.493441	3.083877	9.053979	3.083901	9.766253	3.083877	12.930245	3.083901	10.603988
3.083889	40.624881	3.083889	9.042440	3.083912	9.775485	3.083889	12.925631	3.083912	10.557834
3.083901	39.645441	3.083901	9.063210	3.083924	9.770869	3.083901	12.904861	3.083924	10.585526
3.083912	38.712201	3.083912	9.148595	3.083935	9.768561	3.083912	12.907168	3.083935	10.594757
3.083924	37.792821	3.083924	9.053979	3.083947	9.759331	3.083924	12.914092	3.083947	10.615526
3.083935	36.931191	3.083935	9.058595	3.083958	9.768561	3.083935	12.909476	3.083958	10.564757
3.083947	36.228951	3.083947	9.060902	3.083970	9.768561	3.083947	12.946400	3.083970	10.567065
3.083958	35.328051	3.083958	9.060902	3.083981	9.773177	3.083958	12.918707	3.083981	10.562449
3.083970	34.549581	3.083970	9.028594	3.083993	9.770869	3.083970	12.897938	3.083993	10.638603
3.083982	33.812691	3.083981	9.056287	3.084005	9.775485	3.083981	12.895631	3.084005	10.583219
3.083993	33.055011	3.083993	9.157825	3.084016	9.766253	3.083993	12.944092	3.084016	10.640911
3.084005	32.371251	3.084005	9.042440	3.084028	9.775485	3.084005	12.946400	3.084028	10.525526
3.084016	31.673631	3.084016	9.033210	3.084039	9.768561	3.084016	12.914092	3.084039	10.594757
3.084028	30.980631	3.084028	9.049364	3.084051	9.759331	3.084028	12.955630	3.084051	10.617834
3.084039	30.350001	3.084039	9.051671	3.084062	9.770869	3.084039	12.897938	3.084062	10.666296
3.084051	29.723991	3.084051	9.063210	3.084074	9.770869	3.084051	12.914092	3.084074	10.580911
3.084063	29.162661	3.084062	9.063210	3.084086	9.766253	3.084062	12.909476	3.084086	10.601680
3.084074	28.545891	3.084074	9.051671	3.084097	9.763947	3.084074	12.921015	3.084097	10.599373
3.084086	27.984561	3.084086	9.012441	3.084109	9.770869	3.084086	12.964861	3.084109	10.555527
3.084097	27.448641	3.084097	9.047056	3.084120	9.770869	3.084097	12.939477	3.084120	10.583219
3.084109	26.901171	3.084109	9.028594	3.084132	9.775485	3.084109	12.909476	3.084132	10.562449
3.084120	26.367561	3.084120	9.056287	3.084143	9.761639	3.084120	12.930245	3.084143	10.606296
3.084132	25.877841	3.084132	9.065517	3.084155	9.773177	3.084132	12.891015	3.084155	10.599373
3.084143	25.432011	3.084143	9.051671	3.084167	9.773177	3.084143	12.897938	3.084167	10.599373
3.084155	25.004661	3.084155	9.040133	3.084178	9.773177	3.084155	12.934861	3.084178	10.590141
3.084167	24.496461	3.084167	9.132441	3.084190	9.761639	3.084167	12.897938	3.084190	10.583219
3.084178	24.161511	3.084178	9.012441	3.084201	9.775485	3.084178	12.897938	3.084201	10.578603
3.084190	23.711061	3.084190	9.051671	3.084213	9.768561	3.084190	12.951015	3.084213	10.585526
3.084201	23.359941	3.084201	9.035518	3.084224	9.757023	3.084201	12.916400	3.084224	10.585526
3.084213	22.955691	3.084213	9.063210	3.084236	9.761639	3.084213	12.925631	3.084236	10.606296
3.084224	22.567611	3.084224	9.077056	3.084248	9.768561	3.084224	12.930245	3.084248	10.583219
3.084236	22.262691	3.084236	9.042440	3.084259	9.754716	3.084236	12.918707	3.084259	10.583219
3.084248	21.946221	3.084248	9.047056	3.084282	9.766253	3.084248	12.893323	3.084282	10.597065
3.084271	21.320211	3.084259	9.047056	3.084317	9.773177	3.084259	12.893323	3.084317	10.592449
3.084305	20.518641	3.084282	9.049364	3.084329	9.766253	3.084282	12.937169	3.084329	10.601680
3.084317	20.299191	3.084317	9.067825	3.084352	9.763947	3.084317	12.900246	3.084352	10.603988
3.084340	19.844121	3.084329	9.065517	3.084363	9.759331	3.084329	12.886399	3.084363	10.622449
3.084352	19.626981	3.084352	9.044748	3.084387	9.766253	3.084352	12.895631	3.084387	10.594757
3.084375	19.225041	3.084363	9.035518	3.084398	9.775485	3.084363	12.909476	3.084398	10.564757

Table B.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

32-3C		49		324C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
3.084386	19.079511	3.084387	9.023979	3.084421	9.770869	3.084387	12.930245	3.084421	10.578603
3.084410	18.739941	3.084398	9.047056	3.084456	9.766253	3.084398	12.918707	3.084456	10.606296
3.084444	18.402681	3.084421	9.141671	3.084491	9.770869	3.084421	12.925631	3.084491	10.583219
3.084479	18.125481	3.084456	9.040133	3.084526	9.766253	3.084456	12.930245	3.084526	10.578603
3.084514	17.938371	3.084491	9.063210	3.084560	9.780100	3.084491	12.914092	3.084560	10.599373
3.084549	17.758191	3.084526	9.063210	3.084595	9.757023	3.084526	12.879477	3.084595	10.585526
3.084583	17.649621	3.084560	9.125518	3.084630	9.763947	3.084560	12.932553	3.084630	10.567065
3.084618	17.520261	3.084595	9.058595	3.084664	9.761639	3.084595	12.932553	3.084664	10.597065
3.084653	17.388591	3.084630	9.033210	3.084699	9.766253	3.084630	12.925631	3.084699	10.601680
3.084688	17.256921	3.084664	9.056287	3.084769	9.766253	3.084664	12.867938	3.084769	10.587834
3.084757	17.035161	3.084699	9.153210	3.084838	9.770869	3.084699	12.909476	3.084838	10.592449
3.084826	16.811091	3.084769	9.077056	3.084907	9.750100	3.084769	12.934861	3.084907	10.599373
3.084896	16.531581	3.084838	9.033210	3.084977	9.754716	3.084838	12.902554	3.084977	10.624757
3.084965	16.325991	3.084907	9.021671	3.085046	9.768561	3.084907	12.851785	3.085046	10.590141
3.085035	16.078821	3.084977	9.042440	3.085116	9.770869	3.084977	12.851785	3.085116	10.583219
3.085104	15.880161	3.085046	9.077056	3.085185	9.768561	3.085046	12.886399	3.085185	10.594757
3.085173	15.803931	3.085116	9.053979	3.085255	9.770869	3.085116	12.844861	3.085255	10.594757
3.085243	15.519801	3.085185	9.074748	3.085359	9.757023	3.085185	12.835630	3.085359	10.610911
3.085347	15.348861	3.085255	9.056287	3.085463	9.752408	3.085255	12.807938	3.085463	10.578603
3.085452	15.247221	3.085359	9.023979	3.085567	9.770869	3.085359	12.796400	3.085567	10.606296
3.085556	15.161751	3.085463	9.033210	3.085671	9.752408	3.085463	12.773323	3.085671	10.617834
3.085660	15.032391	3.085567	9.053979	3.085810	9.752408	3.085567	12.731784	3.085810	10.583219
3.085798	14.916891	3.085671	9.056287	3.085961	9.747792	3.085671	12.674092	3.085961	10.608603
3.085939	14.775981	3.085810	9.040133	3.086088	9.747792	3.085810	12.641785	3.086088	10.633987
3.086076	14.782911	3.085961	9.040133	3.086227	9.740870	3.085961	12.584092	3.086227	10.594757
3.086215	14.810631	3.086088	9.047056	3.086366	9.736254	3.086088	12.537938	3.086366	10.615526
3.086354	14.764431	3.086227	9.021671	3.086505	9.731639	3.086227	12.524092	3.086505	10.627065
3.086493	14.688201	3.086366	9.037826	3.086643	9.729331	3.086366	12.475631	3.086643	10.647834
3.086632	14.623521	3.086505	9.104749	3.086817	9.715485	3.086505	12.429477	3.086817	10.592449
3.086806	14.563461	3.086643	9.042440	3.086991	9.703946	3.086643	12.392553	3.086991	10.599373
3.086979	14.586561	3.086817	9.049364	3.087164	9.703946	3.086817	12.314092	3.087164	10.643219
3.087153	14.496471	3.086991	9.146287	3.087338	9.687793	3.086991	12.321015	3.087338	10.654757
3.087327	14.461821	3.087164	9.058595	3.087570	9.690100	3.087164	12.212553	3.087570	10.622449
3.087558	14.415621	3.087338	9.017056	3.087801	9.667023	3.087338	12.175631	3.087801	10.645526
3.087789	14.350941	3.087570	9.049364	3.088032	9.662408	3.087570	12.117938	3.088032	10.622449
3.088021	14.281641	3.087801	9.060902	3.088264	9.662408	3.087801	12.051015	3.088264	10.615526
3.088252	14.244681	3.088032	9.030902	3.088495	9.639331	3.088032	12.014091	3.088495	10.622449
3.088484	14.184621	3.088264	9.113979	3.088727	9.630100	3.088264	11.949476	3.088727	10.622449
3.088715	14.205411	3.088495	9.044748	3.089074	9.600101	3.088495	11.887169	3.089074	10.594757
3.089062	14.032161	3.088727	9.035518	3.089421	9.600101	3.088727	11.864092	3.089421	10.599373

Table B.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

32-3C		49		324C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
3.089410	14.025231	3.089074	9.060902	3.089768	9.570100	3.089074	11.815630	3.089768	10.576296
3.089757	13.847361	3.089421	9.051671	3.090116	9.558561	3.089421	11.762553	3.090116	10.580911
3.090104	12.685431	3.089768	9.042440	3.090463	9.535484	3.089768	11.658708	3.090463	10.615526
3.090451	12.315831	3.090116	9.047056	3.090810	9.512407	3.090116	11.617168	3.090810	10.594757
3.090799	12.163371	3.090463	9.040133	3.091157	9.500870	3.090463	11.511015	3.091157	10.587834
3.091146	12.066351	3.090810	9.100133	3.091505	9.473177	3.090810	11.492554	3.091505	10.585526
3.091493	11.960091	3.091157	9.060902	3.091852	9.459331	3.091157	11.439477	3.091852	10.567065
3.091840	12.001671	3.091505	9.063210	3.092199	9.440869	3.091505	11.342553	3.092199	10.562449
3.092187	11.782221	3.091852	9.058595	3.092893	9.413177	3.091852	11.296400	3.092893	10.530142
3.092882	11.675961	3.092199	9.060902	3.093588	9.364716	3.092199	11.261785	3.093588	10.520911
3.093576	11.574321	3.092893	9.042440	3.094282	9.337023	3.092893	11.178707	3.094282	10.490911
3.094271	11.470371	3.093588	9.067825	3.094977	9.295485	3.093588	11.049477	3.094977	10.453988
3.094965	11.331771	3.094282	9.072440	3.095683	9.256254	3.094282	10.952554	3.095683	10.488604
3.095671	11.375661	3.094977	9.056287	3.096366	9.233177	3.094977	10.869476	3.096366	10.414757
3.096354	11.204721	3.095683	9.023979	3.097060	9.189331	3.095683	10.823322	3.097060	10.382449
3.097049	11.160831	3.096366	9.056287	3.097755	9.161638	3.096366	10.703322	3.097755	10.363988
3.097743	11.103081	3.097060	9.030902	3.098796	9.108562	3.097060	10.613322	3.098796	10.373219
3.098785	11.001441	3.097755	9.049364	3.099838	9.073946	3.097755	10.592553	3.099838	10.292449
3.099826	10.885941	3.098796	9.148595	3.100880	9.013947	3.098796	10.463323	3.100880	10.287834
3.100868	10.761201	3.099838	9.118594	3.101921	8.970100	3.099838	10.435631	3.101921	10.225526
3.101910	10.719621	3.100880	9.070133	3.103310	8.910100	3.100880	10.322554	3.103310	10.264757
3.103299	10.511721	3.101921	9.017056	3.104699	8.857023	3.101921	10.255630	3.104699	10.188603
3.104687	10.403151	3.103310	9.123210	3.106088	8.808561	3.103310	10.119476	3.106088	10.147065
3.106076	10.289961	3.104699	9.047056	3.107477	8.762407	3.104699	10.043323	3.107477	10.093987
3.107465	10.206801	3.106088	9.026287	3.108866	8.713946	3.106088	9.957938	3.108866	10.070910
3.108854	10.116711	3.107477	8.998594	3.110255	8.658562	3.107477	9.946400	3.110255	10.063988
3.110243	9.950391	3.108866	9.095517	3.111643	8.628562	3.108866	9.780246	3.111643	10.031680
3.111632	9.878781	3.110255	8.989364	3.113380	8.563946	3.110255	9.717938	3.113380	10.001680
3.113368	9.719391	3.111643	8.970902	3.115116	8.520100	3.111643	9.648707	3.115116	9.946296
3.115104	9.532281	3.113380	9.074748	3.116852	8.462408	3.113380	9.561015	3.116852	9.893219
3.116840	9.310521	3.115116	9.012441	3.118588	8.402408	3.115116	9.473323	3.118588	9.851680
3.118576	9.218121	3.116852	8.963979	3.120903	8.344715	3.116852	9.447938	3.120903	9.807834
3.120891	9.091071	3.118588	9.047056	3.123217	8.287024	3.118588	9.339477	3.123217	9.782450
3.123206	9.116481	3.120903	9.014749	3.125532	8.243177	3.120903	9.277169	3.125532	9.720141
3.125521	8.975571	3.123217	8.959364	3.127847	8.173946	3.123217	9.147938	3.127847	9.676295
3.127836	8.890101	3.125532	8.846287	3.130162	8.123177	3.125532	9.067169	3.130162	9.680911
3.130150	8.834661	3.127847	8.825518	3.132477	8.077024	3.127847	9.011785	3.132477	9.648603
3.132465	8.751501	3.130162	8.807055	3.135949	8.007792	3.130162	8.935631	3.135949	9.521680
3.135937	8.700681	3.132477	8.848595	3.139421	7.938561	3.132477	8.887169	3.139421	9.477834
3.139410	8.594421	3.135949	8.721671	3.142893	7.878561	3.135949	8.790246	3.142893	9.431680

Table B.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

32-3C		49		324C		32-5		32-9C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
3.142882	8.522811	3.139421	8.788594	3.146366	7.825485	3.139421	8.695630	3.146366	9.380911
3.146354	8.435031	3.142893	8.640903	3.149838	7.765485	3.142893	8.603323	3.149838	9.290911
3.149826	8.405001	3.146366	8.564748	3.153310	7.707792	3.146366	8.541015	3.153310	9.265527
3.153299	8.287191	3.149838	8.550902	3.156782	7.661639	3.149838	8.448708	3.156782	9.203218
3.156771	8.217891	3.153310	8.493210	3.160301	7.615485	3.153310	8.377169	3.160255	9.131680
3.160243	8.190171	3.156829	8.467825	3.163773	7.569331	3.156782	8.351784	3.163762	9.136295
3.163715	8.109321	3.160301	8.456286	3.167361	7.523177	3.160255	8.268707	3.167350	9.071680
3.167268	8.042331	3.163773	8.370902	3.174421	7.435485	3.163727	8.229477	3.174410	8.947064
3.174329	7.991511	3.167361	8.366286	3.181250	7.345485	3.167315	8.079476	3.181238	8.877834
3.181157	7.859841	3.174421	8.211671	3.188194	7.283177	3.174375	8.051785	3.188183	8.697834
3.188102	7.746651	3.181250	8.133210	3.195139	7.202408	3.181204	7.917938	3.195127	8.686296
3.195046	7.614981	3.188194	8.057055	3.202083	7.091639	3.188148	7.804861	3.202072	8.637834
3.201991	7.612671	3.195139	7.948595	3.209028	7.057023	3.195092	7.744861	3.209016	8.547834
3.208935	7.501791	3.202083	7.874748	3.215972	6.999331	3.202037	7.645630	3.215961	8.473988
3.215880	7.404771	3.209028	7.752440	3.222917	6.932408	3.208981	7.583323	3.222905	8.377065
3.222824	7.360881	3.215972	7.724748	3.233333	6.840100	3.215926	7.502553	3.233322	8.268603
3.233241	7.215351	3.222917	7.625517	3.243750	6.773177	3.222870	7.449477	3.243738	8.171680
3.243657	7.150671	3.233333	7.526287	3.254167	6.715485	3.233287	7.225630	3.254155	8.056295
3.254074	7.060581	3.243750	7.408595	3.264583	6.641639	3.243704	7.188707	3.264572	7.980142
3.264491	6.986661	3.254167	7.297825	3.278472	6.540100	3.254120	7.114861	3.278461	7.827834
3.278380	6.873471	3.264583	7.189363	3.292361	6.457023	3.264537	6.939476	3.292350	7.747065
3.292268	6.755661	3.278472	7.041671	3.306250	6.392408	3.278426	6.918707	3.306238	7.645526
3.306157	6.684051	3.292361	6.960902	3.320139	6.270100	3.292315	6.798707	3.320127	7.509372
3.320046	6.575481	3.306250	6.866287	3.334028	6.203177	3.306204	6.701784	3.334016	7.451680
3.333935	6.462291	3.320139	6.737056	3.347917	6.122408	3.320092	6.600246	3.347905	7.264757
3.347824	6.448431	3.334028	6.633210	3.361806	6.062408	3.333981	6.503323	3.361794	7.234757
3.361713	6.295971	3.347917	6.524748	3.379167	6.025485	3.347870	6.369476	3.379155	7.123988
3.379074	6.265941	3.361806	6.471671	3.396528	5.949331	3.361759	6.327938	3.396516	7.024757
3.396435	6.166611	3.379167	6.328594	3.413889	5.889331	3.379120	6.270246	3.413877	6.925526
3.413796	6.023391	3.396528	6.284748	3.431250	5.817792	3.396481	6.159477	3.431238	6.793988
3.431157	6.060351	3.413889	6.167056	3.454398	5.750869	3.413842	6.083323	3.454387	6.690142
3.454306	5.935611	3.431250	6.081671	3.477546	5.667792	3.431204	6.027938	3.477535	6.593219
3.477454	5.778531	3.454398	5.966287	3.500694	5.593946	3.454352	5.850246	3.500683	6.477834
3.500602	5.746191	3.477546	5.910902	3.523958	5.536254	3.477500	5.861784	3.523947	6.403988
3.523866	5.702301	3.500694	5.781672	3.546991	5.471639	3.500648	5.757938	3.546979	6.247065
3.546898	5.623761	3.523958	5.774748	3.570139	5.413946	3.523912	5.688707	3.570127	6.173219
3.570046	5.556771	3.546991	5.721671	3.604861	5.330869	3.546945	5.568707	3.604850	6.060142
3.604768	5.480541	3.570139	5.523210	3.639583	5.240870	3.570092	5.527169	3.639572	5.910141
3.639491	5.369661	3.604861	5.433210	3.674306	5.155485	3.604815	5.455630	3.674294	5.700142
3.674213	5.231061	3.639583	5.322441	3.709028	5.047023	3.639537	5.310246	3.709016	5.658603

Table B.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Dewey Test, Recovery Data

32-3C		**49**		**324C**		**32-5**		**32-9C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
3.708935	5.138661	3.674306	5.269363	3.743750	4.991639	3.674259	5.241015	3.743738	5.527065
3.743657	5.069361	3.709028	5.172441	3.778472	4.931639	3.708981	5.155631	3.778461	5.427834
3.778380	5.030091	3.743750	5.036287	3.813542	4.873946	3.743704	5.001015	3.813530	5.395526
3.813449	4.916901	3.778472	4.967056	3.847917	4.811638	3.778426	4.975630	3.847905	5.270911
3.847824	4.900731	3.813542	4.890902	3.882639	4.767792	3.813495	4.941015	3.882627	5.180911
3.882546	4.856841	3.847917	4.853979	3.917361	4.726254	3.847870	4.864861	3.917350	5.148603
3.917268	4.782921	3.882639	4.784748	3.986806	4.633946	3.882592	4.846400	3.986794	4.952449
3.986713	4.655871	3.917361	4.724748	4.056944	4.543946	3.917315	4.733323	4.056933	4.825526
4.056852	4.651251	3.986806	4.727056	4.125694	4.444715	3.986759	4.657169	4.125683	4.723988
4.125602	4.512651	4.056944	4.540133	4.195139	4.301639	4.056898	4.594861	4.195127	4.523219
4.195046	4.337091	4.125694	4.413210	4.264583	4.211638	4.125648	4.511784	4.264572	4.465526
4.264491	4.274721	4.195139	4.293210	4.334028	4.110100	4.195092	4.366400	4.334016	4.317834
4.333935	4.221591	4.264583	4.267825	4.403472	4.029331	4.264537	4.248707	4.403461	4.181680
4.403380	4.076061	4.334028	4.092441	4.472917	3.985485	4.333981	4.126400	4.472905	4.163218
4.472824	4.020621	4.403472	4.069364	4.577083	3.886254	4.403426	4.041015	4.577072	4.031680
4.576991	3.875091	4.472917	3.983979	4.681250	3.775485	4.472870	4.015630	4.681238	3.842449
4.681157	3.849681	4.577083	3.843210	4.785417	3.662408	4.577037	3.826400	4.785405	3.727065
4.785324	3.715701	4.681250	3.732440	4.889583	3.574715	4.681204	3.810246	4.889572	3.669373
4.889491	3.604821	4.785417	3.598594	5.028472	3.431638	4.785370	3.639477	5.028461	3.487065
5.028380	3.558621	4.889583	3.492440	5.167361	3.279331	4.889537	3.597938	5.167350	3.362449
5.167268	3.357651	5.028472	3.407056	5.306250	3.076254	5.028426	3.466400	5.306238	3.157065
5.306157	3.154371	5.167361	3.323979	5.445139	2.944715	5.167315	3.309477	5.445127	2.960911
5.445046	2.997291	5.306250	3.130133	5.584028	2.810869	5.306204	3.092553	5.584016	2.917065
5.583935	2.837901	5.445139	2.869364	5.722917	2.674716	5.445092	2.947169	5.722905	2.713988
5.722824	2.738571	5.584028	2.777056	5.861806	2.552408	5.583981	2.852553	5.861794	2.582449
5.861713	2.653101	5.722917	2.622441	6.008217	2.469331	5.722871	2.661015	6.008206	2.513219
6.008125	2.521431	5.861806	2.479364			5.861759	2.497169		
		6.008217	2.403210			6.008171	2.494861		

General Methodology: PSI, temperature, and time readings from Win-Situ™ digital data log were exported to Excel ".csv" file.
Drawdown was calculated as PSI at time after pumping minus average PSI before pumping; therefore, at small or zero changes in PSI negative drawdowns may be calculated.
A FORTRAN program was written to read the ".csv" file and produce a second file by extracting the records at a frequency of 40 per log-time cycle (in minutes) in order achieve equal representation of data throughout the pumping and drawdown phases of the test.

