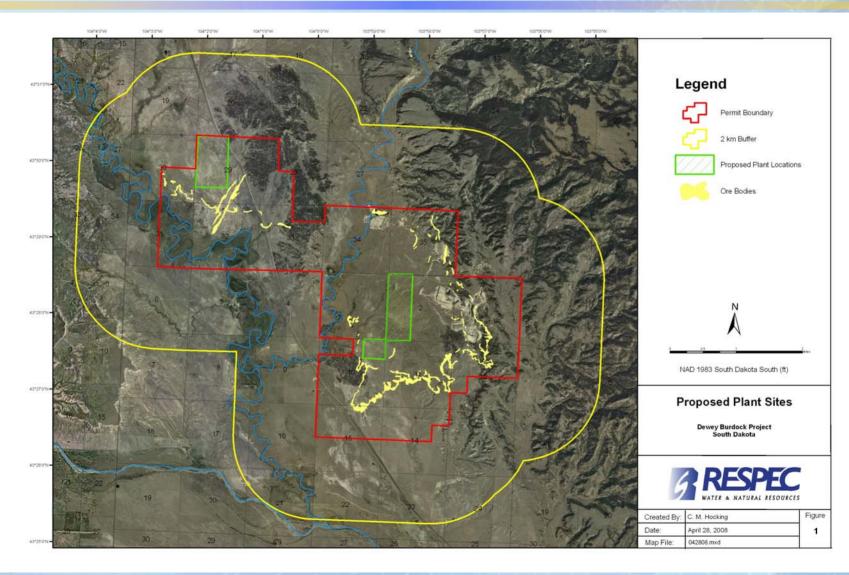


Plant Description

- Total Annual Production of 1 Million Pounds
 - → Split equally between the Dewey and Burdock sites
- Production, Restoration and New Developmental Wellfields
 - → Dewey and Burdock sites
- Ion Exchange System at Dewey with Resin Transport to Burdock
- Ion Exchange with Resin Elution, Precipitation and Rotary Vacuum Drying
 - → Burdock site
- Yellow Cake Packaging with Product Transport
 - → Burdock site



Facilities Locations



Environmental Baseline Progress

- Surface Water Hydrology
- Ground Water Hydrology
- Aquifer Pump Test
- Land Use/Demographics/Socioecomics
- Meteorology
- Geology
- * Radiological Baseline
- ❖ Soils
- Vegetation
- Wetlands
- Wildlife and Fisheries
- Cultural Resources

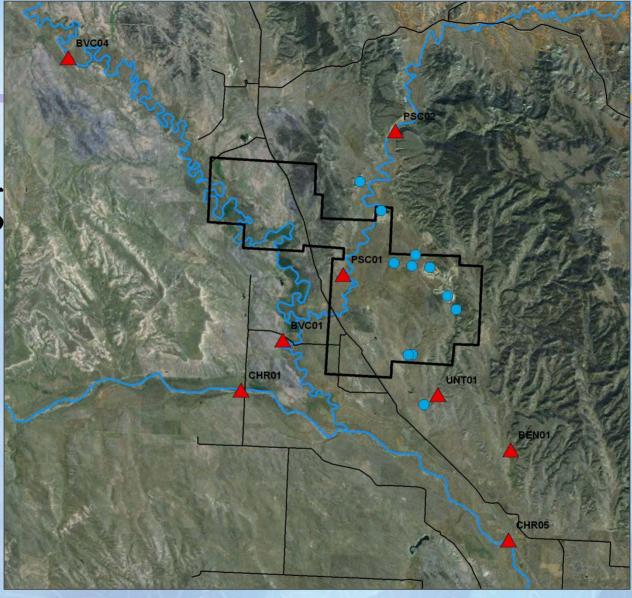


Surface Water Hydrology

- Monthly Stream Samples and Flow
 - → Beaver Creek
 - → Pass Creek
 - → Cheyenne River
- Quarterly Sub-impoundment Samples
 - → 11 impoundments