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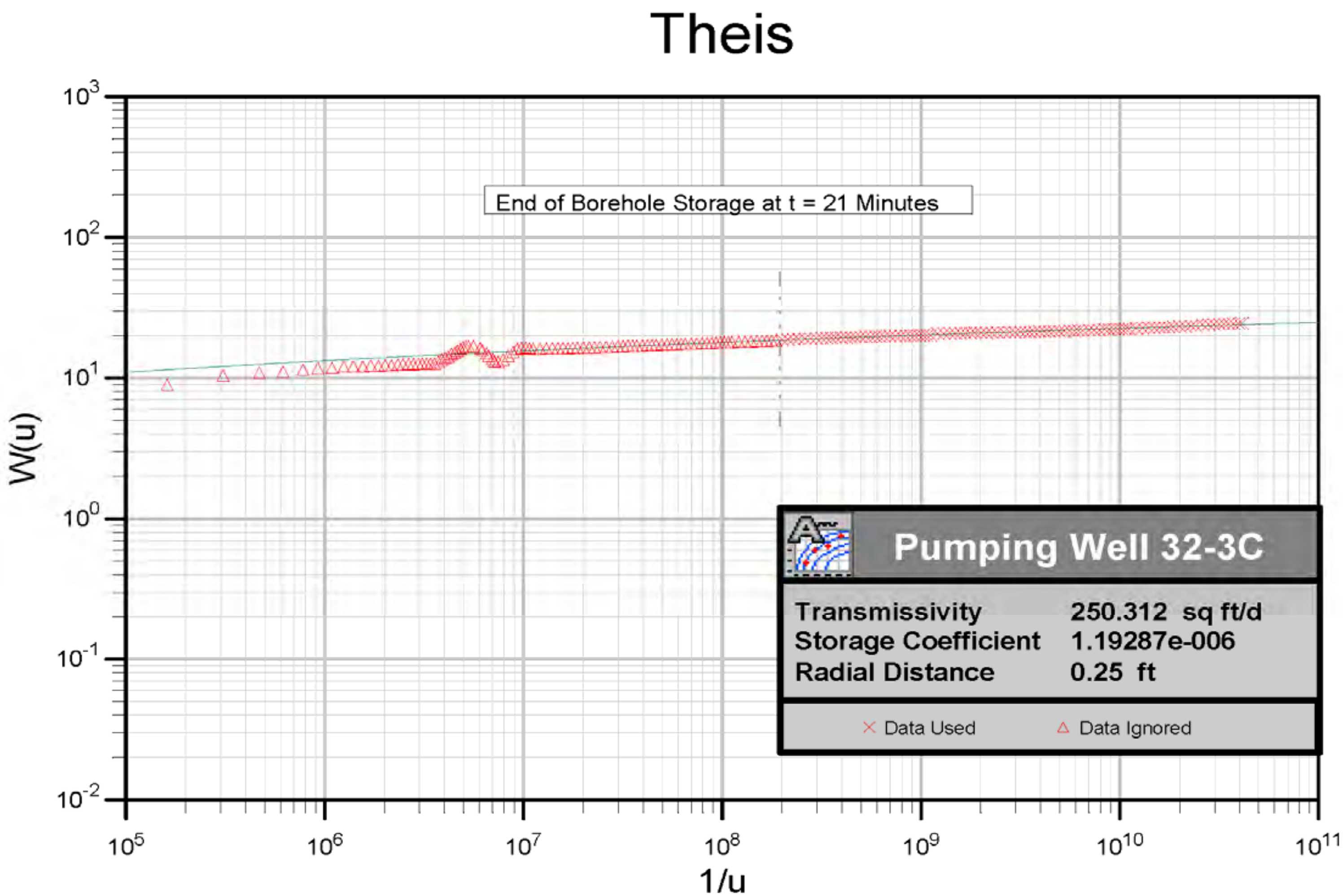
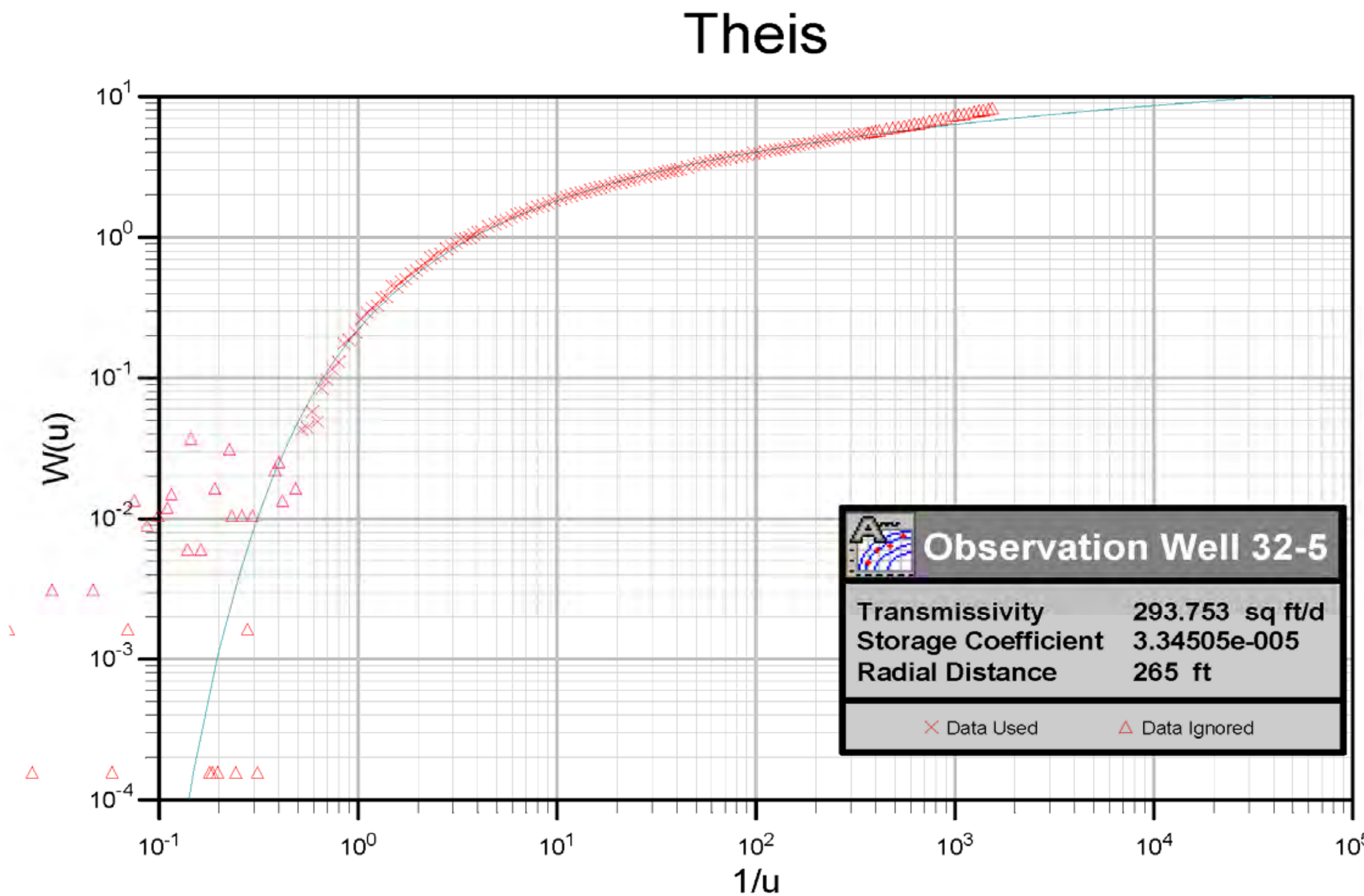
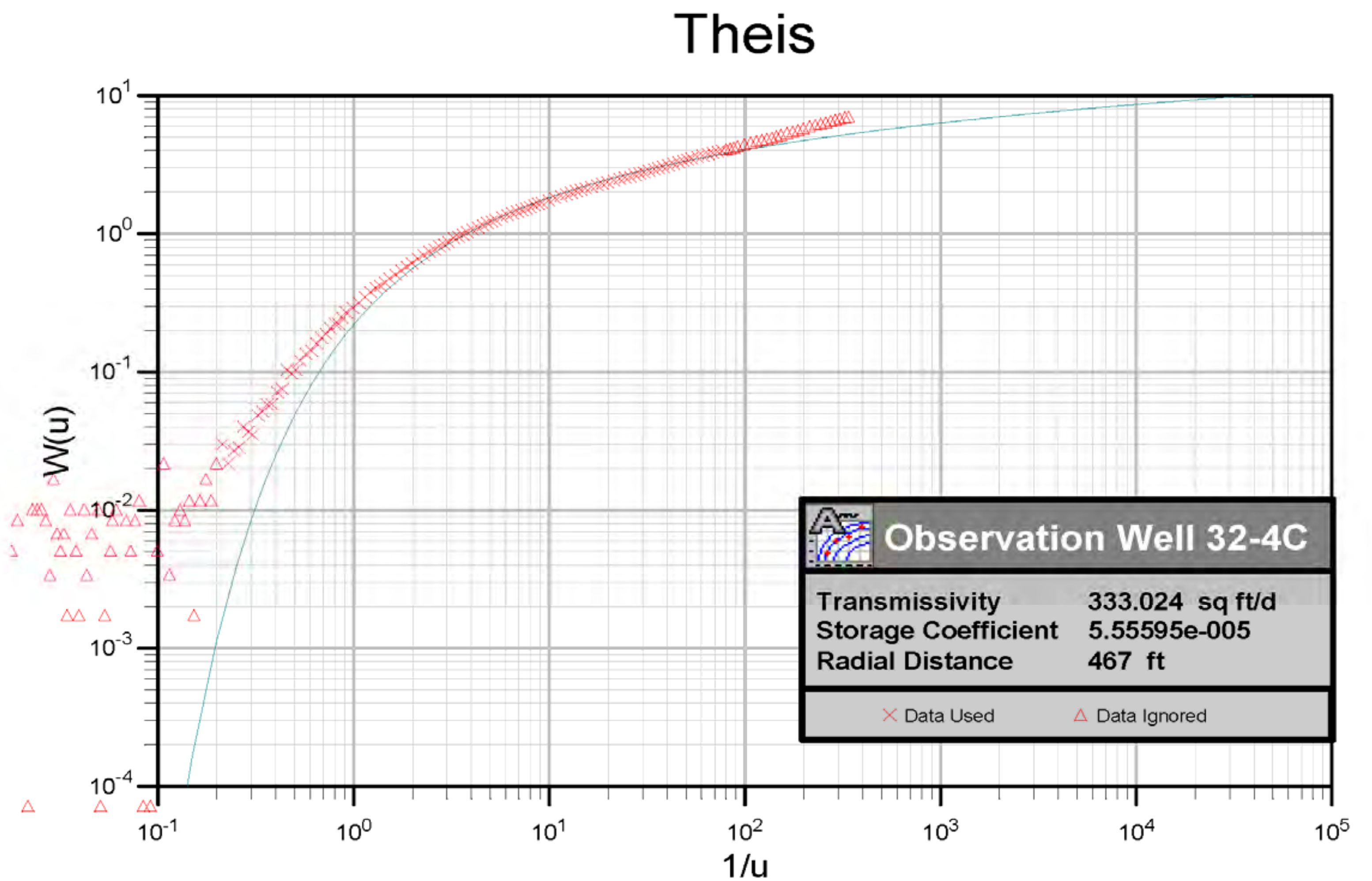
Appendix B-4
Additional Aquifer Parameter Determinations



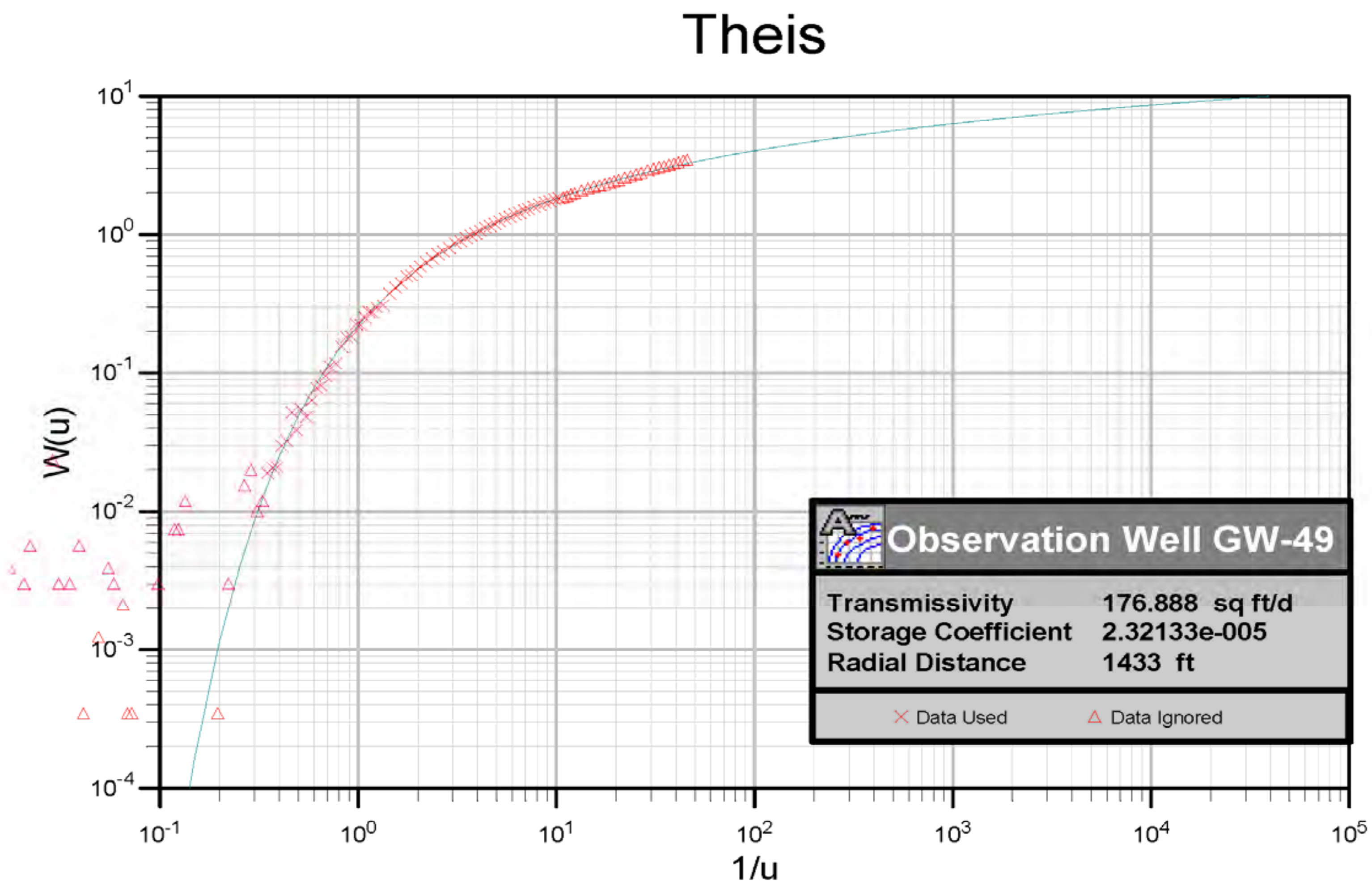
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Pumping Well 32-3C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-1



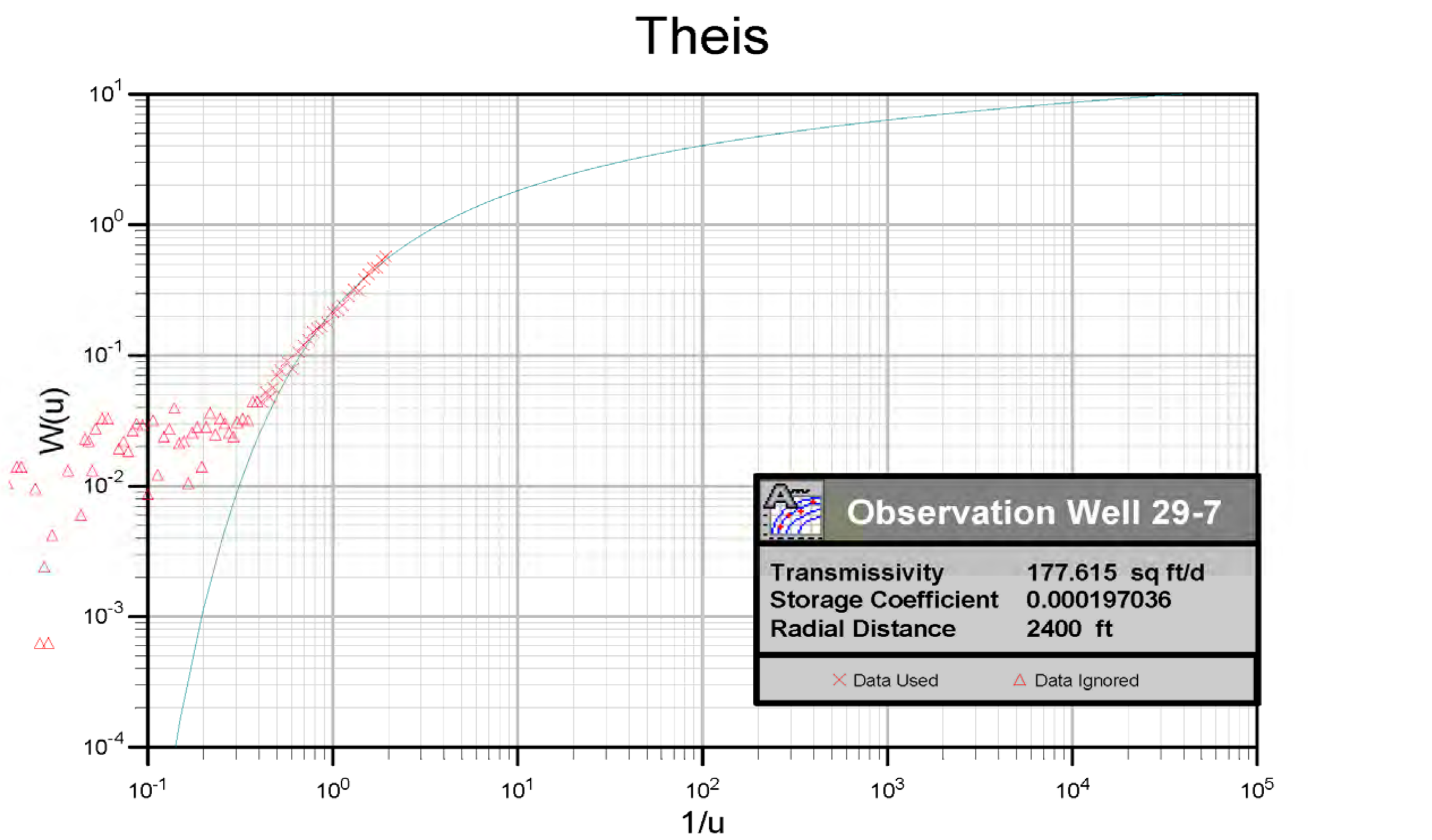
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Observation Well 32-5	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-2



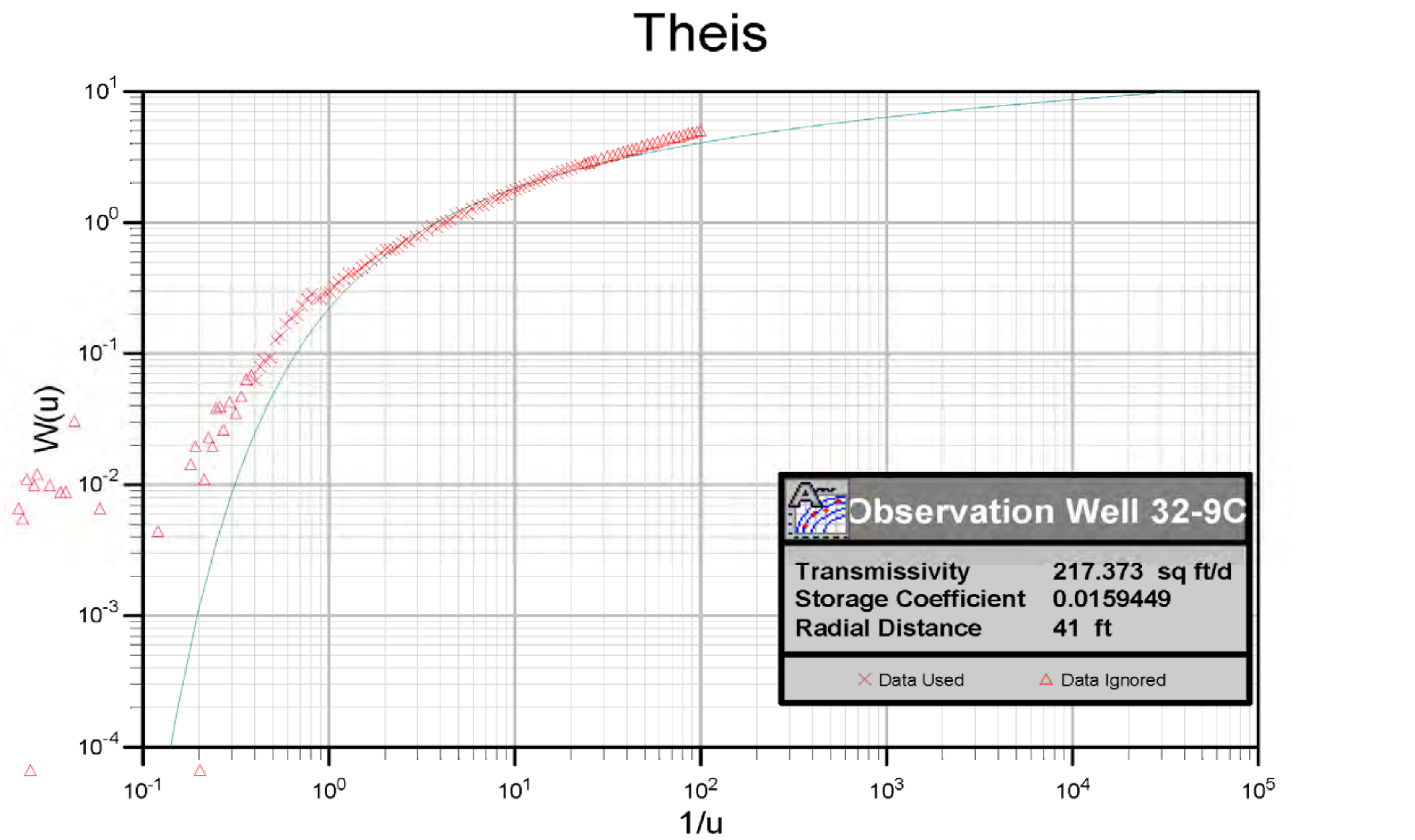
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Observation Well 32-4C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-3



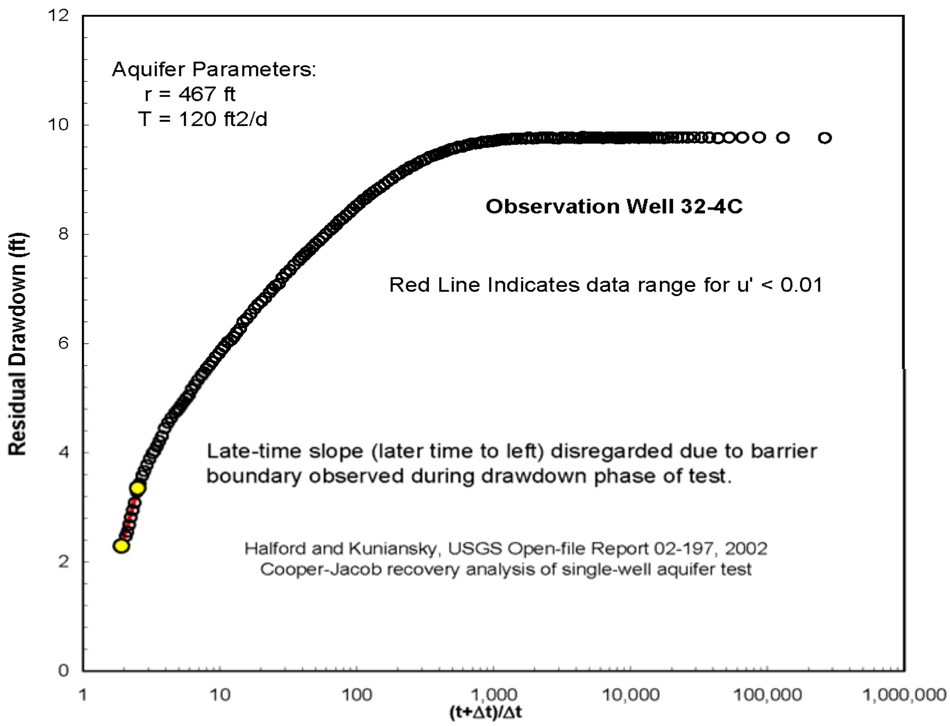
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Stock Well GW-49	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-4

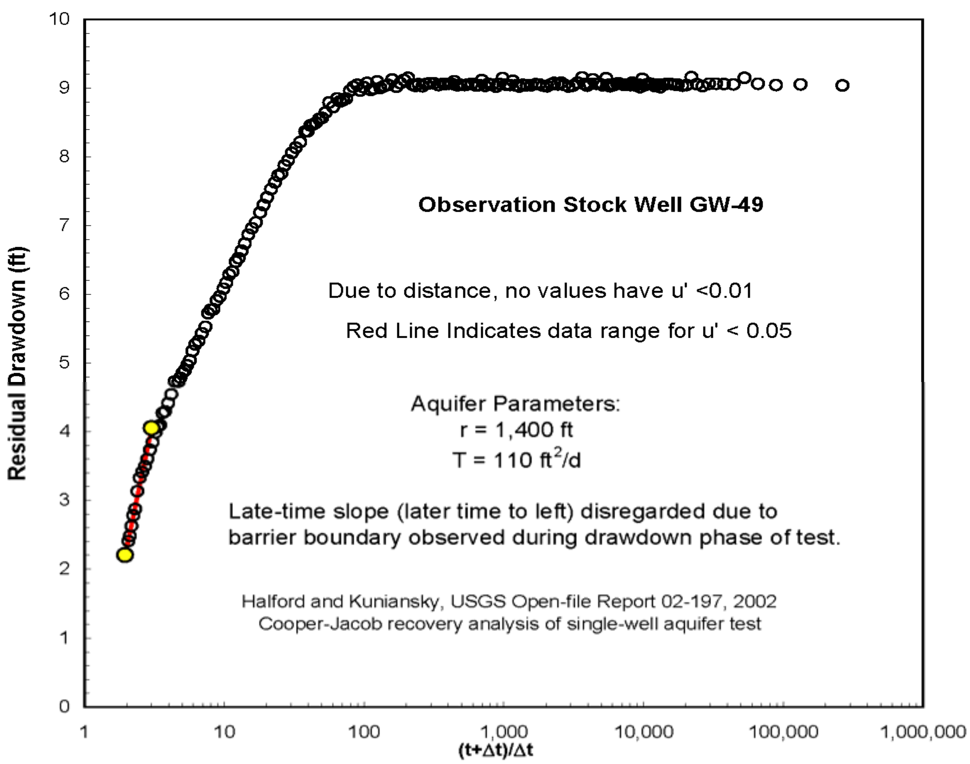


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Observation Well 29-7	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-5

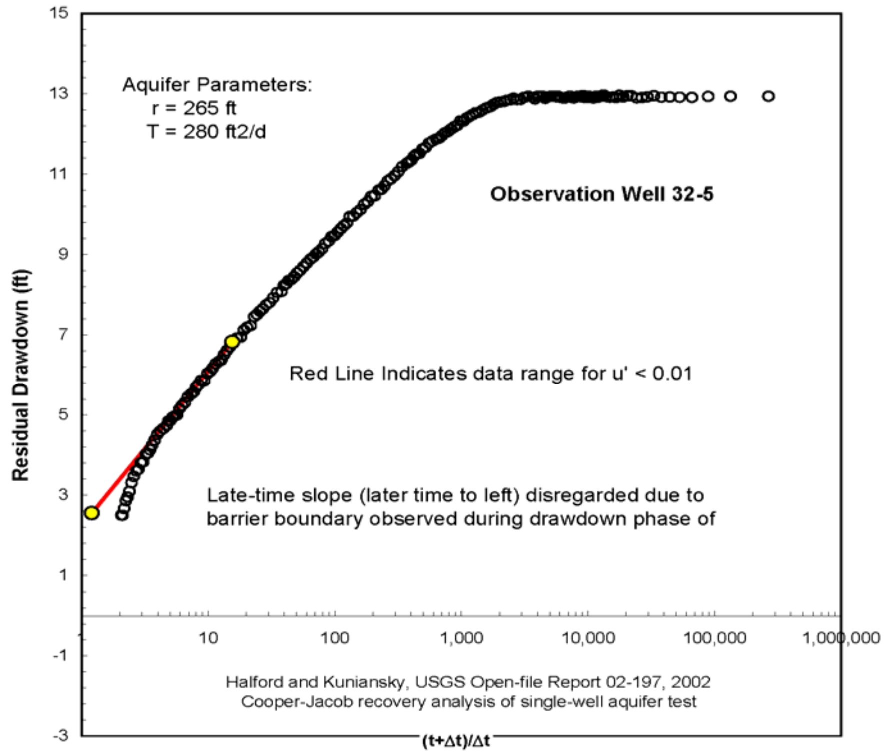


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Dewey Upper Fall River Observation Well 32-9C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B, Figure B.4-6

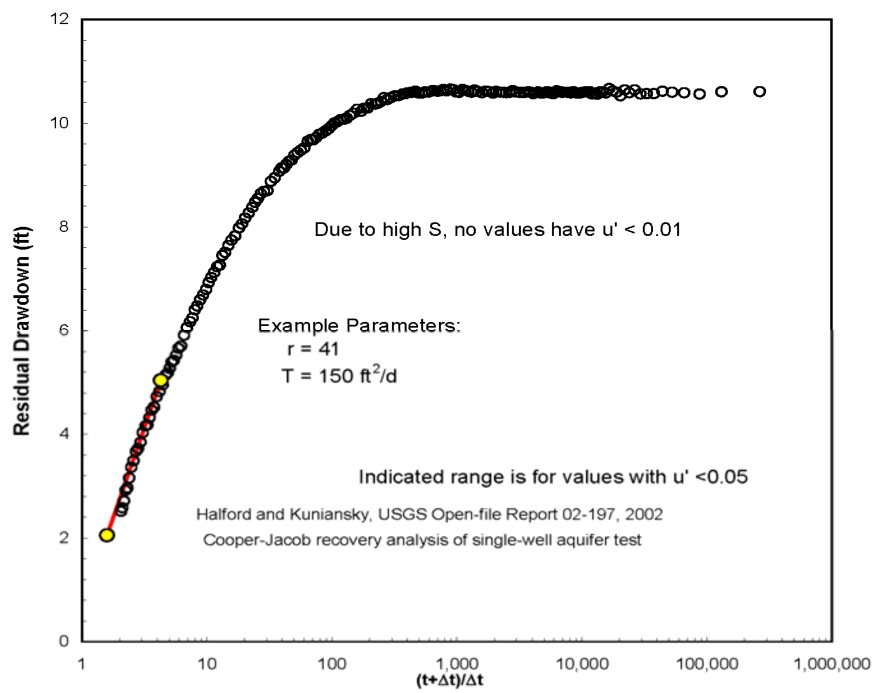




Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis-Cooper-Jacob Recovery Analyses, Dewey Observation Wells 32-4C and GW-49	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B Figure B.4-7



Observation Well 32-9C



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis-Cooper-Jacob Recovery Analyses, Dewey Observation Wells 32-5 and 32-9C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix B Figure B.4-8

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Appendix C
Burdock Test Supplemental Information

Appendix C-1:	**Well Completion Diagrams**
Appendix C-2:	**Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data**
Appendix C-3:	**Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recover Data**
Appendix C-4:	**Additional Aquifer Parameter Determinations**

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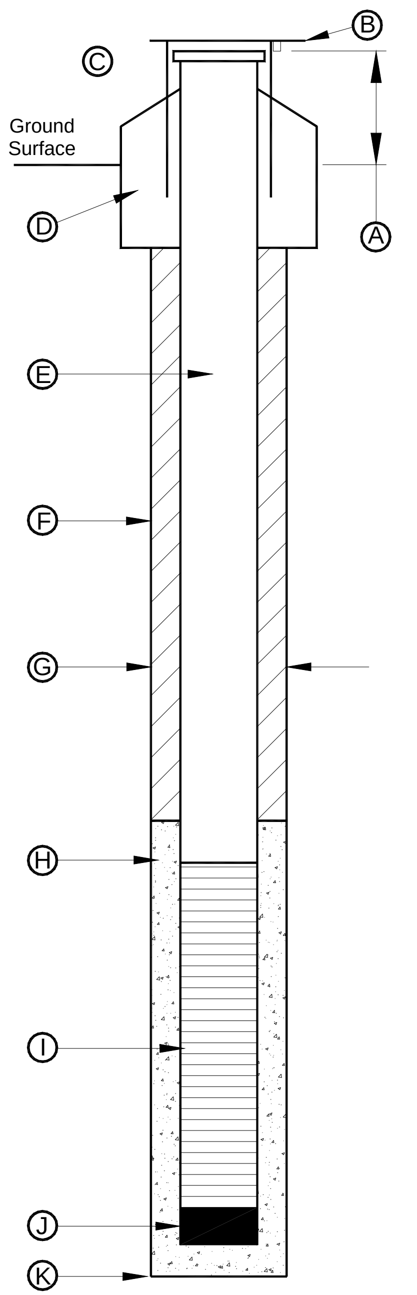
Appendix C-1
Well Completion Diagrams

POWERTECH WELL AND PUMP DATA

Location of Well Burdock, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-11-11C
County Fall River	Type of Rig	Drilling Fluid mud	Well Depth 436'
LAT 4811660N	LONG 583455E	Elevation 4163'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. *NA*

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 428'
- Weight SCH 40
- Depth to Bottom 426'

F. Grout cement Date 10/30/07
- Depth to Top 0'
- Depth to Bottom 427'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 24.1 bbls
- % Excess 50
- Method of Installation displacement
- Depth to Cement in Casing 396'
- Return Constant [ ] Yes [x] No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.5" 10/10/07

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 12/18/08
- Depth to Top 426-436"
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tony

Boring Depth 495'TD 418' casing'

Method of Drilling Date: 10/10/07

- [ ] Cabel Tool
- [ ] Hollow Rod
- [x] Direct Rotary
- [ ] Air Rotary
- [ ] Bucket Auger
- [ ] Reverse Rotary
- [ ] Flight Auger
- [ ] Jetted
- [ ] Dug
- [ ] Driven
- [ ] Other mud rotary

Use

- [ ] Domestic
- [ ] Public Supply
- [ ] Industrial
- [ ] Irrigation
- [ ] Municipal
- [ ] Commercial
- [ ] Test Well
- [ ] Heating or Cooling
- [x] Monitoring
- [ ] Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump
Date Installed — Type
Manufacturer — Model No.
H.P. — Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
[ ] Oil [ ] Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting — Impellors
Bowl Diameter
Column Pipe Diameter — Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 10/10/07

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	12/13/08
Time Beginning of Test	0900	Time End of Test	1100
Initial Pressure	35.0PSIG	Initial Fluid Level	5.0 inches
Final Pressure	35.0PSIG	Final Fluid Level	5.0inches

Water Quality
Sample taken? [ ] Yes [ ] No
Where analyzed?

Date well completed 12/18/08

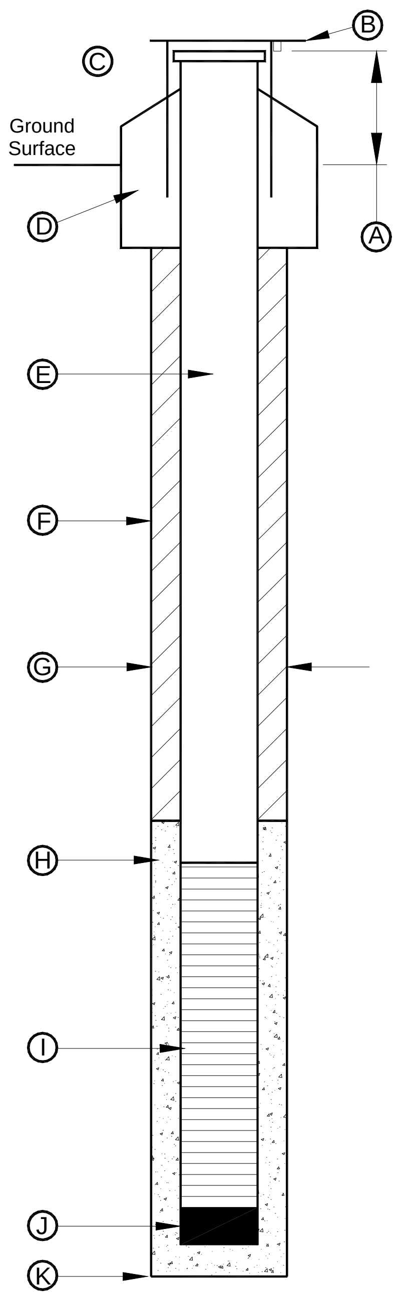
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
11-11c	1400						appears cl.	12/18/08 well developed
	1430							water appeared clear within 5 minutes
								approx. 30 gpm while pumping
								150psi kickoff, 90psi sustained

POWERTECH WELL AND PUMP DATA

Location of Well Burdock, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-11-14C
County Fall River	Type of Rig	Drilling Fluid mud	Well Depth 423'
LAT 4811591N	LONG 583496E	Elevation 3645'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 415'
- Weight SCH 40
- Depth to Bottom 413'

F. Grout cement Date 11/3/07
- Depth to Top 0'
- Depth to Bottom 414'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 15.8 bbls
- % Excess 50
- Method of Installation displacement
- Depth to Cement in Casing 303'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.25" 11/2/07

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/13/08
- Depth to Top 413-423'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tony

Boring Depth 460'TD 415' ream'

Method of Drilling Date: 11/2/07

- ☐ Cabel Tool ☐ Hollow Rod
- ☒ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump
Date Installed | Type
Manufacturer | Model No.
H.P. | Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
☐ Oil ☐ Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting | Impellors
Bowl Diameter
Column Pipe Diameter | Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 11/2/07

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	2/12/08
Time Beginning of Test	1400	Time End of Test	1445
Initial Pressure	40.0PSIG	Initial Fluid Level	5.0 inches
Final Pressure	40.0PSIG	Final Fluid Level	5.0inches

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed?

Date well completed 2/13/08

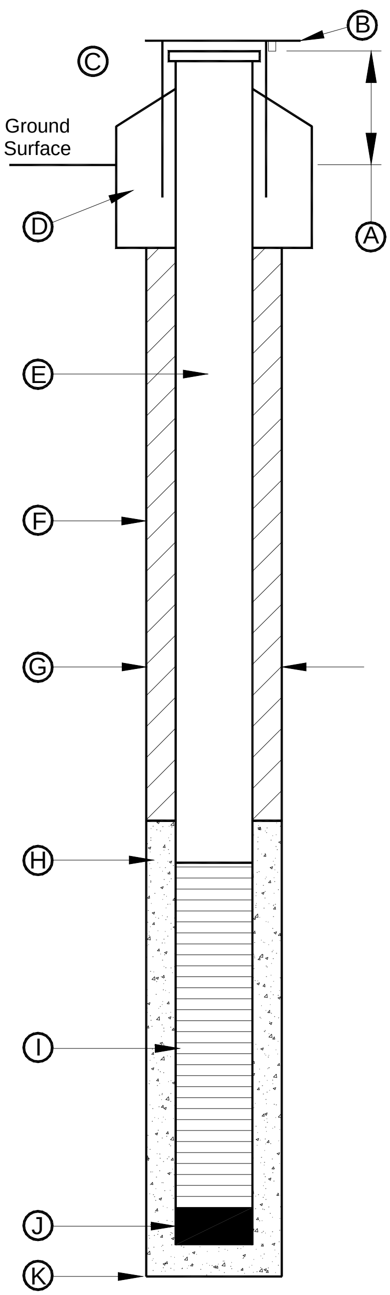
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
11-14c	1500						appears cl.	2/13/08 well developed
	1530							water cleared up in approx. 3 minutes
								approx. 30 gpm while pumping
								150psi kickoff, 100psi sustained

POWERTECH WELL AND PUMP DATA

Location of Well Burdock, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-11-15
County Fall River	Type of Rig	Drilling Fluid mud	Well Depth 428'
LAT 4811590N	LONG 583428E	Elevation 3710'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 420'
- Weight SCH 40
- Depth to Bottom 418'

F. Grout cement Date 11/5/07
- Depth to Top 0'
- Depth to Bottom 419'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 15.7 bbls
- % Excess 50
- Method of Installation displacement
- Depth to Cement in Casing 290'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.5" 11/4/07

H. Pack Type/SizeNA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/24/08
- Depth to Top 418-428'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tony

Boring Depth 495'TD 418' casing'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	2/9/08
Time Beginning of Test	0930	Time End of Test	1015
Initial Pressure	40.0PSIG	Initial Fluid Level	5.0 inches
Final Pressure	40.0PSIG	Final Fluid Level	5.0inches

Method of Drilling Date: 11/4/07

- ☐ Cabel Tool ☐ Hollow Rod
- ☒ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump
Date Installed — Type
Manufacturer — Model No.
H.P. — Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
☐ Oil ☐ Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting — Impellors
Bowl Diameter
Column Pipe Diameter — Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 11/4/07

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed?