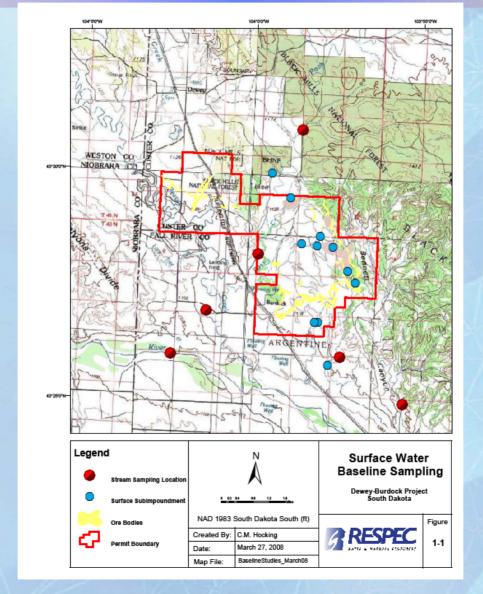


Surface Water Sampling





Surface Water Sampling Locations





Surface Water Quality Results

Average Concentrations in Streams

Sample Location	TSS @ 105 C mg/L	Fecal Coliform cfu/100ml	Lead 210- Total (pCi/L)	Radium 226- Total (pCi/L)	Gross Alpha pCi/L	Polonium 210 – Total pCi/L	Thorium 230 – Dissolved pCi/L	Uranium- Total mg/L
Beaver Creek Upstream	58.17	91.00	18.00	0.54	11.93	3	1.7	0.013
Beaver Creek Downstream	22.29	385.14	6.00	0.23	9.50	3.2	ND	0.010
Pass Creek Upstream	140	4400		0.20	6.90	ND	ND	0.001
Pass Creek Downstream	150	4000		0.70	11.95	ND	ND	0.010
Cheyenne River Upstream	36.67	66.67	1.00	0.28	15.33	4	ND	0.022
Cheyenne River Downstream	12.33	118.33	2.63	0.20	11.78	3.1	ND	0.021
Standards	158[1]	400 [1]		5 [3]	15 [2]		SCHOOL OF	0.030

[1] SD DENR SW Beneficial Use Standard

[2] EPA MCL for Drinking Water

[3] EPA MCL for Drinking Water for Radium 226 and 228 combined



Surface Water Quality Results

Average Concentrations in Sub-impoundments

Sample Locations	TSS @ 105 C (mg/L)	Fecal Coliform (cfu/100ml)	Lead 210- Total (pCi/L)	Radium 226- Total (pCi/L)	Gross Alpha- Total (pCi/L)	Polonium 210-Total (pCi/L)	Thorium 230- Dissolved (pCi/L)	Uranium- Total (mg/L)
Darrow Pits Mine #10032	5	2	ND	2	4925	3.1	25.8	6.605
Stock Pond #10033	8.5	2	ND	0.5	5.2	1.3	.8	0.00085
Stock Pond #10040 (well fed)	5	3	2.8	0.35	2.9	2.3	ND	0.00185
Stock Pond #10051	23	2	ND	3.5	13.6	3.4	.9	0.0024
Stock Pond #10052	6	2	ND	4	16.6	2.5	ND	0.0014
Triangle Pit Mine #10054	5	2	ND	0.6	107.4	1.5	ND	0.165
Stock Pond #10070	99.5	13	ND	0.2	2.45	1.8	1.6	0.001
Standards	158[1]	400 [1]	16-1	5 [3]	15 [2]	RAM	1/1-/	0.030