Date well completed 2/24/08

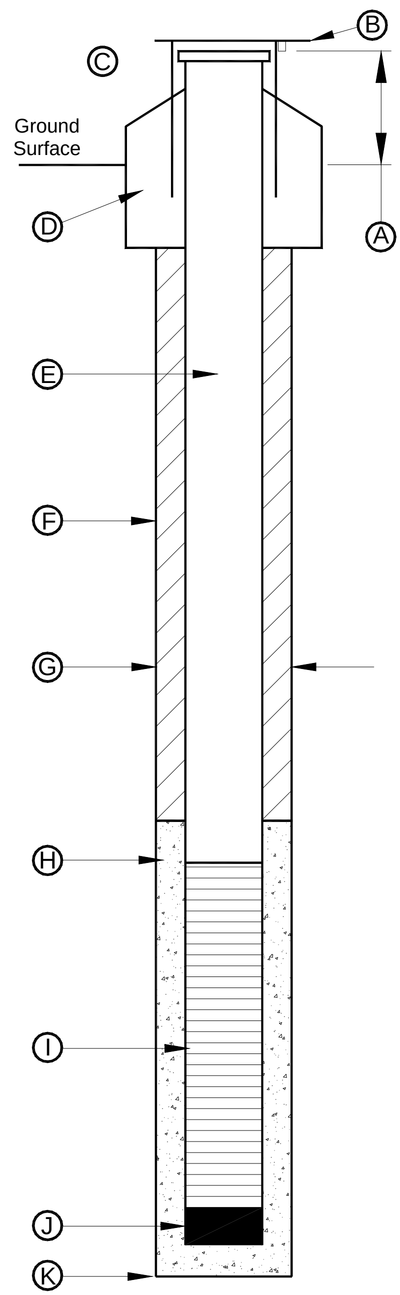
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
11-15	1400						appears cl.	2/12/08 well initially developed
	1430							water appeared clear instantly
								less than 1 gpm while pumping
								100psi kickoff, 50psi sustained
								v. slow recharge, we suspect cement is covering formation. will retrieve screen and shoot with perf. truck to clean off cement
								2/23-2/24/08 came back to well, pulled screen, perforated screen interval, and developed again. made 2-3gpm, but recharged much more quickly

POWERTECH WELL AND PUMP DATA

Location of Well Burdock, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB07-11-2
County Fall River	Type of Rig	Drilling Fluid mud	Well Depth 460'
LAT 4811591N	LONG 583496E	Elevation 3645'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 4" ID
- Material PVC
- Length 415'
- Weight SCH 40
- Depth to Bottom 450'

F. Grout cement Date 10/21/07
- Depth to Top 0'
- Depth to Bottom 451'
- Material sulfate resis. cement
- Density 15.2b/gal
- Volume 17.0 bbls
- % Excess 50
- Method of Installation displacement
- Depth to Cement in Casing 370'
- Return Constant ☐ Yes ☒ No
- Volume of Grout Return 0

G. Borehole Diameter
- Drilling Dates 6.5" 6/2/07

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 2/21/08
- Depth to Top 450-460'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tony

Boring Depth 575'TD 455' ream'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Len Eakin	Date Test Run	2/20/08
Time Beginning of Test	1100	Time End of Test	1200
Initial Pressure	40.0PSIG	Initial Fluid Level	5.0 inches
Final Pressure	40.0PSIG	Final Fluid Level	5.0inches

Method of Drilling Date: 6/2/07

- ☐ Cabel Tool ☐ Hollow Rod
- ☒ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☐ Other mud rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water
- Water Level (TIC)
- Well Depth
- Color
- Odor
- Clarity
- Developed By
- Date

Well Development Date

Description of Development Technique

Pump
- Date Installed Type
- Manufacturer Model No.
- H.P. Volts
- Capacity
- Depth of Pump Intake Setting
- No. of Stages
- ☐ Oil ☐ Water Lubrication
- Power Source
- Material of drop pipe
- Bowls
- Shafting Impellors
- Bowl Diameter
- Column Pipe Diameter Length
- Modification

Geophysical Logs Run Gamma, Resistivity, SP, ran 6/2/07

Water Quality
- Sample taken? ☐ Yes ☐ No
- Where analyzed?

Date well completed 2/21/08

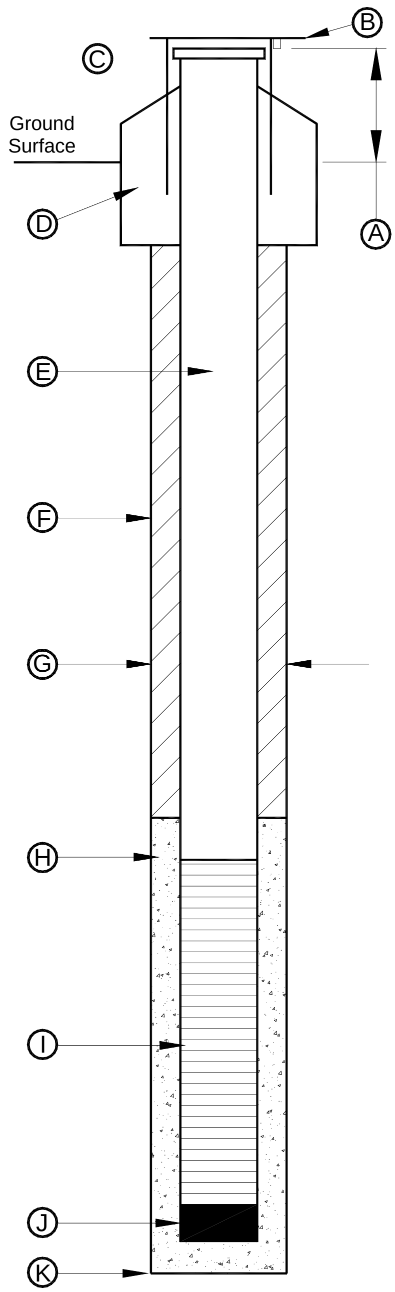
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
11-2	1300						appears cl.	2/21/08 well developed
	1330							water cleared up in approx. 10 minutes
								approx. 25-30 gpm while pumping
								175psi kickoff, 90psi sustained
								we lifted well for 10 minutes before pushing screen to make sure that the formation was not blocked off by cement. appeared to be making good water, so we pushed screened then lifted for another 30 minutes.

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB08-11-17
County Fall River	Type of Rig Speed Star 1500	Drilling Fluid Mud	Well Depth 255'
LAT 4811660N	LONG 583440E	Elevation ?'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 247'
- Weight SDR17
- Depth to Bottom 245'

F. Grout Cement Date 03/26/08
- Depth to Top 0'
- Depth to Bottom 247'
- Material Type V "LA" Cement
- Density 15.2 lb/gal
- Volume 10.05 bbls
- % Excess 10
- Method of Installation Displacement
- Depth to Cement in Casing ?'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 2.5 bbls

G. Borehole Diameter
- Drilling Dates 8.75" 03/26/08

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 04/01/08
- Depth to Top 245-255'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 257'

Additional Information

******Mechanical Integrity Test******

PSI Increments		Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Dan Tschopp	Date Test Run	04/01/08
Time Beginning of Test	0830	Time End of Test	0930
Initial Pressure	35.0 PSIG	Initial Fluid Level	4 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4inches

Method of Drilling Date: 03/25/08

☐ Cabel Tool ☐ Hollow Rod
☐ Direct Rotary ☐ Air Rotary
☐ Bucket Auger ☐ Reverse Rotary
☐ Flight Auger ☐ Jetted
☐ Dug ☐ Driven
☒ Other Mud Rotary

Use

☐ Domestic ☐ Public Supply
☐ Industrial ☐ Irrigation
☐ Municipal ☐ Commercial
☐ Test Well ☐ Heating or Cooling
☒ Monitoring
☐ Other

One well volume (V) = gallons

Initial Development Water

Water Level (TIC) 38.08 ft below ground surface

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed Type

Manufacturer Model No.

H.P. Volts

Capacity

Depth of Pump Intake Setting

No. of Stages

☐ Oil ☐ Water Lubrication

Power Source

Material of drop pipe

Bowls

Shafting Impellors

Bowl Diameter

Column Pipe Diameter Length

Modification

Geophysical Logs Run Gamma, Resistivity, SP

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 04/01/08

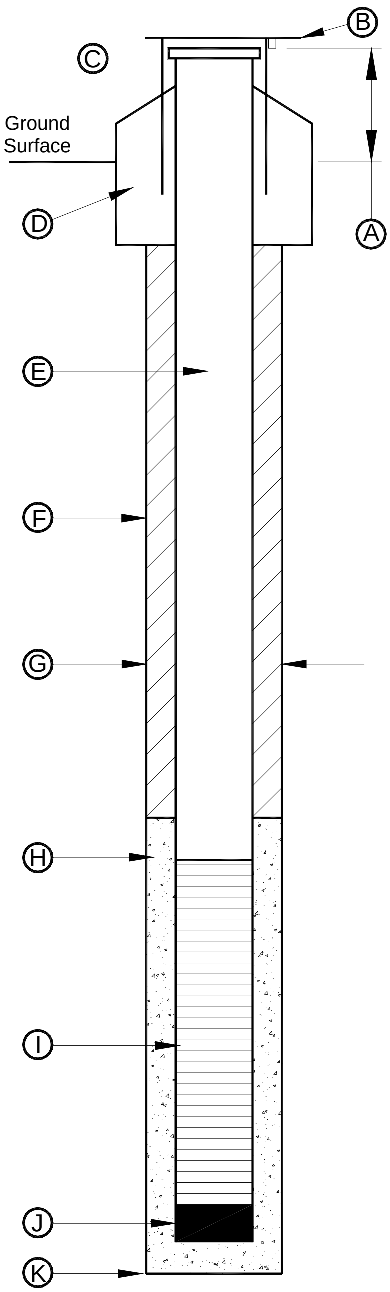
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
								Well developed: 04/01/08
								Water cleared up within 5 minutes
								Unload Pressure: 110psi
								Steady Lift Pressure: 10psi
								20 minute Recovery Pressure: 15psi
								Output: Approximately 1.5 gpm
								Screened Interval: Fall River SS Formation

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB08-11-18
County Fall River	Type of Rig Speed Star 1500	Drilling Fluid Mud	Well Depth 631'
LAT 583471N	LONG 4811660E	Elevation 3791'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material Steel
- Length 623'
- Weight Schedule 40
- Depth to Bottom 621'

F. Grout Cement Date 04/02/08
- Depth to Top 0'
- Depth to Bottom 623'
- Material Type V "LA" Cement
- Density 15.15 lb/gal
- Volume 23.14 bbls
- % Excess 10
- Method of Installation Displacement
- Depth to Cement in Casing 490'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 1 bbls

G. Borehole Diameter
- Drilling Dates 8.75" 03/31/08

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 04/15/08
- Depth to Top 621 to 631'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 633'

Additional Information

******Mechanical Integrity Test******

PSI Increments	5	Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Dan Tschopp	Date Test Run	04/14/08
Time Beginning of Test	1200	Time End of Test	1300
Initial Pressure	35.0 PSIG	Initial Fluid Level	4 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4inches

Method of Drilling Date: 04/01/08

- ☐ Cabel Tool ☐ Hollow Rod
- ☐ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☒ Other Mud Rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water

Water Level (TIC)

Well Depth

Color

Odor

Clarity

Developed By

Date

Well Development Date

Description of Development Technique

Pump

Date Installed Type

Manufacturer Model No.

H.P. Volts

Capacity

Depth of Pump Intake Setting

No. of Stages

☐ Oil ☐ Water Lubrication

Power Source

Material of drop pipe

Bowls

Shafting Impellors

Bowl Diameter

Column Pipe Diameter Length

Modification

Geophysical Logs Run Gamma, Resistivity, SP

Water Quality

Sample taken? ☐ Yes ☐ No

Where analyzed?

Date well completed 04/15/08

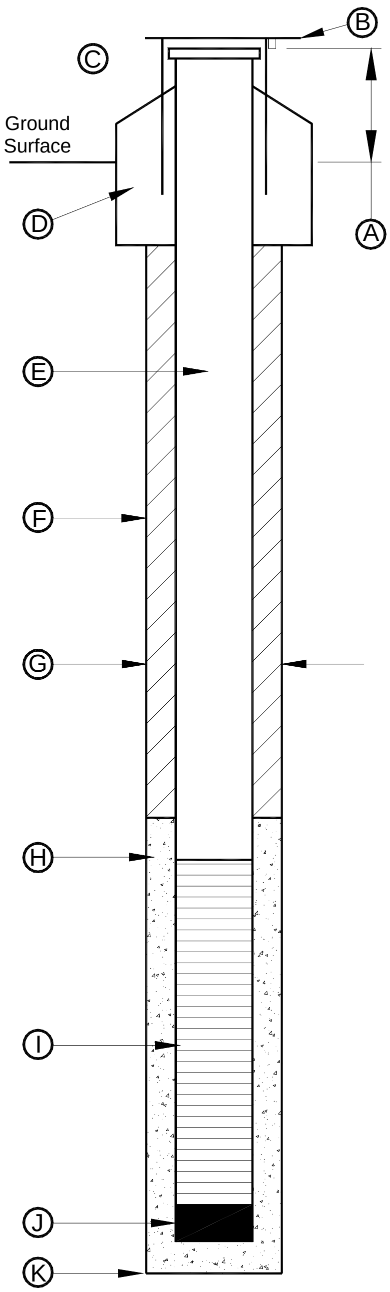
WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
								Well developed: 04/15/08
								Water cleared up within 5 minutes
								Unload Pressure: 245psi
								Steady Lift Pressure: 30psi
								Output: Approximately <2 gpm
								Screened Interval: Unkpapa SS formation
								20 min recovery lift: 50 psi

POWERTECH WELL AND PUMP DATA

Location of Well Dewey, SD	Drilling Contractor Davis Drilling	Driller Tony	Well Name DB08-11-19
County Fall River	Type of Rig Speed Star 1500	Drilling Fluid Mud	Well Depth 335'
LAT 583453N	LONG 4811673E	Elevation 4029'	Datum point from which all measurements are taken

Screened Monitoring Well Completion Detail



Screened Well No.

A. Stick-up Length 2.0'

B. Key No. NA

C. Protective Casing
- Diameter NA
- Material NA
- Length NA
- Depth to Bottom NA

D. Surface Completion
- Diameter NA
- Depth NA
- Material NA

E. Well Casing Data
- Diameter 6" ID
- Material PVC
- Length 327'
- Weight SDR17
- Depth to Bottom 325'

F. Grout Cement Date 04/4/08
- Depth to Top 0'
- Depth to Bottom 327'
- Material Type V "LA" Cement
- Density 15.65 lb/gal
- Volume 12.77 bbls
- % Excess 10
- Method of Installation Displacement
- Depth to Cement in Casing 223'
- Return Constant ☒ Yes ☐ No
- Volume of Grout Return 2 bbls

G. Borehole Diameter
- Drilling Dates 8.75" 04/3/08

H. Pack Type/Size NA Date NA
- Depth to Top NA
- Depth to Bottom
- Material
- Method of Installation
- Gradation

I. Screen Date 04/16/08
- Depth to Top 325 to335'
- Depth to Bottom
- Manufacturer
- Material PVC
- Slot .01"

J. Bottom Cap
- Material PVC
- Length 1"
- Driller Tommy

Boring Depth 337'

Additional Information

******Mechanical Integrity Test******

PSI Increments	5	Calibration Date of Gage	
PSI Full Scale			
Test Run By	Stan Davis, Dan Tschopp	Date Test Run	04/15/08
Time Beginning of Test	0830	Time End of Test	0930
Initial Pressure	35.0 PSIG	Initial Fluid Level	4 inches
Final Pressure	35.0 PSIG	Final Fluid Level	4inches

Method of Drilling Date: 04/3/08

- ☐ Cabel Tool ☐ Hollow Rod
- ☐ Direct Rotary ☐ Air Rotary
- ☐ Bucket Auger ☐ Reverse Rotary
- ☐ Flight Auger ☐ Jetted
- ☐ Dug ☐ Driven
- ☒ Other Mud Rotary

Use

- ☐ Domestic ☐ Public Supply
- ☐ Industrial ☐ Irrigation
- ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Heating or Cooling
- ☒ Monitoring
- ☐ Other

One well volume (V) = gallons

Initial Development Water
Water Level (TIC)
Well Depth
Color
Odor
Clarity
Developed By
Date
Well Development Date
Description of Development Technique

Pump
Date Installed Type
Manufacturer Model No.
H.P. Volts
Capacity
Depth of Pump Intake Setting
No. of Stages
☐ Oil ☐ Water Lubrication
Power Source
Material of drop pipe
Bowls
Shafting Impellors
Bowl Diameter
Column Pipe Diameter Length
Modification

Geophysical Logs Run Gamma, Resistivity, SP

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed?

Date well completed 04/16/08

WELL DEVELOPMENT RECORD – PARAMETER MEASUREMENTS

Well No.	Time	Total Volume Withdrawal		pH	Conductivity (ms/cm)	Temp (°C)	Turbidity (NTU)	Comments
		Gallons	Borehole Volume					
								Well developed: 04/16/08
								Water cleared up within 5 minutes
								Unload Pressure: 150 psi
								Steady Lift Pressure: 45 psi
								Output: Approximately 30 gpm
								Screened Interval: Lakota SS formation

Knight Piésold
CONSULTING

Appendix C-2
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

Table C.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

11-2		**11-14C**		**11-15**		**11-19***		**11-11C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.000012	-0.024157	0.000012	-0.009060	0.000012	0.000000	0.000012	0.047297	0.000025	1.516154
0.000023	-0.047234	0.000023	0.018633	0.000023	-0.023077	0.000058	0.072682	0.000035	1.781538
0.000035	-0.038003	0.000035	0.002479	0.000035	-0.025385	0.000069	0.042682	0.000046	2.453077
0.000046	0.081997	0.000046	0.002479	0.000046	0.030000	0.000093	0.010374	0.000058	2.967692
0.000058	0.033535	0.000058	-0.078290	0.000058	-0.013846	0.000116	0.042682	0.000069	3.648462
0.000069	0.021997	0.000069	-0.015983	0.000069	0.009231	0.000162	0.031143	0.000083	4.463077
0.000081	0.070458	0.000081	0.060171	0.000081	-0.053077	0.000174	0.054220	0.000093	5.010000
0.000093	-0.028772	0.000093	0.007094	0.000093	-0.009231	0.000185	0.031143	0.000104	5.016923
0.000104	-0.051849	0.000104	0.011710	0.000104	-0.018462	0.000197	0.010374	0.000116	5.480769
0.000116	-0.040311	0.000116	-0.027521	0.000116	0.011538	0.000208	0.047297	0.000127	5.746154
0.000127	-0.061080	0.000127	-0.015983	0.000127	-0.032308	0.000220	0.031143	0.000141	5.981538
0.000139	-0.021849	0.000139	-0.004444	0.000139	0.129231	0.000255	0.017297	0.000150	6.256154
0.000150	0.072766	0.000150	0.016325	0.000150	0.025385	0.000289	0.010374	0.000162	6.306923
0.000162	-0.058772	0.000162	0.011710	0.000162	0.009231	0.000370	0.042682	0.000174	6.773077
0.000174	-0.040311	0.000174	0.002479	0.000174	-0.011538	0.000498	0.051912	0.000185	6.969231
0.000185	-0.044926	0.000185	-0.013675	0.000185	0.002308	0.000521	0.003451	0.000199	7.061539
0.000197	-0.031080	0.000197	-0.022906	0.000197	0.018462	0.000833	0.056528	0.000208	7.377692
0.000208	-0.021849	0.000208	-0.032137	0.000208	0.101538	0.001111	0.051912	0.000220	7.467692
0.000220	-0.061080	0.000220	-0.034444	0.000220	-0.006923	0.001319	0.012682	0.000231	7.873846
0.000231	-0.012619	0.000231	0.023248	0.000231	0.013846	0.002639	0.054220	0.000243	8.206154
0.000243	-0.008003	0.000243	0.016325	0.000243	-0.027692	0.004167	0.001143	0.000257	9.445385
0.000255	0.045074	0.000255	-0.002137	0.000255	-0.020769	0.005903	0.033451	0.000266	9.078462
0.000266	-0.019542	0.000266	0.030171	0.000266	-0.004615	0.007292	0.070374	0.000278	9.729231
0.000278	0.040458	0.000278	0.009402	0.000278	0.018462	0.008333	0.008066	0.000289	9.835384
0.000289	0.001228	0.000289	-0.020598	0.000289	0.023077	0.009028	0.024220	0.000301	10.308461
0.000301	0.063535	0.000301	-0.039060	0.000301	-0.009231	0.020833	0.003451	0.000312	10.712308
0.000312	0.045074	0.000312	-0.006752	0.000312	-0.018462	0.025000	0.019605	0.000324	11.180769
0.000324	-0.065696	0.000324	0.000171	0.000324	0.006923	0.072917	0.077297	0.000336	11.457692
0.000336	0.081997	0.000336	0.004786	0.000336	-0.027692	0.079896	0.005759	0.000347	11.833846
0.000347	0.070458	0.000347	0.032479	0.000347	-0.004615	0.083368	0.003451	0.000359	12.263077
0.000359	0.091228	0.000359	-0.009060	0.000359	0.011538	0.090313	0.028836	0.000370	11.210770
0.000370	0.058920	0.000370	-0.029829	0.000370	-0.002308	0.097257	0.038066	0.000382	11.289230
0.000382	0.056612	0.000382	0.018633	0.000382	-0.020769	0.104201	0.081912	0.000394	12.422308
0.000394	0.077381	0.000394	-0.006752	0.000394	0.013846	0.111146	0.088836	0.000405	12.669230
0.000417	-0.070311	0.000405	0.002479	0.000417	0.011538	0.118206	0.128066	0.000417	12.837692
0.000451	-0.061080	0.000417	0.004786	0.000451	-0.011538	0.125035	0.155759	0.000428	12.692307
0.000463	-0.008003	0.000451	0.002479	0.000463	0.090000	0.131979	0.155759	0.000451	13.112308
0.000486	-0.019542	0.000463	0.009402	0.000486	-0.018462	0.138924	0.160374	0.000463	13.324615
0.000498	0.072766	0.000486	-0.027521	0.000498	0.000000	0.149340	0.174220	0.000486	13.633846
0.000521	0.008151	0.000498	-0.043675	0.000521	0.000000	0.159757	0.204220	0.000498	13.970769
0.000532	0.061228	0.000521	-0.039060	0.000532	0.006923	0.170174	0.208836	0.000521	14.370000

Table C.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

11-2		11-14C		11-15		11-19*		11-11C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.000556	0.079689	0.000532	-0.006752	0.000556	0.009231	0.180590	0.238836	0.000532	15.939231
0.000590	0.035843	0.000556	0.014017	0.000590	0.013846	0.194479	0.275759	0.000556	15.150000
0.000625	-0.047234	0.000590	0.011710	0.000625	0.000000	0.208368	0.326528	0.000590	16.077692
0.000660	0.045074	0.000625	0.050940	0.000660	-0.025385	0.222257	0.342682	0.000625	17.023846
0.000694	-0.049542	0.000660	0.055556	0.000694	-0.009231	0.236146	0.368066	0.000660	17.820000
0.000729	0.088920	0.000694	-0.009060	0.000729	0.016154	0.250035	0.398066	0.000694	18.664616
0.000764	-0.040311	0.000729	-0.004444	0.000764	-0.027692	0.263924	0.478836	0.000729	19.426153
0.000799	0.091228	0.000764	0.018633	0.000799	0.126923	0.277812	0.485759	0.000764	20.319231
0.000833	-0.047234	0.000799	0.014017	0.000833	0.122308	0.295174	0.548066	0.000799	20.972307
0.000903	0.049689	0.000833	0.041710	0.000903	0.018462	0.312535	0.548066	0.000833	21.867693
0.000972	-0.012619	0.000903	-0.004444	0.000972	0.053077	0.329896	0.617297	0.000903	23.321539
0.001042	-0.035696	0.000972	-0.015983	0.001042	0.002308	0.347257	0.642682	0.000972	24.676153
0.001111	-0.038003	0.001042	-0.004444	0.001111	-0.020769	0.370405	0.753451	0.001042	25.989231
0.001181	-0.044926	0.001111	0.004786	0.001181	0.000000	0.393553	0.801912	0.001111	27.496155
0.001250	-0.038003	0.001181	0.011710	0.001250	0.032308	0.416701	0.799605	0.001181	28.686924
0.001319	-0.077234	0.001250	0.023248	0.001319	-0.041538	0.439965	0.824989	0.001250	30.036922
0.001389	-0.019542	0.001319	0.018633	0.001389	-0.032308	0.462998	0.912682	0.001319	31.310770
0.001493	-0.058772	0.001389	0.034786	0.001493	0.002308	0.486146	0.947297	0.001389	32.589230
0.001597	-0.021849	0.001493	-0.002137	0.001597	-0.046154	0.520868	1.004989	0.001493	34.361538
0.001701	-0.061080	0.001597	0.027863	0.001701	0.023077	0.555590	1.060374	0.001597	36.092308
0.001806	-0.012619	0.001701	0.050940	0.001806	0.013846	0.590312	1.099605	0.001701	37.631538
0.001944	-0.044926	0.001806	0.037094	0.001944	0.006923	0.625035	1.233451	0.001806	39.083076
0.002083	-0.019542	0.001944	0.018633	0.002083	-0.020769	0.659757	1.270374	0.001944	41.026154
0.002222	-0.077234	0.002083	0.044017	0.002222	0.018462	0.694479	1.332682	0.002083	42.489231
0.002361	-0.001080	0.002222	0.037094	0.002361	-0.002308	0.729549	1.408836	0.002222	44.259232
0.002500	-0.044926	0.002361	0.023248	0.002500	0.006923	0.763924	1.466528	0.002361	45.662308
0.002639	-0.056465	0.002500	0.101710	0.002639	-0.046154	0.798646	1.535759	0.002500	47.166924
0.002778	-0.038003	0.002639	0.108633	0.002778	-0.006923	0.833368	1.604989	0.002639	48.606922
0.002951	-0.038003	0.002778	0.057863	0.002951	-0.016154	0.902928	1.736528	0.002778	49.860001
0.003125	-0.019542	0.002951	0.129402	0.003125	-0.023077	0.972951	1.794220	0.002951	51.387692
0.003299	-0.068003	0.003125	0.090171	0.003299	-0.011538	1.041701	1.907297	0.003125	52.799999
0.003472	-0.084157	0.003299	0.092479	0.003472	0.041538	1.111146	1.960374	0.003299	54.080769
0.003704	-0.040311	0.003472	0.108633	0.003704	0.027692	1.180590	2.094220	0.003472	55.310768
0.003935	-0.051849	0.003704	0.129402	0.003935	-0.011538	1.250035	2.101143	0.003704	56.683846
0.004167	-0.038003	0.003935	0.150171	0.004167	0.016154	1.319479	2.193451	0.003935	57.895386
0.004398	-0.063388	0.004167	0.164017	0.004398	0.013846	1.388924	2.311143	0.004167	59.180771
0.004630	-0.058772	0.004398	0.196325	0.004630	0.006923	1.493090	2.396528	0.004398	60.244614
0.004861	-0.021849	0.004630	0.228633	0.004861	-0.053077	1.597257	2.504989	0.004630	61.167694
0.005208	-0.035696	0.004861	0.247094	0.005208	-0.023077	1.701424	2.620374	0.004861	61.975384
0.005556	-0.086465	0.005208	0.295556	0.005556	-0.036923	1.805590	2.756528	0.005208	63.325386
0.005903	-0.026465	0.005556	0.330171	0.005903	-0.011538	1.944479	2.848835	0.005556	64.400772

Table C.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

11-2		**11-14C**		**11-15**		**11-19***		**11-11C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.006250	-0.028772	0.005903	0.374017	0.006250	0.025385	2.083368	2.890374	0.005903	65.418465
0.006597	-0.058772	0.006250	0.429402	0.006597	0.041538	2.222257	2.915759	0.006250	66.311539
0.006944	-0.063388	0.006597	0.498633	0.006944	-0.016154	2.361146	2.984989	0.006597	67.100769
0.007292	-0.051849	0.006944	0.560940	0.007292	0.011538	2.500035	3.086528	0.006944	67.728462
0.007639	-0.070311	0.007292	0.620940	0.007639	-0.023077	2.638924	3.148836	0.007292	68.552307
0.007986	-0.086465	0.007639	0.653248	0.007986	0.000000	2.777813	3.222682	0.007639	69.124619
0.008333	-0.088772	0.007986	0.678633	0.008333	0.009231	2.951423	3.358835	0.007986	69.708458
0.009028	-0.024157	0.008333	0.745556	0.009028	-0.002308	2.999988	3.358835	0.008333	70.416924
0.009722	-0.021849	0.009028	0.881710	0.009722	-0.009231			0.009028	71.642311
0.010417	-0.033388	0.009722	0.950940	0.010417	0.002308			0.009722	72.440773
0.011111	0.075074	0.010417	1.103248	0.011111	-0.016154			0.010417	73.167694
0.011806	-0.065696	0.011111	1.193248	0.011806	-0.004615			0.011111	73.636154
0.012500	-0.044926	0.011806	1.287863	0.012500	0.025385			0.011806	74.150772
0.013194	-0.056465	0.012500	1.424017	0.013194	0.011538			0.012500	74.545387
0.013889	-0.031080	0.013194	1.504786	0.013889	-0.046154			0.013194	74.815384
0.014931	0.065843	0.013889	1.703248	0.014931	-0.002308			0.013889	74.995384
0.015972	-0.047234	0.014931	1.770171	0.015972	-0.023077			0.014931	75.251541
0.017014	-0.084157	0.015972	1.934017	0.017014	-0.011538			0.015972	75.565384
0.018056	-0.061080	0.017014	2.047094	0.018056	0.000000			0.017014	75.904617
0.019444	0.008151	0.018056	2.213248	0.019444	0.011538			0.018056	76.105385
0.020833	-0.061080	0.019444	2.377094	0.020833	0.057692			0.019444	76.299232
0.022222	-0.049542	0.020833	2.550171	0.022222	-0.018462			0.020833	76.631538
0.023611	-0.093388	0.022222	2.727863	0.023611	0.004615			0.022222	76.746925
0.025000	-0.042619	0.023611	2.861710	0.025000	0.025385			0.023611	76.998459
0.026389	-0.077234	0.025000	3.018633	0.026389	0.020769			0.024990	77.176155
0.027778	-0.065696	0.026389	3.168633	0.027778	0.000000			0.026389	77.411537
0.029514	-0.068003	0.027778	3.297863	0.029514	-0.034615			0.027778	77.464615
0.031250	-0.051849	0.029514	3.415556	0.031250	-0.009231			0.029514	77.723076
0.032986	-0.040311	0.031250	3.563248	0.032986	0.000000			0.031250	77.755386
0.034722	-0.079542	0.032986	3.766325	0.034722	-0.004615			0.032986	78.025383
0.037037	-0.074926	0.034722	3.872479	0.037037	-0.025385			0.034722	78.302307
0.039352	-0.077234	0.037037	4.091710	0.039352	0.030000			0.037037	78.260773
0.041667	-0.079542	0.039352	4.195556	0.041667	0.090000			0.039352	78.567696
0.043981	0.049689	0.041667	4.417094	0.043981	-0.027692			0.041667	78.678459
0.046296	0.049689	0.043981	4.640940	0.046296	0.057692			0.043981	78.959999
0.048611	-0.047234	0.046296	4.664017	0.048611	0.009231			0.046296	79.008461
0.052083	0.084304	0.048611	4.827863	0.052083	0.011538			0.048611	79.151535
0.055556	0.051997	0.052083	5.035556	0.055556	-0.009231			0.052083	79.290001
0.059028	0.049689	0.055556	5.222479	0.059028	0.000000			0.055556	79.437691
0.062500	-0.008003	0.059028	5.358633	0.062500	0.018462			0.059028	79.666153
0.065972	0.028920	0.062500	5.568633	0.065972	0.034615			0.062500	79.823074

Table C.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

11-2		11-14C		11-15		11-19*		11-11C	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.069444	-0.012619	0.065972	5.750940	0.069444	0.036923			0.065972	80.005386
0.072917	0.061228	0.069444	5.854786	0.072917	0.027692			0.069444	80.173843
0.076470	-0.054157	0.072917	6.044017	0.076389	0.106154			0.072917	80.266151
0.079942	-0.003388	0.076389	6.161710	0.079861	0.060000			0.076389	80.420769
0.083414	-0.047234	0.079942	6.325556	0.083449	0.057692			0.079861	80.533844
0.090359	-0.038003	0.083414	6.470940	0.090394	0.101538			0.083368	80.702309
0.097303	-0.005696	0.090359	6.738633	0.097338	0.152308			0.090313	80.923843
0.104248	0.035843	0.097303	6.953248	0.104282	0.170769			0.097257	81.223846
0.111192	0.003535	0.104248	7.172479	0.111227	0.163846			0.104201	81.373848
0.118137	0.021997	0.111192	7.414786	0.118171	0.233077			0.111146	83.363075
0.125081	-0.001080	0.118137	7.659402	0.125116	0.267692			0.118206	83.801537
0.132025	0.026612	0.125081	7.855556	0.132060	0.306923			0.125035	84.023079
0.138970	0.045074	0.132025	8.058633	0.139005	0.346154			0.131979	84.295387
0.149387	0.047381	0.138970	8.254786	0.149421	0.433846			0.138924	84.408463
0.159803	0.021997	0.149387	8.520171	0.159838	0.450000			0.149340	84.701538
0.170220	0.045074	0.159803	8.787864	0.170255	0.567692			0.159757	84.886154
0.180637	0.072766	0.170220	9.032478	0.180671	0.634615			0.170174	85.036156
0.194525	0.102766	0.180637	9.251710	0.194560	0.745385			0.180590	85.093849
0.208414	0.125843	0.194525	9.535556	0.208449	0.860769			0.194481	85.407692
0.222303	0.169689	0.208414	9.777864	0.222338	0.960000			0.208368	85.668465
0.236192	0.167381	0.222303	10.004017	0.236227	1.112308			0.222257	85.698463
0.250081	0.190458	0.236192	10.220941	0.250116	1.174615			0.236146	85.924614
0.263970	0.271228	0.250081	10.463248	0.264005	1.359231			0.250035	86.176155
0.277859	0.268920	0.263970	10.629402	0.277894	1.467692			0.263924	86.381538
0.295220	0.301228	0.277859	10.839402	0.295255	1.615385			0.277812	86.476151
0.312581	0.342766	0.295220	11.037864	0.312616	1.804615			0.295174	86.568459
0.329942	0.368151	0.312581	11.213248	0.329977	1.929231			0.312535	86.683846
0.347303	0.411997	0.329942	11.411710	0.347338	2.118462			0.329896	86.801537
0.370451	0.499689	0.347303	11.594017	0.370486	2.303077			0.347257	87.147690
0.393600	0.548151	0.370451	11.884787	0.393634	2.524615			0.370405	87.223846
0.416748	0.561997	0.393600	12.039402	0.416782	2.764615			0.393553	87.353073
0.440012	0.619689	0.416748	12.240171	0.440046	2.933077			0.416701	87.613846
0.463044	0.688920	0.440012	12.397094	0.463079	3.168462			0.439965	87.560768
0.486192	0.762766	0.463044	12.602479	0.486227	3.297692			0.462998	87.625381
0.520914	0.806612	0.486192	12.685555	0.520949	3.620769			0.486146	87.985382
0.555637	0.820458	0.520914	12.969402	0.555671	3.913846			0.520868	88.033844
0.590359	0.894304	0.555637	13.144787	0.590394	4.144615			0.555590	88.010773
0.625081	0.995843	0.590359	13.317863	0.625116	4.352308			0.590312	88.456154
0.659803	1.044304	0.625081	13.433248	0.659838	4.668461			0.625035	88.396156
0.694525	1.097381	0.659803	13.574018	0.694560	4.846154			0.659757	88.737694
0.729595	1.136612	0.694525	13.707864	0.729630	5.088461			0.694479	88.555382

Table C.2-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Drawdown Data

11-2		**11-14C**		**11-15**		**11-19***		**11-11C**	
Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)	Time (days)	Drawdown (ft)
0.763970	1.224304	0.729595	13.867094	0.764005	5.245385			0.729549	88.721535
0.798692	1.295843	0.763970	13.973248	0.798727	5.476154			0.763924	88.975388
0.833414	1.399689	0.798692	14.224787	0.833449	5.651538			0.798646	88.666153
0.902859	1.487381	0.833414	14.324018	0.902893	6.032308			0.833368	88.786156
0.972998	1.598151	0.902859	14.557095	0.973032	6.346154			0.902928	88.931541
1.041748	1.711228	0.972998	14.723248	1.041782	6.643846			0.972951	89.081535
1.111192	1.757381	1.041748	14.868632	1.111227	6.946154			1.041701	89.093079
1.180637	1.840458	1.111192	15.067094	1.180671	7.181539			1.111146	89.376923
1.250081	1.900458	1.180637	15.187094	1.250116	7.375385			1.180590	89.307693
1.319525	2.008920	1.250081	15.297863	1.319560	7.629231			1.250035	89.554619
1.388970	2.117381	1.319525	15.378633	1.389005	7.820769			1.319479	89.826920
1.493137	2.207381	1.388970	15.614017	1.493171	8.093077			1.388924	90.085388
1.597303	2.299689	1.493137	15.789402	1.597338	8.406923			1.493090	89.976921
1.701470	2.440458	1.597303	15.893248	1.701505	8.614615			1.597257	90.182304
1.805637	2.486612	1.701470	16.008633	1.805671	8.824615			1.701424	90.168465
1.944525	2.585843	1.805637	16.149403	1.944560	9.115385			1.805590	90.166153
2.083414	2.634305	1.944525	16.310940	2.083449	9.323077			1.944479	90.678459
2.222303	2.668920	2.083414	16.405556	2.222338	9.459230			2.083368	90.639229
2.361192	2.724304	2.222303	16.516325	2.361227	9.602307			2.222257	90.736153
2.500081	2.844305	2.361192	16.587864	2.500116	9.766154			2.361146	90.819229
2.638970	2.837381	2.500081	16.634018	2.639005	9.953077			2.500035	91.047691
2.777859	2.966612	2.638970	16.770170	2.777894	10.040770			2.638924	91.165382
2.951470	3.084305	2.777859	16.874018	2.951505	10.250770			2.777813	91.137695
2.999988	3.063535	2.951470	17.010172	2.999988	10.373077			2.951423	91.176926
		2.999988	17.014786					2.999988	91.066154

General Methodology: PSI, temperature, and time readings from Win-Situ™ digital data log were exported to Excel ".csv" file.
Drawdown was calculated as PSI at time after pumping minus average PSI before pumping; therefore, at small or zero changes in PSI negative drawdowns may be calculated.
A FORTRAN program was written to read the ".csv" file and produce a second file by extracting the records at a frequency of 40 per log-time cycle (in minutes) in order achieve equal representation of data throughout the pumping and drawdown phases of the test.

Note: * = early time data filtered to remove calculated negative drawdown values

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Appendix C-3
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
3.000035	3.052742	3.000035	17.052603	3.000035	10.293365	3.000035	3.347297	3.002651	91.335097
3.000046	3.045798	3.000046	17.017954	3.000046	10.353427	3.000046	3.370374	3.002662	89.775840
3.000058	3.094334	3.000058	17.075690	3.000058	10.328013	3.000058	3.455759	3.002674	89.062054
3.000070	3.050451	3.000070	16.999449	3.000070	10.318778	3.000070	3.448836	3.002685	88.339016
3.000081	3.089717	3.000081	17.036424	3.000081	10.309544	3.000081	3.444220	3.002697	87.676058
3.000093	3.061977	3.000093	17.006393	3.000093	10.328013	3.000093	3.444220	3.002708	87.077762
3.000104	3.075829	3.000104	17.027189	3.000104	10.445812	3.000104	3.358835	3.002720	86.327019
3.000116	3.055068	3.000116	17.013337	3.000116	10.274895	3.000116	3.351912	3.002732	85.668660
3.000127	3.078155	3.000127	16.997158	3.000127	10.291038	3.000127	3.430374	3.002743	85.077308
3.000139	3.057359	3.000139	16.980979	3.000139	10.399637	3.000139	3.437297	3.002755	84.428184
3.000151	3.066594	3.000151	17.052603	3.000151	10.307217	3.000151	3.335759	3.002766	83.869172
3.000162	3.055068	3.000162	17.020246	3.000162	10.328013	3.000162	3.400374	3.002778	83.215448
3.000174	3.071212	3.000174	17.001776	3.000174	10.267951	3.000174	3.432682	3.002789	82.612535
3.000185	3.089717	3.000185	17.013337	3.000185	10.445812	3.000185	3.393451	3.002801	82.021165
3.000197	3.048124	3.000197	17.020246	3.000197	10.323396	3.000197	3.409605	3.002813	81.385929
3.000208	3.050451	3.000208	17.004067	3.000208	10.291038	3.000208	3.432682	3.002824	80.928536
3.000220	3.098952	3.000220	17.013337	3.000220	10.300273	3.000220	3.391143	3.002836	80.267886
3.000232	3.036563	3.000232	17.027189	3.000232	10.300273	3.000232	3.448836	3.002847	79.845142
3.000243	3.075829	3.000243	16.992541	3.000243	10.330304	3.000243	3.356528	3.002859	79.119812
3.000255	3.085099	3.000255	16.990214	3.000255	10.281804	3.000255	3.488066	3.002870	78.657802
3.000266	3.087390	3.000266	17.020246	3.000266	10.399637	3.000266	3.344989	3.002882	78.015622
3.000278	3.085099	3.000278	16.974036	3.000278	10.314161	3.000278	3.326528	3.002894	77.498184
3.000289	3.029654	3.000289	17.057220	3.000289	10.314161	3.000289	3.483451	3.002905	76.918375
3.000301	3.071212	3.000301	16.990214	3.000301	10.371897	3.000301	3.425759	3.002917	76.403246
3.000313	3.071212	3.000313	17.034098	3.000313	10.328013	3.000313	3.391143	3.002928	75.733344
3.000324	3.101243	3.000324	17.015628	3.000324	10.295656	3.000324	3.400374	3.002940	75.220524
3.000336	3.071212	3.000336	17.022572	3.000336	10.297982	3.000336	3.432682	3.002951	74.786254
3.000347	3.038889	3.000347	16.969418	3.000347	10.316452	3.000347	3.451143	3.002963	74.093246
3.000359	3.096625	3.000359	17.006393	3.000359	10.334957	3.000359	3.455759	3.002974	73.559648
3.000370	3.031945	3.000370	17.020246	3.000370	10.323396	3.000370	3.437297	3.002986	73.032957
3.000382	3.082773	3.000382	16.918626	3.000382	10.274895	3.000382	3.421143	3.002998	72.704941
3.000394	3.043507	3.000394	17.022572	3.000394	10.316452	3.000394	3.425759	3.003009	71.935711
3.000405	3.085099	3.000405	16.997158	3.000405	10.286421	3.000405	3.428066	3.003021	71.480644
3.000417	3.048124	3.000417	17.008684	3.000417	10.284130	3.000417	3.384220	3.003032	70.889274