[1] SD DENR SW Beneficial Use Standard

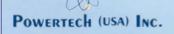
[2] EPA MCL for Drinking Water

[3] EPA MCL for Drinking Water for Radium 226 and 228 combined

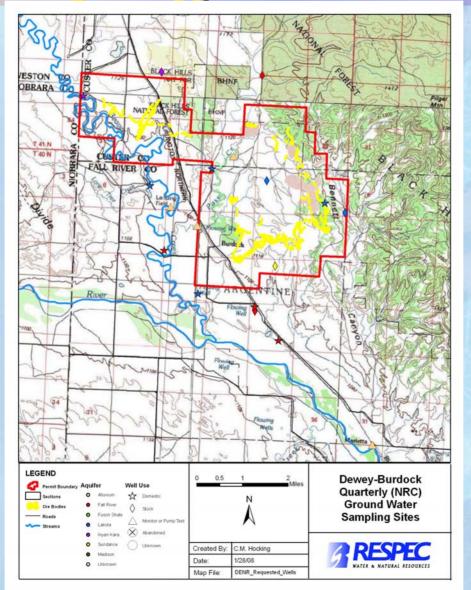


Floodplain Modeling

- Development of Digital Terrain Model (DTM)
 - → Completed and cross checked
- Development of Boundary Conditions
 - → 100, 500, and 1000 year events
 - Currently working on HEC-HMS model for BVC and PSC
- Development of Hydraulic Model
 - → Have developed screening level models using HEC-RAS
 - Working on more detailed versions of the HEC-RAS models
- Delineation of 100, 500, and 1000 Floodplain Boundaries
 - In progress



NRC Quarterly Groundwater Sampling Locations





Groundwater Quality Results

	Gross Alpha- Dissolved	Radium 226-Total	Radon 222-Total	Solids-Total Dissolved TDS	Polonium 210-Total	Thorium 230-Total	Uranium- Dissolved
Well ID	(pCi/L)	(pCi/L)	(pCi/L)	@ 180 C (mg/L)	(pCi/L)	(pCi/L)	(mg/L)
2	5.1	2.2	674	1100	ND	ND	0.0003
7	5.8	0.2	206	1000	ND	ND	0.0003
8	7.6	3.5	160	1020	ND	ND	0.0003
13	8.2	1.1	305	890	5.2	ND	0.0003
16	37.5	17.4	1090	785	ND	ND	0.0014
18	18.2	4	944.5	967	6.0	ND	0.0064
42	373.0	79.7	132000	950	13	ND	0.0237
619	354.0	120	2990	2000	ND	ND	0.00175
628	56.9	6.8	2740	1550	6.4	ND	0.00255
631	48.8	15.2	4220	1950	ND	ND	0.0028
635	3.5	2.4	902	2250	ND	ND	0.002
650	9.4	3.2	134	1800	ND	ND	0.0011
675	18.6	2.3	712	6000	ND	ND	0.03395
676	34.5	0.2	453	2950	ND	ND	0.0521
677	39.9	0.2	892	9300	ND	ND	0.03305
678	21.1	0.2	391	6050	ND	ND	0.03505
679	16.6	2.5	819	2550		1.9	0.01505
4002	162.7	71.05	8010	823	ND	ND	0.0026
680	4090.0	1192.7	143000	2400	ND	ND	0.172
681	656.0	430.9	462000	930	ND	ND	0.0117
EPA MCL	15	5 [2]	300 [3]	500 [1]			0.03

^{[1] &}quot;Secondary" guideline value above which use of water may give rise to complaints by consumers

^[2] Radium 226 and 228 (combined)

^[3] Proposed MCL

Aquifer Pump Tests

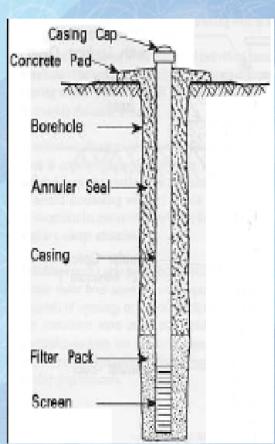
Objectives

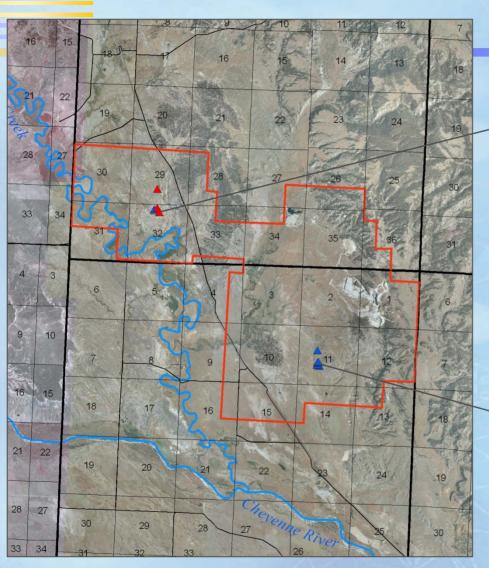
- → Aquifer parameters (T, S)
- → Site aquifer characterization
- → Max sustainable pumping rates
- → Well efficiency
- → Validate hydrogeological conceptual model
- Work Plan
 - → Completed

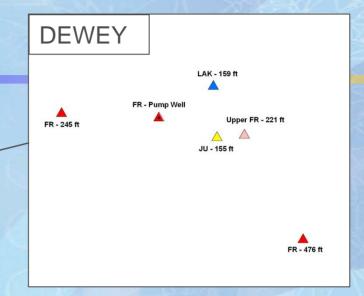


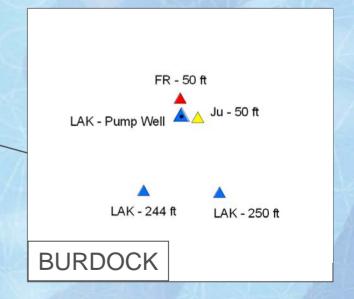
Aquifer Pump Tests

- 2 Tests Burdock and Dewey
- Background Measurements & Water Samples
- Step-Rate Test
 - → 10, 15, 20, 25, 30 gpm
- Pump Test
 - → 48-72 hrs
- Recovery Measurements
- Analysis
 - Analytical and direct modeling











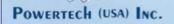
Aquifer Pump Test

- Temporary Water Rights and Discharge Permit
 - → Approved by SD DENR Jan 2, 2008
 - → Expires Dec 31, 2008
 - → Requires submittal of water quality results
- Schedule
 - → Observation wells completed
 - → Instrumentation procurement in progress
 - → Samples collected from each pump test well
 results OK for pit discharge per DENR
 - → Tests scheduled for mid-May 2008



Land Use ~ Completed

- Federal, State, and County Lands Identified
- Nearby Settlements and Transportation Links Identified
- Current Land Use
 - → No zoning in these counties
- Sector Analysis Maps
 - → Distance to nearest residence
 - → Sector population summary
 - → Sector/ring with areas of significant population groups
 - → Minority populations within 80km

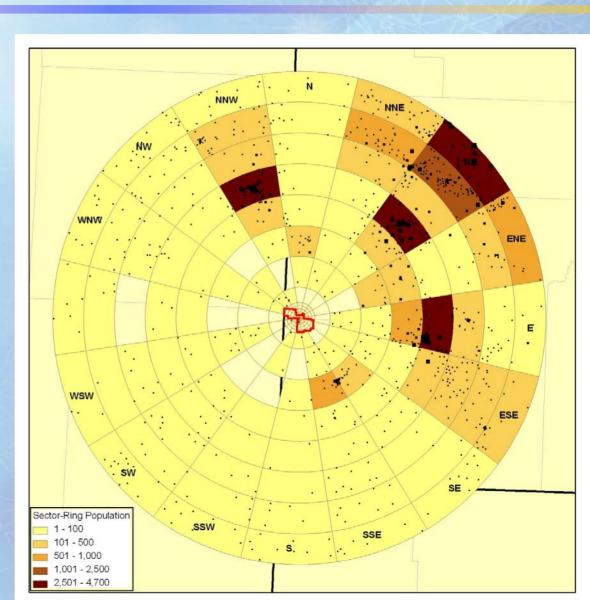


Demographics

Sector Analysis Maps

- Distance to nearest residence
- Sector popular summary
- Sector/ring with areas of significant population groups
- Minority populations within 80km