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
3.000428	3.096625	3.000428	17.031807	3.000428	10.302600	3.000428	3.458066	3.003044	70.441134
3.000451	3.082773	3.000451	17.029480	3.000451	10.297982	3.000451	3.432682	3.003067	69.438598
3.000486	3.034272	3.000486	17.027189	3.000486	10.318778	3.000486	3.432682	3.003102	68.024879
3.000498	3.041180	3.000498	17.041042	3.000498	10.311835	3.000498	3.414220	3.003113	67.482028
3.000509	3.038889	3.000509	17.011011	3.000509	10.286421	3.000509	3.451143	3.003125	67.024652
3.000532	3.055068	3.000532	16.992541	3.000532	10.348810	3.000532	3.441912	3.003148	66.121445
3.000544	3.034272	3.000544	17.008684	3.000544	10.281804	3.000544	3.402682	3.003160	65.712570
3.000567	3.068920	3.000567	17.057220	3.000567	10.286421	3.000567	3.414220	3.003183	64.809363
3.000590	3.094334	3.000590	17.022572	3.000590	10.261007	3.000590	3.448836	3.003206	64.010101
3.000625	3.052742	3.000625	17.008684	3.000625	10.295656	3.000625	3.356528	3.003241	62.806583
3.000660	3.087390	3.000660	17.036424	3.000660	10.293365	3.000660	3.432682	3.003276	61.730133
3.000683	3.075829	3.000683	17.022572	3.000683	10.288747	3.000683	3.476528	3.003299	60.965520
3.000718	3.055068	3.000718	17.017954	3.000718	10.425015	3.000718	3.340374	3.003333	59.974528
3.000764	3.061977	3.000764	16.990214	3.000764	10.427342	3.000764	3.354220	3.003380	58.627797
3.000799	3.048124	3.000799	17.015628	3.000799	10.316452	3.000799	3.428066	3.003415	57.664528
3.000822	3.085099	3.000822	16.999449	3.000822	10.286421	3.000822	3.448836	3.003438	57.070866
3.000857	3.041180	3.000857	16.978688	3.000857	10.323396	3.000857	3.340374	3.003472	56.197673
3.000938	3.041180	3.000938	17.029480	3.000938	10.358045	3.000938	3.448836	3.003553	54.402802
3.000995	3.050451	3.000995	16.976362	3.000995	10.277186	3.000995	3.432682	3.003611	53.229332
3.001076	3.066594	3.001076	17.038715	3.001076	10.351101	3.001076	3.354220	3.003692	51.808687
3.001134	3.055068	3.001134	17.008684	3.001134	10.304926	3.001134	3.354220	3.003751	50.990938
3.001215	3.092008	3.001215	17.038715	3.001215	10.277186	3.001215	3.349605	3.003821	50.133923
3.001285	3.038889	3.001285	17.013337	3.001285	10.346483	3.001285	3.344989	3.003900	49.177597
3.001354	3.082773	3.001354	17.013337	3.001354	10.300273	3.001354	3.328835	3.003971	48.334434
3.001423	3.094334	3.001423	16.914009	3.001423	10.323396	3.001423	3.421143	3.004039	47.567513
3.001528	3.103569	3.001528	16.987923	3.001528	10.346483	3.001528	3.354220	3.004144	46.484136
3.001620	3.061977	3.001620	16.987923	3.001620	10.385749	3.001620	3.358835	3.004236	45.405359
3.001736	3.071212	3.001736	16.967127	3.001736	10.325687	3.001736	3.384220	3.004352	44.317348
3.001840	3.075829	3.001840	16.971745	3.001840	10.293365	3.001840	3.462682	3.004457	43.307886
3.001979	3.094334	3.001979	16.976362	3.001979	10.302600	3.001979	3.441912	3.004595	42.021218
3.002130	3.085099	3.002130	16.946331	3.002130	10.334957	3.002130	3.351912	3.004745	40.621351
3.002245	3.057359	3.002245	16.955566	3.002245	10.316452	3.002245	3.363451	3.004861	39.639594
3.002396	3.031945	3.002396	16.955566	3.002396	10.304926	3.002396	3.351912	3.005012	38.581614
3.002535	3.045798	3.002535	16.946331	3.002535	10.341866	3.002535	3.356528	3.005151	37.555973

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
3.002674	3.055068	3.002674	16.962510	3.002674	10.337248	3.002674	3.437297	3.005289	36.467962
3.002812	3.057359	3.002812	16.950948	3.002812	10.316452	3.002812	3.437297	3.005428	35.574007
3.002986	3.048124	3.002986	16.883978	3.002986	10.286421	3.002986	3.377297	3.005602	34.502157
3.003160	3.050451	3.003160	16.918626	3.003160	10.348810	3.003160	3.377297	3.005776	33.561992
3.003322	3.085099	3.003322	16.877034	3.003322	10.364953	3.003322	3.432682	3.005938	32.691125
3.003495	3.080446	3.003495	16.842385	3.003495	10.328013	3.003495	3.425759	3.006111	31.808696
3.003727	3.064303	3.003727	16.865472	3.003727	10.323396	3.003727	3.409605	3.006343	30.702214
3.003958	3.048124	3.003958	16.840059	3.003958	10.279512	3.003958	3.511143	3.006574	29.701987
3.004201	3.075829	3.004201	16.826206	3.004201	10.328013	3.004201	3.453451	3.006817	28.727157
3.004433	3.126656	3.004433	16.761527	3.004433	10.422724	3.004433	3.358835	3.007048	27.902481
3.004664	3.048124	3.004664	16.775379	3.004664	10.330304	3.004664	3.377297	3.007280	27.126325
3.004884	3.094334	3.004884	16.724587	3.004884	10.362662	3.004884	3.386528	3.007500	26.454114
3.005231	3.055068	3.005231	16.641402	3.005231	10.302600	3.005231	3.458066	3.007847	25.465448
3.005590	3.048124	3.005590	16.655255	3.005590	10.348810	3.005590	3.393451	3.008206	24.559915
3.005926	3.186719	3.005926	16.625259	3.005926	10.302600	3.005926	3.388836	3.008542	23.811480
3.006285	3.080446	3.006285	16.549018	3.006285	10.355718	3.006285	3.349605	3.008901	23.319456
3.006620	3.057359	3.006620	16.477394	3.006620	10.302600	3.006620	3.388836	3.009236	22.707308
3.006968	3.052742	3.006968	16.417332	3.006968	10.323396	3.006968	3.368066	3.009583	22.210649
3.007315	3.048124	3.007315	16.354979	3.007315	10.297982	3.007315	3.393451	3.009931	21.700137
3.007673	3.089717	3.007673	16.301825	3.007673	10.351101	3.007673	3.494989	3.010289	21.258923
3.008009	3.101243	3.008009	16.241798	3.008009	10.358045	3.008009	3.474220	3.010625	20.866227
3.008356	3.195954	3.008356	16.195588	3.008356	10.316452	3.008356	3.508836	3.010972	20.501254
3.009062	3.034272	3.009062	16.068520	3.009062	10.307217	3.009062	3.379605	3.011678	19.852148
3.009745	3.154396	3.009745	16.054667	3.009745	10.291038	3.009745	3.453451	3.012361	19.337019
3.010451	3.061977	3.010451	15.899894	3.010451	10.316452	3.010451	3.416528	3.013067	18.884243
3.011134	3.087390	3.011134	15.786713	3.011134	10.300273	3.011134	3.361143	3.013750	18.438429
3.011840	3.112804	3.011840	15.638884	3.011840	10.339575	3.011840	3.388836	3.014456	18.108086
3.012523	3.122039	3.012523	15.544173	3.012523	10.316452	3.012523	3.391143	3.015139	17.823954
3.013218	3.182101	3.013218	15.472550	3.013218	10.314161	3.013218	3.458066	3.015833	17.537513
3.013912	3.098952	3.013912	15.354752	3.013912	10.307217	3.013912	3.379605	3.016528	17.288046
3.014954	3.025037	3.014954	15.218448	3.014954	10.297982	3.014954	3.409605	3.017570	16.902277
3.015995	3.061977	3.015995	15.045205	3.015995	10.318778	3.015995	3.485759	3.018611	16.613527
3.017048	3.006532	3.017048	14.899667	3.017048	10.344192	3.017048	3.515759	3.019664	16.340938
3.018090	3.055068	3.018090	14.763364	3.018090	10.353427	3.018090	3.506528	3.020706	16.109941

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
3.019479	3.108186	3.019479	14.610917	3.019479	10.332631	3.019479	3.458066	3.022095	15.758820
3.020856	3.048124	3.020856	14.421496	3.020856	10.325687	3.020856	3.414220	3.023472	15.500101
3.022245	3.022711	3.022245	14.308315	3.022245	10.341866	3.022245	3.501913	3.024861	15.246000
3.023634	3.036563	3.023634	14.038035	3.023634	10.323396	3.023634	3.504220	3.026250	14.987281
3.025035	3.038889	3.025035	13.987207	3.025035	10.267951	3.025035	3.448836	3.027651	14.830199
3.026423	3.075829	3.026423	13.850939	3.026423	10.311835	3.026423	3.529605	3.029039	14.666191
3.027812	3.094334	3.027812	13.663809	3.027812	10.358045	3.027812	3.414220	3.030428	14.379750
3.029537	3.027328	3.029537	13.550628	3.029537	10.316452	3.029537	3.402682	3.032153	14.231903
3.031285	3.055068	3.031285	13.342737	3.031285	10.316452	3.031285	3.441912	3.033901	13.991672
3.033009	3.075829	3.033009	13.254934	3.033009	10.325687	3.033009	3.430374	3.035625	13.827664
3.034745	3.061977	3.034745	13.146371	3.034745	10.321070	3.034745	3.511143	3.037361	13.647477
3.037060	3.101243	3.037060	12.896887	3.037060	10.355718	3.037060	3.384220	3.039676	13.469616
3.039375	3.075829	3.039375	12.797559	3.039375	10.328013	3.039375	3.499605	3.041991	13.236294
3.041701	3.168249	3.041701	12.642786	3.041701	10.330304	3.041701	3.471912	3.044317	12.996062
3.044005	3.064303	3.044005	12.469543	3.044005	10.330304	3.044005	3.476528	3.046620	12.827437
3.046331	3.057359	3.046331	12.388684	3.046331	10.321070	3.046331	3.501913	3.048947	12.681899
3.048634	3.045798	3.048634	12.099934	3.048634	10.297982	3.048634	3.488066	3.051250	12.517891
3.052106	3.048124	3.052106	12.032963	3.052106	10.328013	3.052106	3.444220	3.054722	12.203727
3.055590	3.034272	3.055590	11.838924	3.055590	10.291038	3.055590	3.483451	3.058206	12.018923
3.059062	3.041180	3.059062	11.656446	3.059062	10.316452	3.059062	3.379605	3.061678	11.797179
3.062535	3.057359	3.062535	11.453137	3.062535	10.311835	3.062535	3.464989	3.065151	11.580035
3.065995	3.029654	3.065995	11.242954	3.065995	10.364953	3.065995	3.374990	3.068611	11.395230
3.069468	3.057359	3.069468	11.085855	3.069468	10.431959	3.069468	3.464989	3.072083	11.210426
3.072951	3.048124	3.072951	11.011940	3.072951	10.263334	3.072951	3.361143	3.075567	11.048727
3.076470	3.087390	3.076412	10.850259	3.076505	10.302600	3.076412	3.368066	3.079028	10.907824
3.079942	3.061977	3.079942	10.653893	3.079977	10.286421	3.079896	3.370374	3.082500	10.704532
3.083530	3.006532	3.083530	10.515299	3.083449	10.270277	3.083484	3.351912	3.086100	10.554394
3.090590	3.087390	3.090590	10.221931	3.090509	10.247155	3.090544	3.340374	3.093160	10.263335
3.097419	3.048124	3.097419	10.027892	3.097338	10.205563	3.097373	3.326528	3.099988	10.020778
3.104363	3.041180	3.104363	9.868502	3.104282	10.191710	3.104317	3.342682	3.106933	9.722793
3.111308	3.001914	3.111308	9.542777	3.111227	10.161679	3.111262	3.261913	3.113877	9.533371
3.118252	3.013476	3.118252	9.351064	3.118171	10.177858	3.118206	3.268836	3.120822	9.297757
3.125197	3.018093	3.125197	9.136229	3.125116	10.170914	3.125151	3.280374	3.127766	9.062125
3.132141	3.001914	3.132141	8.946807	3.132060	10.085473	3.132095	3.261913	3.134711	8.865778

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
3.139086	2.997297	3.139086	8.755059	3.139005	10.043881	3.139039	3.259605	3.141655	8.678665
3.149502	3.025037	3.149502	8.542550	3.149421	10.020794	3.149456	3.201912	3.152072	8.394532
3.159919	3.018093	3.159919	8.369307	3.159838	9.988436	3.159873	3.197297	3.162488	8.124270
3.170336	2.964975	3.170336	8.092118	3.170255	9.875255	3.170289	3.178836	3.172905	7.951027
3.180752	2.953413	3.180752	7.958106	3.180671	9.771310	3.180706	3.144220	3.183322	7.696925
3.194641	2.925709	3.194641	7.593150	3.194560	9.674272	3.194595	3.104990	3.197211	7.368892
3.208530	2.941852	3.208530	7.445286	3.208449	9.611919	3.208484	3.132682	3.211100	7.227988
3.222419	2.916438	3.222419	7.110361	3.222338	9.440967	3.222373	3.102682	3.224988	6.978505
3.236308	2.877172	3.236308	6.913996	3.236227	9.343965	3.236262	3.102682	3.238877	6.726712
3.250197	2.854085	3.250197	6.789254	3.250116	9.253872	3.250151	3.044989	3.252766	6.521129
3.264086	2.821728	3.264086	6.609067	3.264005	9.133747	3.264039	3.042682	3.266655	6.370973
3.277974	2.796349	3.277974	6.359618	3.277893	9.057506	3.277928	2.998836	3.280544	6.190804
3.295336	2.805584	3.295336	6.246402	3.295255	8.875028	3.295289	2.964220	3.297905	5.945938
3.312697	2.872555	3.312697	6.077777	3.312616	8.766465	3.312651	2.941143	3.315266	5.779621
3.330058	2.810202	3.330058	5.916095	3.329977	8.583952	3.330012	3.038066	3.332627	5.627157
3.347419	2.784788	3.347419	5.733582	3.347338	8.438414	3.347373	2.945759	3.349988	5.426191
3.370567	2.727017	3.370567	5.514129	3.370486	8.295202	3.370521	2.890374	3.373137	5.204430
3.393715	2.715491	3.393715	5.336269	3.393634	8.068841	3.393669	2.844220	3.396285	5.054274
3.416863	2.634632	3.416863	5.156082	3.416782	7.932537	3.416817	2.830374	3.419433	4.848691
3.440127	2.639250	3.440127	4.957425	3.440046	7.729263	3.440081	2.784220	3.442697	4.696227
3.463160	2.655428	3.463160	4.832683	3.463079	7.556020	3.463113	2.731143	3.465729	4.548398
3.486308	2.576896	3.486308	4.701033	3.486227	7.412773	3.486262	2.682682	3.488877	4.389007
3.521030	2.537630	3.521030	4.520846	3.520949	7.110171	3.520984	2.687297	3.523600	4.261956
3.555752	2.445211	3.555752	4.262127	3.555671	6.911514	3.555706	2.613451	3.558322	4.070226
3.590474	2.401327	3.590474	4.142003	3.590393	6.645887	3.590428	2.509605	3.593044	3.922379
3.625197	2.387475	3.625197	3.984938	3.625116	6.458756	3.625151	2.541913	3.627766	3.806872
3.659919	2.320469	3.659919	3.855544	3.659838	6.262426	3.659873	2.486528	3.662488	3.647481
3.694641	2.281203	3.694641	3.696188	3.694560	6.059117	3.694595	2.414989	3.697211	3.541227
3.729711	2.269641	3.729711	3.603769	3.729630	5.839664	3.729664	2.368835	3.732280	3.393398
3.764086	2.198053	3.764086	3.490588	3.764005	5.659512	3.764039	2.350374	3.766655	3.300995
3.798808	2.174930	3.798808	3.361229	3.798727	5.483943	3.798762	2.331913	3.801377	3.134679
3.833530	2.131047	3.833530	3.296549	3.833449	5.363819	3.833484	2.297297	3.836100	3.104648
3.902974	2.059459	3.902974	3.146393	3.902893	5.033476	3.902928	2.267297	3.905544	2.956801
3.973113	2.089490	3.973113	3.010090	3.973032	4.802497	3.973067	2.179605	3.975683	2.804336

Table C.3-1:
Time and Water Level Data Values Used in Pumping Test Analysis: Burdock Test, Recovery Data

11-2 Time (days)	Drawdown (ft)	**11-14C** Time (days)	Drawdown (ft)	**11-15** Time (days)	Drawdown (ft)	**11-19** Time (days)	Drawdown (ft)	**11-11C** Time (days)	Drawdown (ft)
4.041863	1.948569	4.041863	2.797581	4.041782	4.504512	4.041817	2.274220	4.044433	2.663433
4.111308	1.927773	4.111308	2.605868	4.111227	4.303529	4.111262	2.031913	4.113877	2.538691
4.180752	1.796087	4.180752	2.529627	4.180671	4.035576	4.180706	1.974220	4.183322	2.340035
4.250197	1.752204	4.250197	2.402559	4.250116	3.811505	4.250151	1.928066	4.252766	2.270737
4.319641	1.708320	4.319641	2.354058	4.319560	3.635936	4.319595	1.907297	4.322211	2.125199
4.389086	1.664436	4.389086	2.250112	4.389005	3.476545	4.389039	1.828836	4.391655	2.072063
4.493252	1.664436	4.493252	2.160019	4.493171	3.296359	4.493206	1.798836	4.495822	1.975044
4.597419	1.560491	4.597419	2.065308	4.597338	3.109263	4.597373	1.734220	4.599988	1.963500
4.701586	1.535077	4.701586	1.919770	4.701505	2.919842	4.701539	1.701913	4.704155	1.820288
4.805752	1.456545	4.805752	1.910535	4.805671	2.751216	4.805706	1.688066	4.808322	1.732504
4.944641	1.433422	4.944641	1.792737	4.944560	2.612622	4.944595	1.618836	4.947211	1.644719
5.083530	1.361834	5.083530	1.665668	5.083449	2.460140	5.083368	1.549605	5.086100	1.554625
5.222419	1.347946	5.222419	1.540926	5.222338	2.229161	5.222373	1.480374	5.224988	1.439136
5.361308	1.165469	5.361308	1.370010	5.361227	2.097475	5.361146	1.436528	5.363877	1.337481
5.500197	1.075375	5.500197	1.339979	5.500116	1.917288	5.500150	1.471143	5.502766	1.191961
5.639086	1.015313	5.639086	1.268355	5.639005	1.797164	5.633947	1.401912	5.641655	1.044114
5.777974	0.971429	5.777974	1.092786	5.777894	1.688601	5.777813	1.187297	5.780544	1.030262
5.909340	0.927546	5.909340	1.182879	5.909375	1.612395	5.893901	1.094989	5.911910	1.062601

General Methodology: PSI, temperature, and time readings from Win-Situ™ digital data log were exported to Excel ".csv" file.
Drawdown was calculated as PSI at time after pumping minus average PSI before pumping; therefore, at small or zero changes in PSI negative drawdowns may be calculated.
A FORTRAN program was written to read the ".csv" file and produce a second file by extracting the records at a frequency of 40 per log-time cycle (in minutes) in order achieve equal representation of data throughout the pumping and drawdown phases of the test.

Note [grey shading] Extracted manually from digital data log.