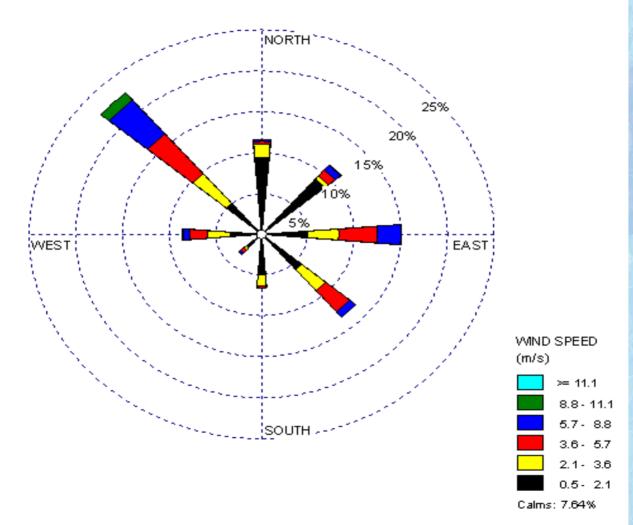
Meteorology

- Full MET Station
 - → Wind speed/direction
 - → Solar radiation
 - → Humidity
 - → Temperature
 - → Year-round precipitation
 - → Evaporation
 - → Soil temperature
 - → Barometric Pressure (installed Feb '08)
- Operating since August 2007





Wind (July – February 2008)

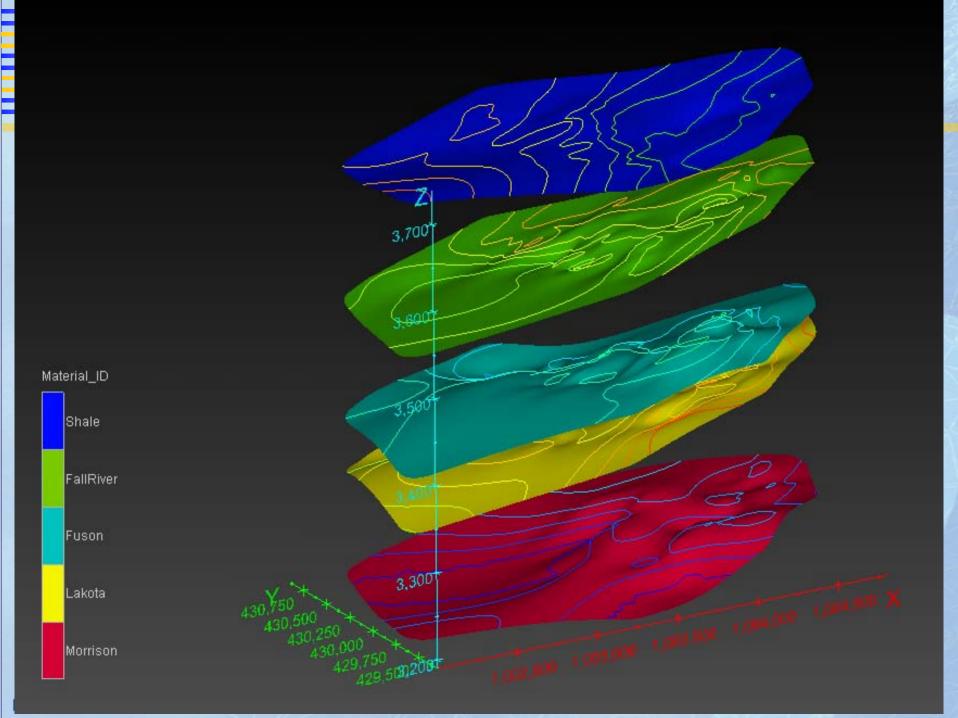




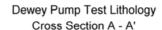
Geology

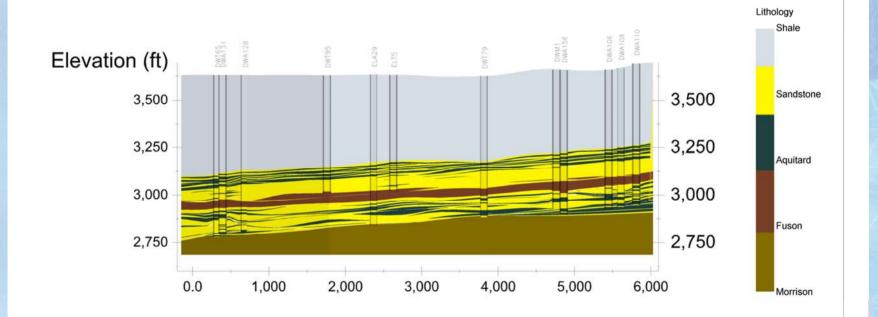
- Seismic Study Complete
- Pilot 3-D Geologic Model (using MVS)
 - → Cross-sections
 - → Isopach and Structure Contour Maps
- Ongoing Development of Geologic Model
 - → Log interpretation
 - Site-wide stratigraphy
 - → Sub-site lithology
 - → Maps and Cross-Sections
 - → Economic Calculations





Dewey Lithology





Z = 2.5x



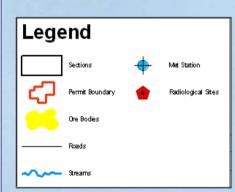
- Hi-Vol TSP Monitoring
- Ambient Radon/Exposure Rate
- **❖ Soil Gamma Survey**
- Soil Sampling
- Vegetation Sampling