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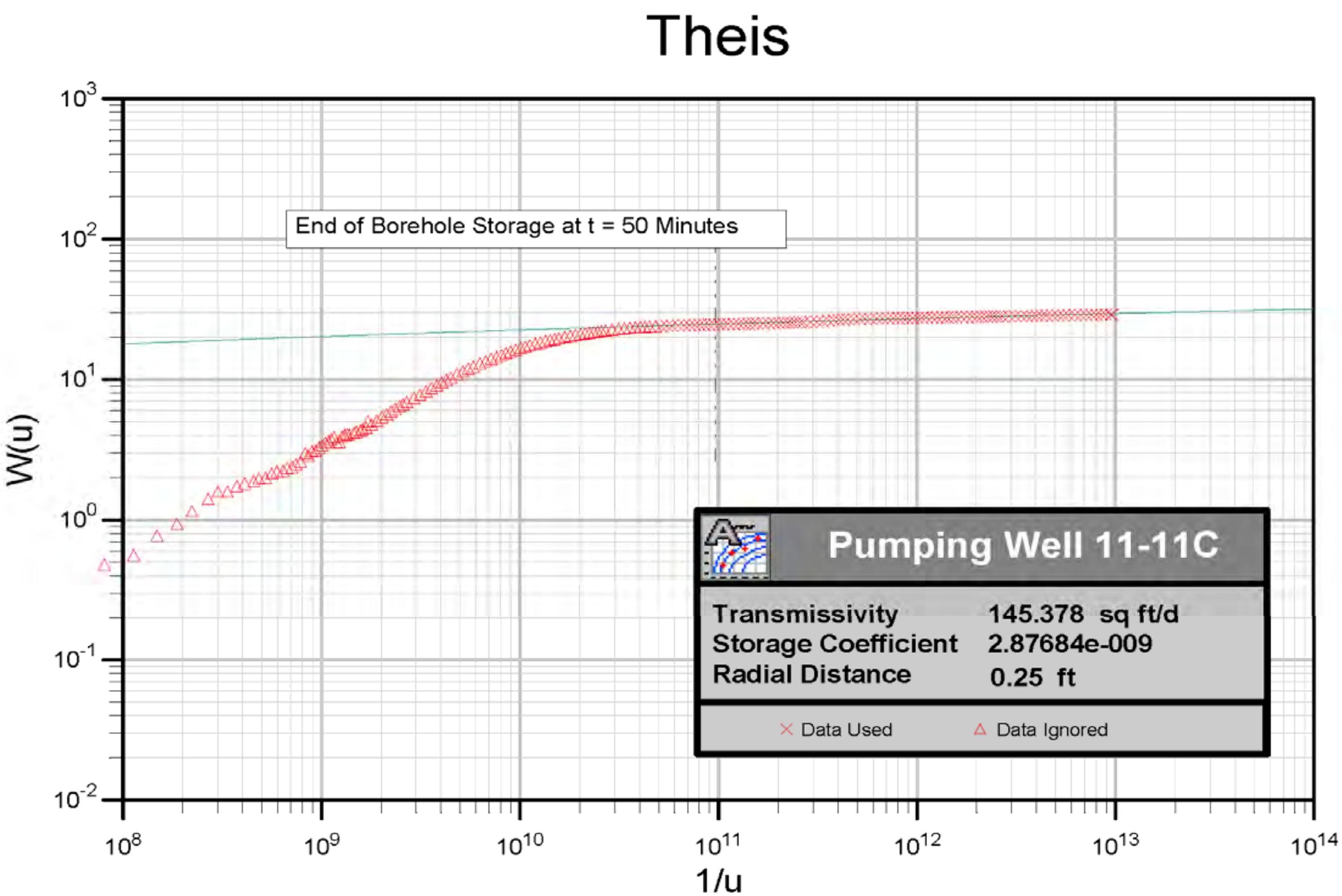
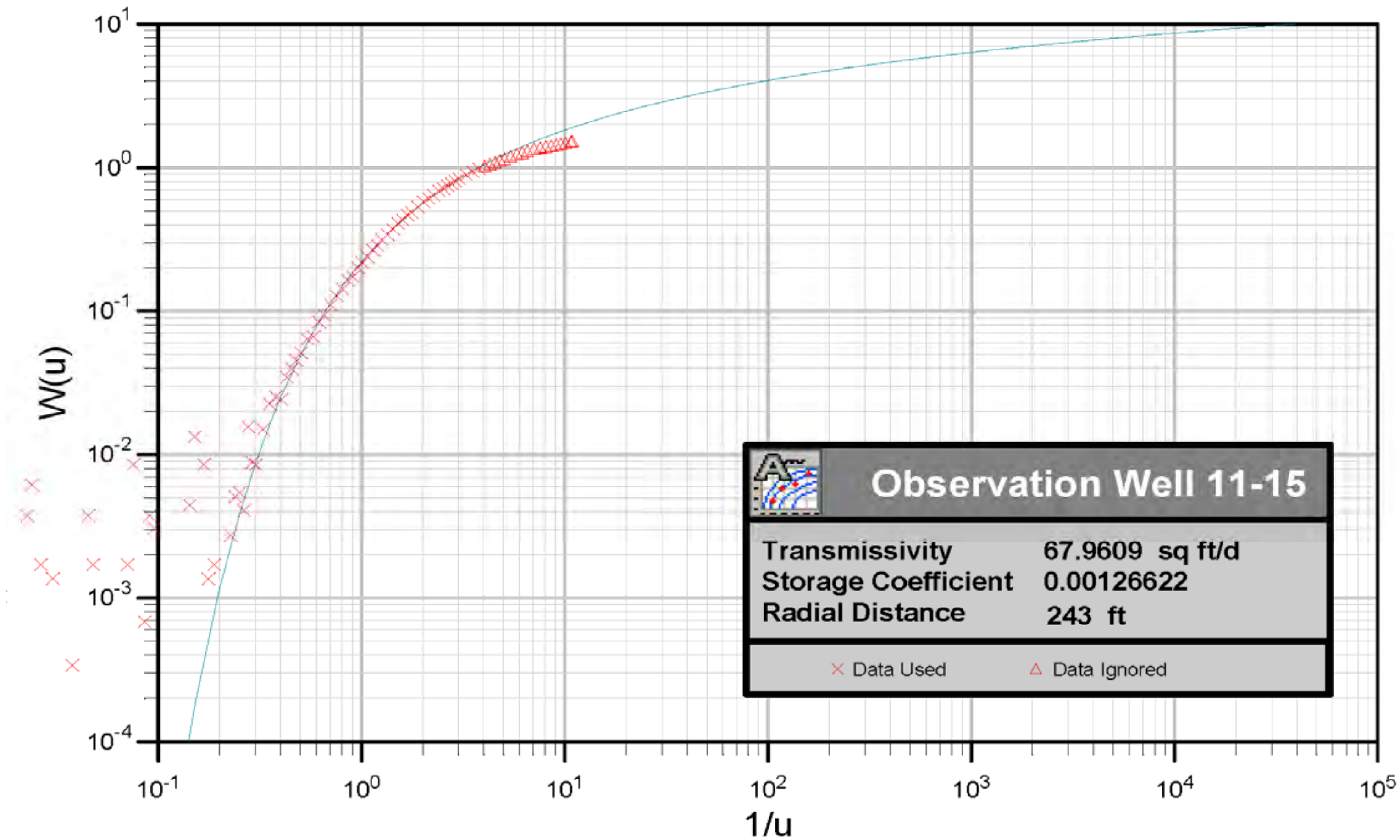
Appendix C-4
Additional Aquifer Parameter Determinations

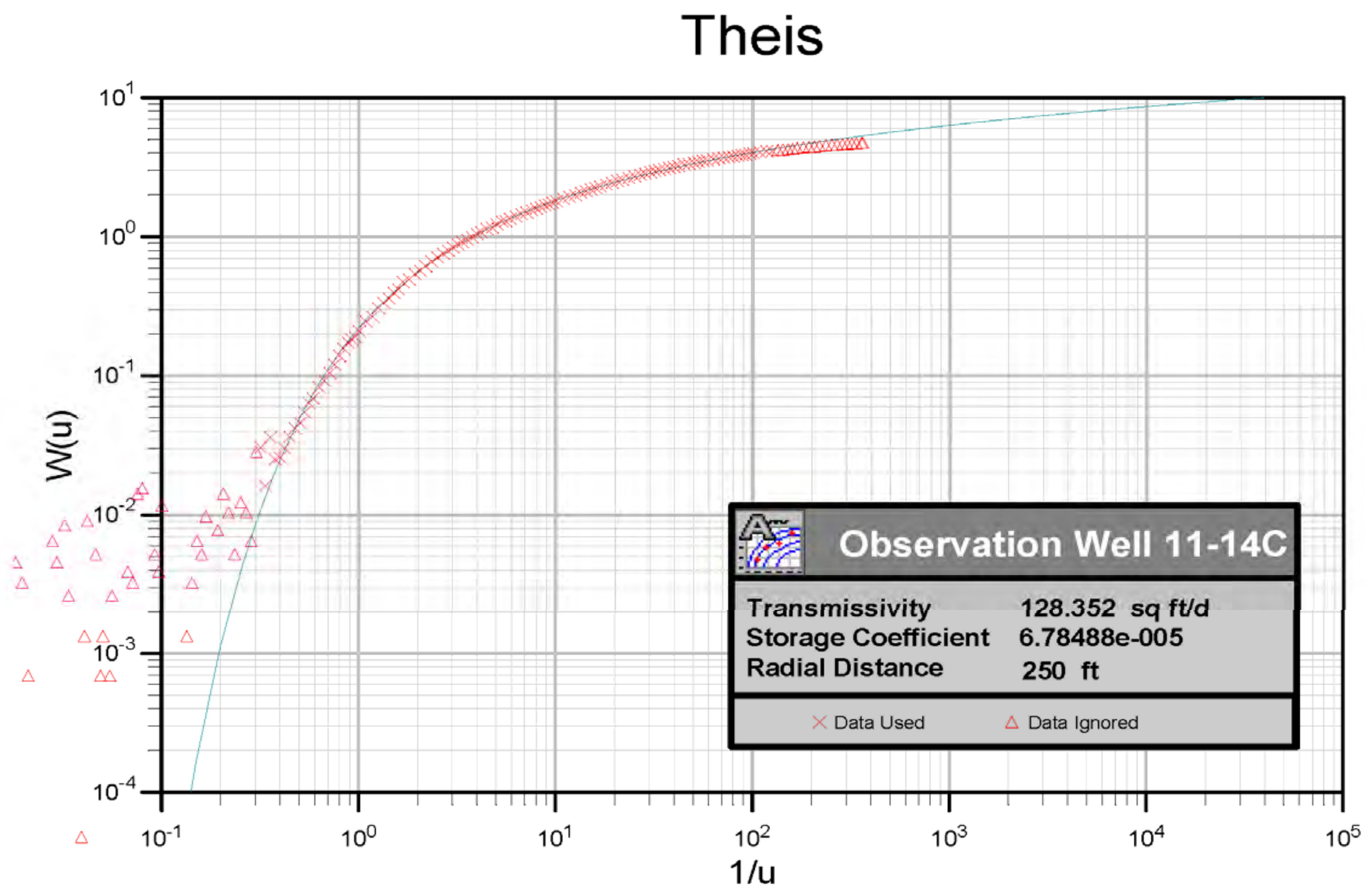


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Burdock Pumping Well 11-11C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-1

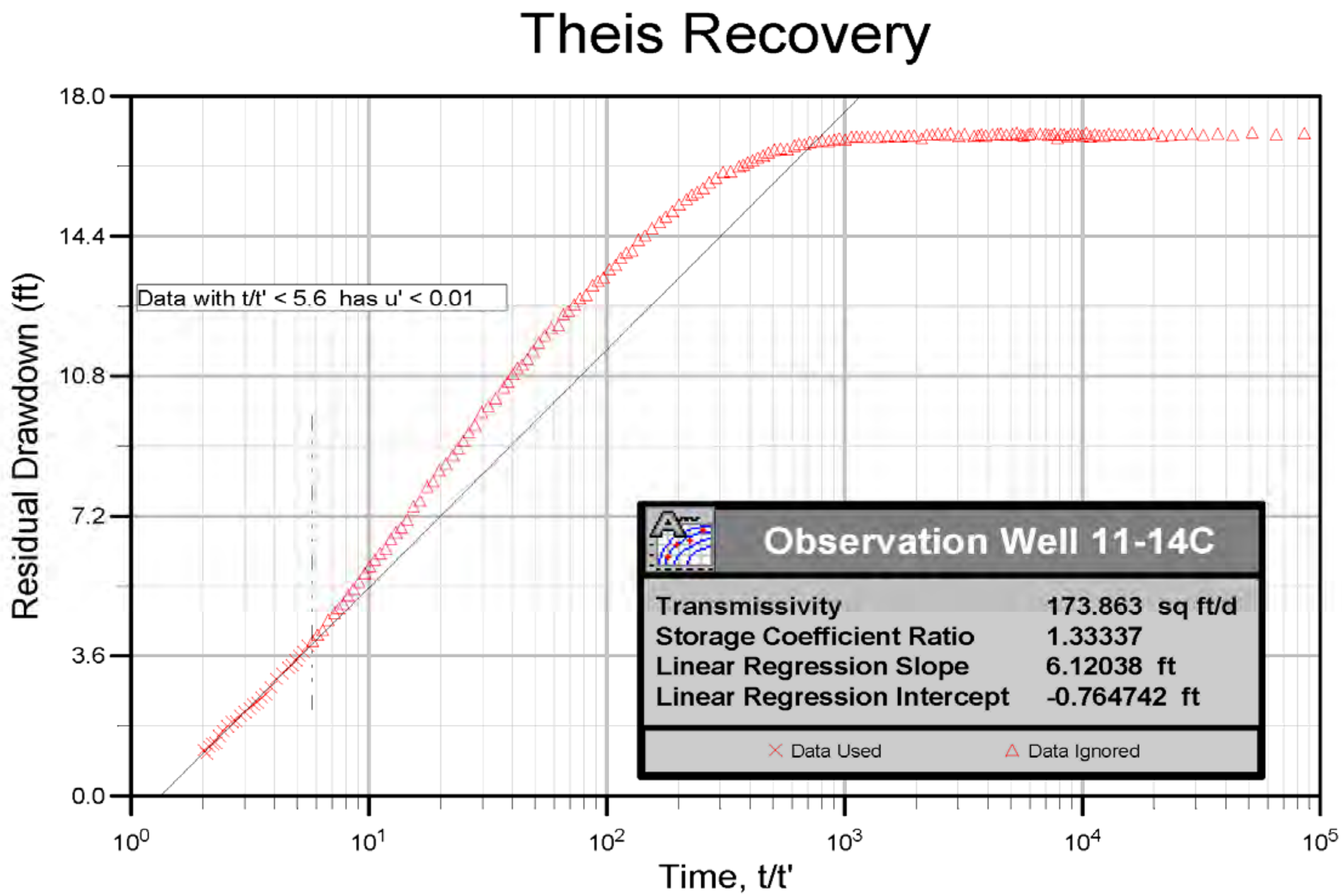
Theis



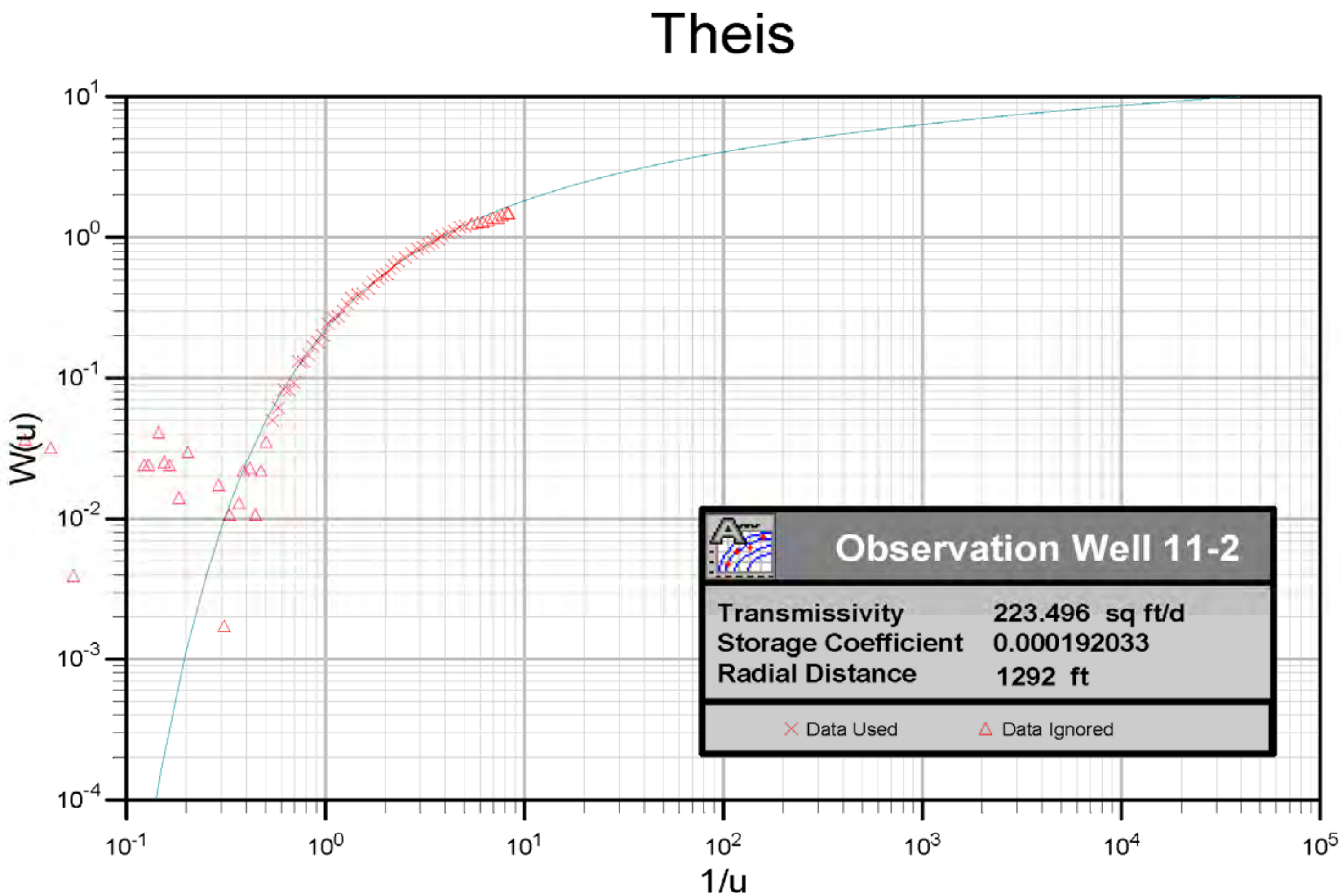
Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Burdock Observation Well 11-15	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-2



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Burdock Observation Well 11-14C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-3

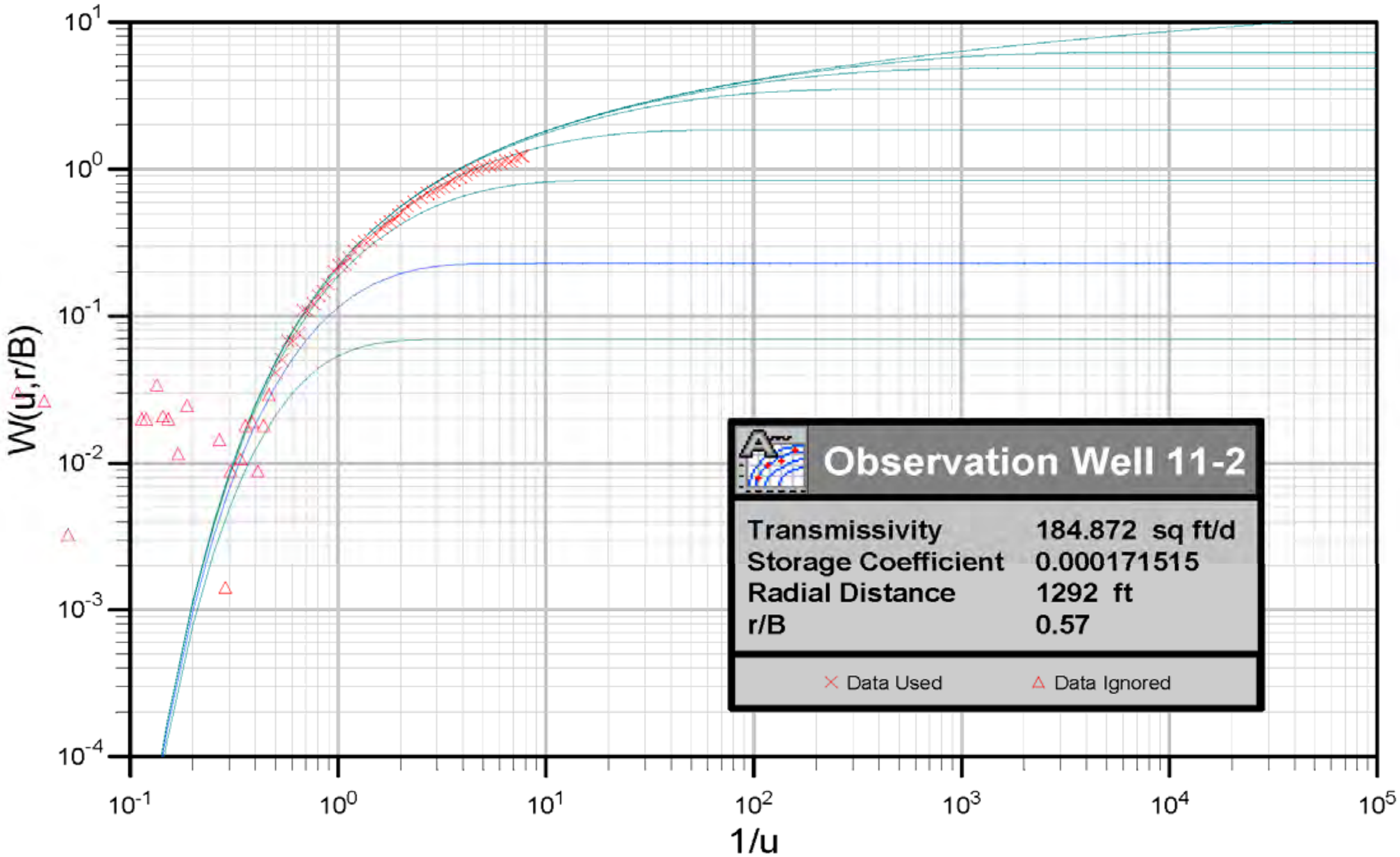


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Recovery Analysis at Burdock Observation Well 11-14C	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-4