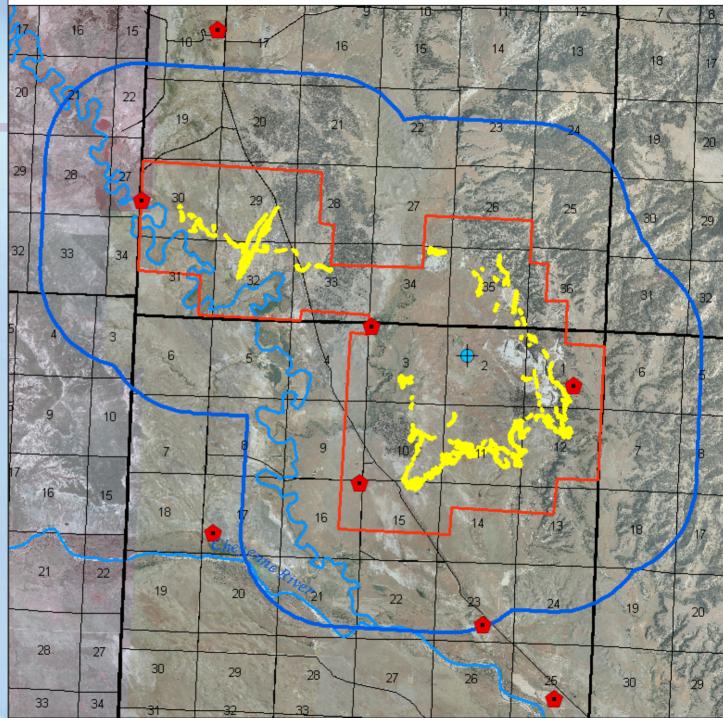




Meteorological and Radiological

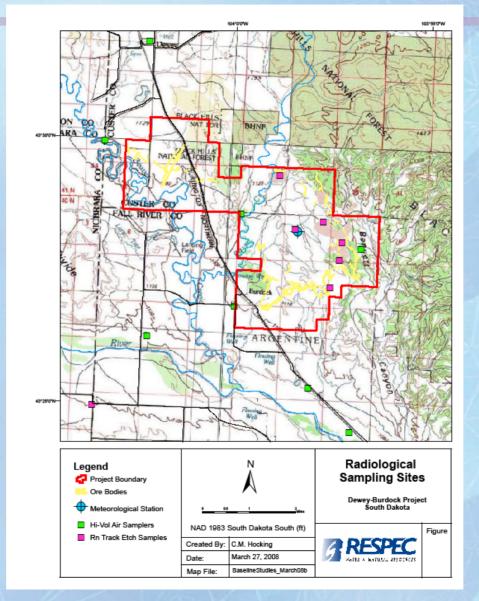








Radiological Monitoring Sites



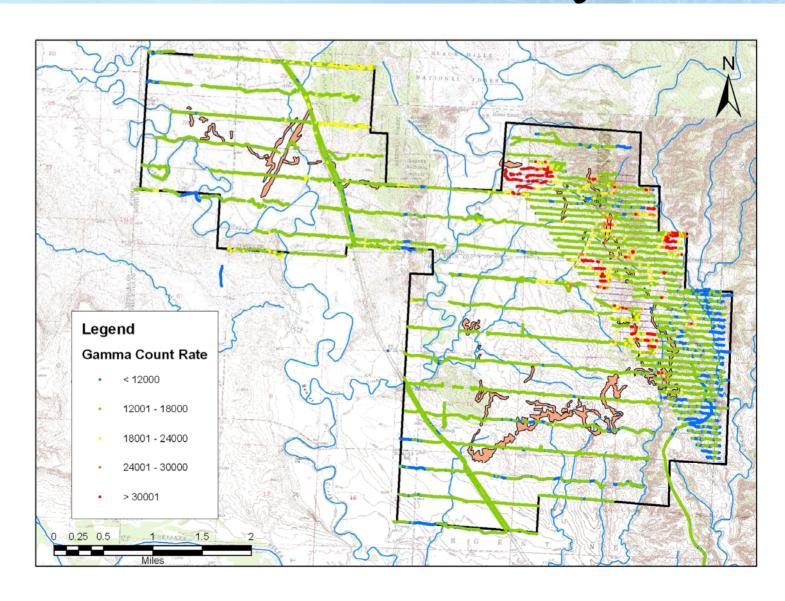


- Radionuclide Air Concentration Data
 - → Data from 4th Quarter of 2007

Location		AMS-01	AMS-02	AMS-03	AMS-04	AMS-05	AMS-06	AMS-07	AMS-bkg
	U-nat.	0	0	0	0	0	0	0	0
Concentration	Th-230	1.6E-18	1.6E-17	9.1E-18	9.4E-18	2.0E-17	1.4E-17	1.3E-17	-7.8E-19
(μCi/mI)	Ra-226	7.2E-18	-2.3E-18	5.3E-18	2.3E-18	4.7E-17	2.3E-17	2.9E-17	1.2E-17
" ,	Pb-210	4.1E-14	2.0E-14	1.3E-14	2.2E-14	2.5E-14	2.1E-14	2.8E-14	2.0E-14
	U-nat.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
% Effluent	Th-230	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Concentration	Ra-226	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Pb-210	0.51%	0.24%	0.16%	0.27%	0.31%	0.27%	0.35%	0.25%
Lower Limit of	U-nat.	1.6E-16	1.5E-16	1.5E-16	1.6E-16	1.5E-16	1.5E-16	1.4E-16	1.6E-16
Detection (LLD)	Th-230	1.6E-18	1.5E-18	1.5E-18	1.6E-18	1.5E-18	1.5E-18	1.4E-18	1.6E-18
` ′	Ra-226	1.6E-18	1.5E-18	1.5E-18	1.6E-18	1.5E-18	1.5E-18	1.4E-18	1.6E-18
(μCi/ml)	Pb-210	7.9E-18	7.6E-18	7.6E-18	7.8E-18	7.7E-18	7.3E-18	7.0E-18	7.8E-18