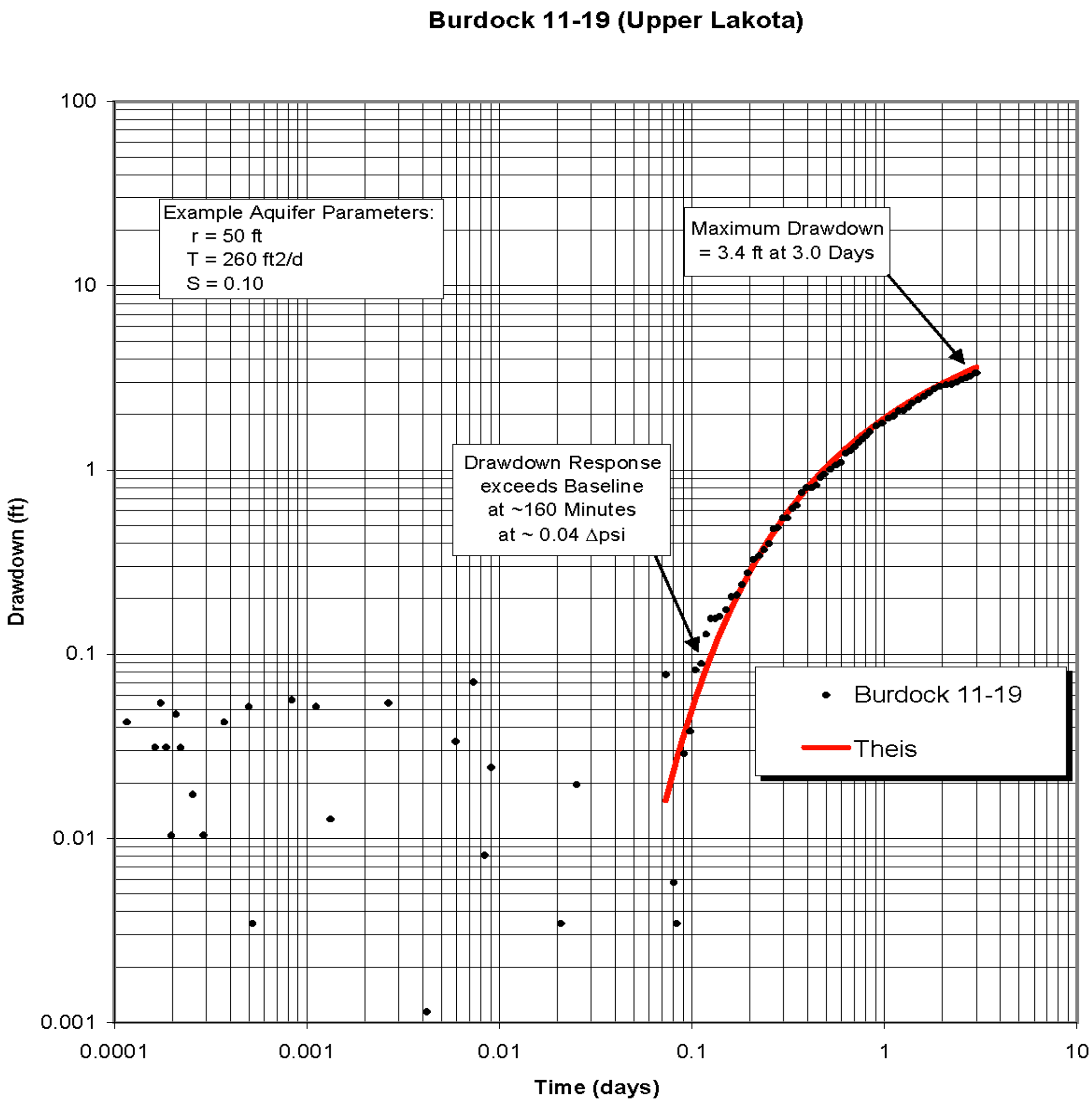


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis Drawdown Analysis at Burdock Observation Well 11-2	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-5

Hantush and Jacob (1955)

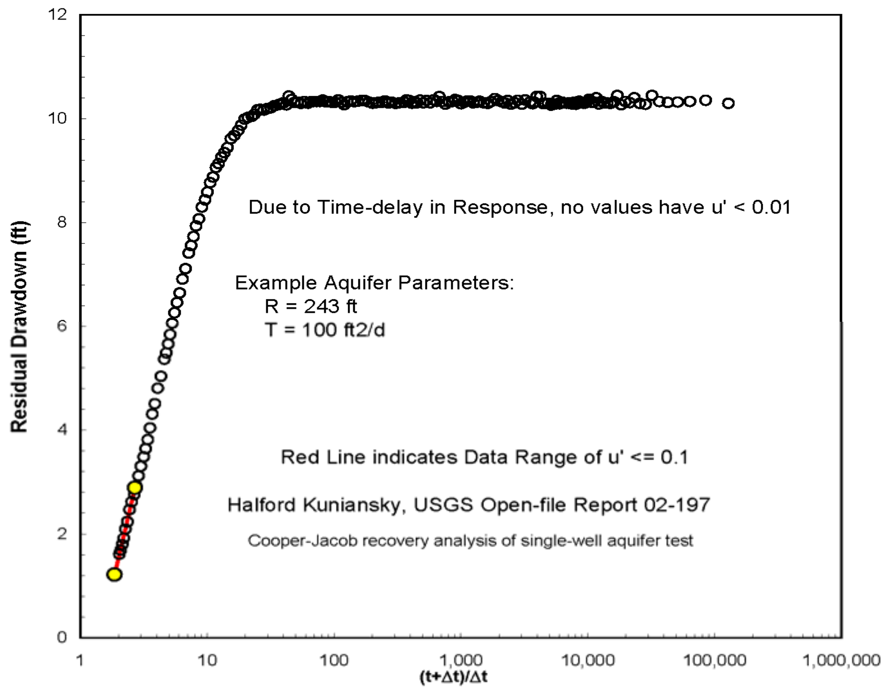


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Hantush-Jacob Leaky Confined Aquifer Analysis at Burdock Observation Well 11-2	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-6

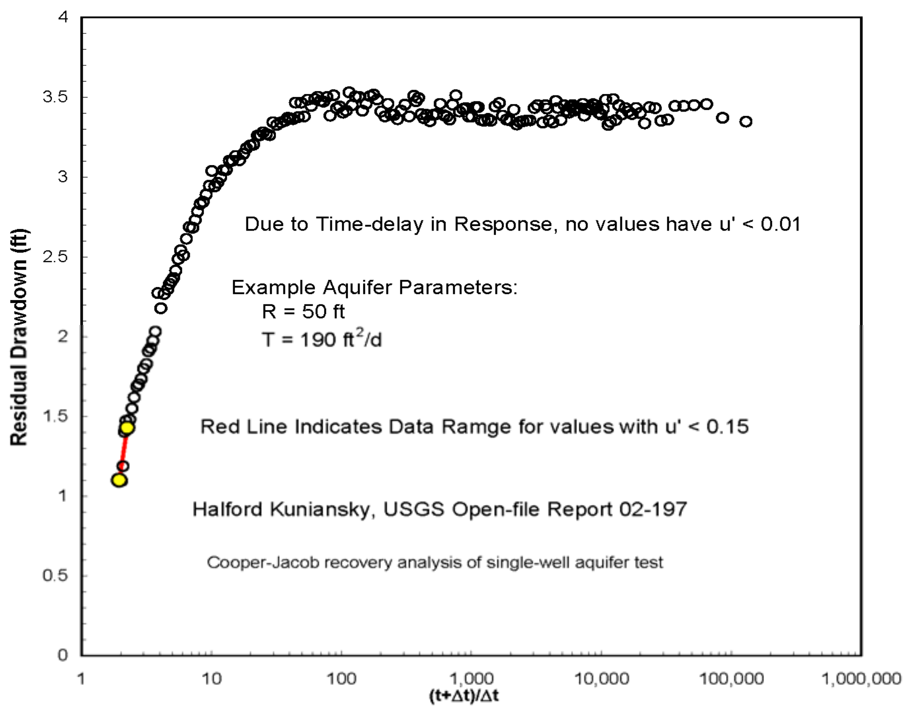


Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Drawdown and Analysis at Burdock Test Observation Well 11-19 (Upper Lakota)	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-7

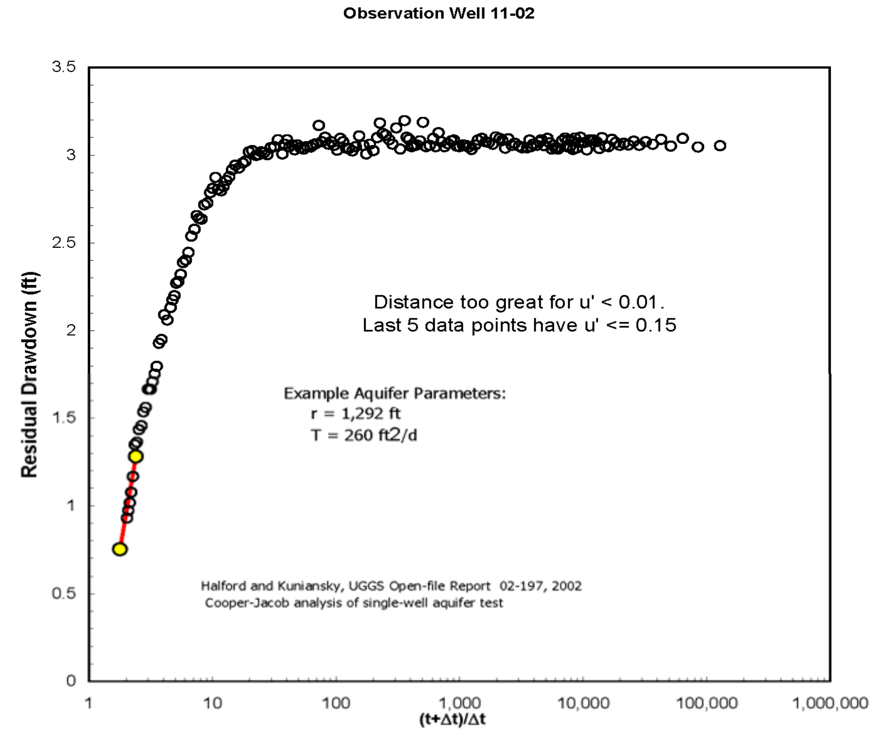
Observation Well 11-15

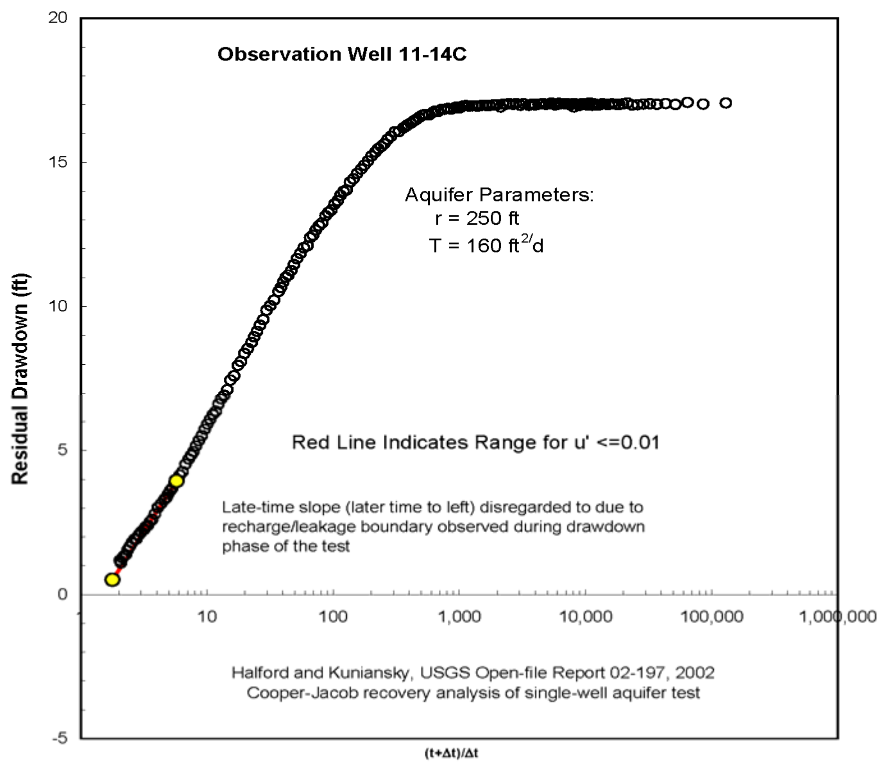


Observation Well 11-19



Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis-Cooper-Jacob Recovery Analyses at Burdock Observation Wells 11-15 and 11-19	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-8





Client	Project	Title	
Knight Piésold CONSULTING	DEWEY-BURDOCK HYDROGEOLOGIC TESTING REPORT	Theis-Cooper-Jacob Recovery at Burdock Observation Wells 11-14C and 11-02	
	Project No: DV10200279.01	Date: 10/16/08	Appendix C, Figure C.4-9

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Appendix D
Laboratory Core Data

Core Lab
PETROLEUM SERVICES

CONVENTIONAL PLUG ANALYSIS

Powertech USA Inc.

Various samples

CL File Number: HOU-070985

Date: January 25, 2008

Powertech USA Inc.
/arious samples

CL File No.: HOU-070985
Date: January 25, 2008
Analyst(s): MS,MM,JH

CONVENTIONAL PLUG ANALYSIS PROTOCOL

Sample Preparation
1.0" diameter plugs were drilled with liquid nitrogen and trimmed into right cylinders with a diamond-blade trim saw. The samples were encapsulated in Teflon tape and stainless steel screens. All sample trims were archived.

Core Extraction
Samples soaked in methanol to remove any salt present.

Sample Drying
Samples were humidity oven dried at 140° F and 40% relative humidity to weight equilibrium.

Porosity
Porosity was determined using Boyle's Law technique by measuring grain volume at ambient conditions & pore volume at indicated net confining stresses (NCS)

Grain Density
Grain density values were calculated by direct measurement of grain volume and weight on dried plug samples. Grain volume was measured by Boyle's Law technique.

Permeability
Permeability to air was measured on each sample using steady-state method at indicated NCS.

PowerTech USA
Various samples

Start Date: 10-19-07
File No: HOU-070985

Core Lab
PETROLEUM SERVICES

Core Sample Log (Updated 01-25-08)

Smpl No.	Depth (ft)	Plug Quality Good	Fair	Poor	Failed	Vert	Smpl Len	Smpl Dia	End Trims	Remarks	Material Weights Teflon	Screens
1H	252.20		x				1.33	**1.00**		DB 07-11-11C	0.717	0.611
1V	252.35			x		x	0.67	**1.00**		DB 07-11-11C	0.465	0.651
2H	480.70	x					1.75	**1.00**		DB 07-29-1C	1.044	0.596
2V	480.80			x		x	1.00	**1.00**		DB 07-29-1C	0.805	0.604
3H	609.10	x					2.20	**1.00**		DB 07-29-1C	1.328	0.601
3V	609.20					x	1.88	**1.00**		DB 07-29-1C	1.220	0.605
4H	412.30	x					2.33	**1.00**		DB 07-11-11C	1.505	0.599
4V	412.45		x			x	1.66	**1.00**		DB 07-11-11C	1.325	0.602
5H	423.60	x					2.00	**1.00**		DB 07-11-14C	0.812	0.729
5V	423.35	x				x	1.80	**1.00**		DB 07-11-14C	0.552	0.734
6H	430.20		x				0.70	**1.00**		DB 07-11-14C	0.410	0.737
6V	430.35	x				x	1.50	**1.00**		DB 07-11-14C	0.594	0.752
7H	453.50	x					1.70	**1.00**		DB 07-11-14C	0.625	0.744
7V	453.45		x			x	0.75	**1.00**		DB 07-11-14C	0.315	0.719
8H	420.40	x					1.25	**1.00**		DB 07-11-16C	0.471	0.743
8V	420.10	x				x	1.90	**1.00**		DB 07-11-16C	0.717	0.732
9H	455.90	x					1.25	**1.00**		DB 07-11-16C	0.575	0.718
9V	455.45	x				x	1.50	**1.00**		DB 07-11-16C	0.634	0.719
10H	503.30	x					1.50	**1.00**		DB 07-11-16C	0.557	0.733
10V	503.45				x	x	-	**1.00**		DB 07-11-16C		
11H	573.25	x					1.25	**1.00**		DB 07-32-4C	0.567	0.730
11V	573.40	x				x	1.00	**1.00**		DB 07-32-4C	0.572	0.722
Totals		**14**	**4**	**2**	**1**	**11**						

10695
3/3/2008

Analyst: AM

Sample ID	Powertech ID	As Received sample mass (kg)	starting volume (mL)	ending volume (mL)	density (g/mL)	description	time in graduated cylinder (min)
51719-75	DB07-11-11C 425'5" to 427'4"	3.92	1395	3140	2.25	mushy sand	5
51719-25	DB07-29-1C 590' to 592'3"	4.32	1995	3880	2.29	mushy sand	5
51660-24	CN-3C 130-131	1.40	2100	2855	1.85	solid sand	40
51660-60	IN-2C 464-465	1.58	1300	2045	2.12	mushy sand	5
51660-59	IN-1C 464-465	1.02	1250	1750	2.04	clumped, wet sand	5
51719-86	DB07-32-2C 580 - 580.5	0.84	1705	2170	1.81	clumped, wet sand	30
51719-2	DB07-32-4C 550'0" to 551'1"	2.30	1015	1925	2.53	clumped, wet sand	180
51719-35	DB07-11-16C 412'1" to 414'3"	3.30	2100	3565	2.25	clumped, wet sand	960
51719-62	DB07-11-14C 11/1/07 436'7" to 438'7"	3.18	1990	3430	2.21	clumped, wet sand	30

Avg of 7 = 2.24

Powertech USA Inc.
Various samples

CL File No.: HOU-070985
Date: January 25, 2008
Analyst(s): MS,MM,JH

CONVENTIONAL PLUG ANALYSIS

Sample Number	Depth (ft)	Net Confining Stress (psig)	Porosity (%)	Kair (mD)	Grain Density (g/cm3)	Footnote
1H	252.20	600	10.50	1.04	2.356	
1V	252.35	600	10.15	.228	2.356	
4H	412.30	600	9.68	.041	2.511	
4V	412.45	600	9.59	.015	2.514	
DB 07-29-1C						
2H	480.70	600	8.90	.078	2.613	
2V	480.80	600	9.30	.007	2.610	
3H	609.10	600	12.26	.073	2.603	
3V	609.20	600	10.84	.008	2.793	
DB 07-11-14C						
5H	423.60	600	29.56	3207	2.645	
5V	423.35	600	30.34	1464	2.645	
6H	430.20	600	31.90	4161	2.640	
6V	430.35	600	30.16	939	2.646	
7H	453.50	600	10.66	1.00	2.519	
7V	453.45	600	11.82	.043	2.543	
DB 07-11-16C						
8H	420.40	600	30.50	2697	2.643	
8V	420.10	600	30.17	1750	2.651	
9H	455.90	600	6.99	.004	2.536	
9V	455.45	600	7.65	.012	2.556	
10H	503.30	600	12.96	.697	2.474	
10V	503.45	600				(6)
DB 07-32-4C						
11H	573.25	600	29.15	2802	2.641	
11V	573.40	600	29.04	619	2.645	

Footnotes :

(6) : Denotes all plug attempts failed.

Core Analyses for Powertach USA Inc. at Dewey-Burdock Site

Sample Number	Depth (ft)	Confining Stress (psig)	Porosity (%)	Air Intrinsic Permeability[(1)] k_a (mD)	Particle Density (g/cm^3)	Notes
DB 07-11-11C						
1H	252.20	600	10.50	1.040	2.356	Fuson Shale
1V	252.35	600	10.15	0.228	2.356	Fuson Shale
4H	412.30	600	9.68	0.041	2.511	Fuson Shale
4V	412.45	600	9.59	0.015	2.514	Fuson Shale
DB 07-29-1C						
2H	480.70	600	8.90	0.078	2.613	Skull Creek shale
2V	480.80	600	9.30	0.007	2.610	Skull Creek shale
3H	609.10	600	12.26	0.073	2.603	Fuson Shale
3V	609.10	600	10.84	0.008	2.793	Fuson Shale
DB 07-11-14C						
5H	423.60	600	29.56	3,207	2.645	
5V	423.35	600	30.34	1,464	2.645	
6H	430.20	600	31.90	4,161	2.640	
6V	430.35	600	30.16	939	2.646	
7H	453.50	600	10.86	1.000	2.519	Morrison Shale
7V	453.45	600	11.82	0.043	2.543	Morrison Shale
DB-07-11-16C						
8H	420.40	600	30.50	2,697	2.643	
8V	420.10	600	30.17	1,750	2.651	
9H	455.90	600	6.99	0.004	2.536	Morrison Shale
9V	455.45	600	7.65	0.012	2.556	Morrison Shale
10H	503.30	600	12.96	0.697	2.474	Morrison Shale
10V	503.45	600	No data			
DB 07-32-4C						
11H	573.25	600	29.15	2,802	2.641	
11V	573.40	600	29.04	619	2.645	

(1) Assumed air temperature = 70°F.

(2) Assumed water temperature = 52.8°F, water density = 0.999548 g/cm^3, and water dynamic viscosity = 0.0125

(3) $K_w = k_a \times (\rho_w g/\mu_w)$, and 1.0 mD = 0.987 x 10^{-11} cm^2 (See Constants Tab).

Hole No	mDarcy horizontal perm	verical perm	ratio h/v	% horizontal porosity	verical porosity
DB 07-11-14C	3207	1464	2.2:1	29.56	30.34
	4161	939	4.4:1	31.9	30.16
DB 07-11-16C	2697	1750	1.5:1	30.5	30.17
DB 07-32-4C	2802	619	4.5:1	29.15	29.04
Avg	3217	1193	2.7:1	30.3	29.9

Knight Piésold
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Appendix E
CD-ROM: Raw Pressure Transducer Data in WinSitu™ Format