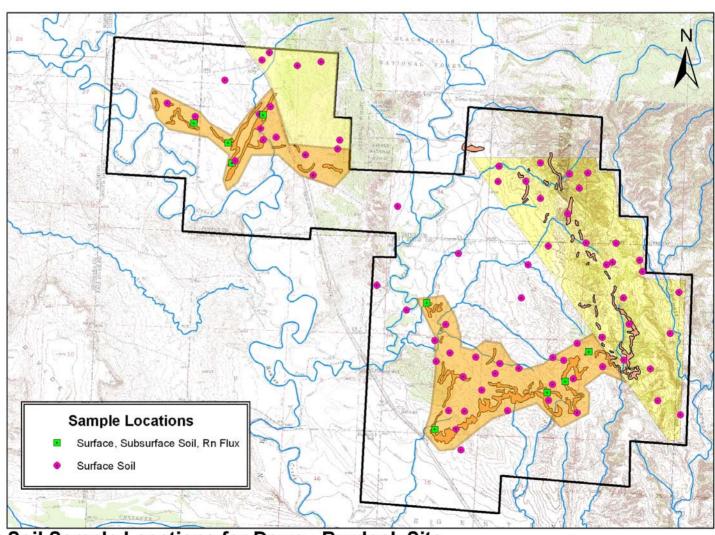


Soil Gamma Survey





Soil Sample Locations

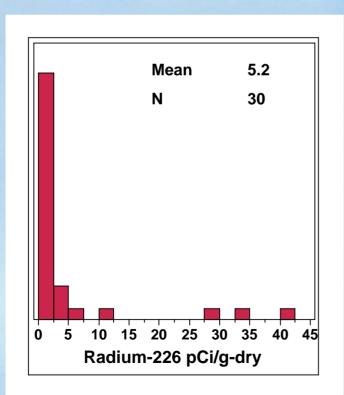




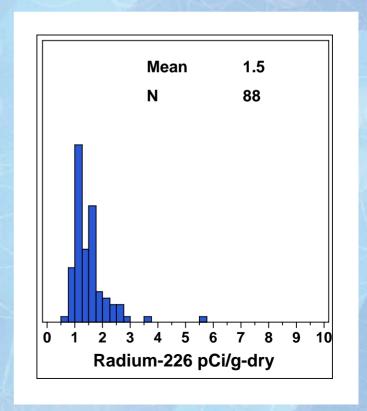
Soil Sample Locations for Dewey-Burdock Site

Surface Soil Ra-226 Concentrations

Surface mine area



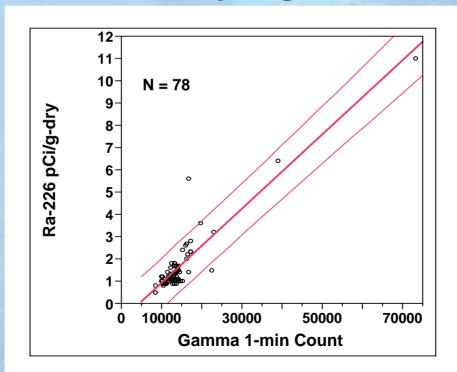
Main plant area, North East area, Roll Front area





POWERTECH (USA) INC.

- Soil: Radium-226 Correlated to Gamma Measurements
 - $\rightarrow R^2 = 0.840$
 - → Most measurements < 4 pCi/g Ra-226





Soil: Natural Uranium, Thorium-230, Pb-210 Summary Statistics

Dedienvelide		Concentration (pCi/g)				
Radionuclide	Min	Max	Average			
U-Nat	0.6	1.9	1.0			
Th-230	0.3	1.0	0.6			
Pb-210	0.6	3.0	1.4			



Radiological Baseline Update

Radon-222 Flux and Concentration Data

Location	Flux (pCi/m²s)	LLD (pCi/m²s)
RFA-B01	1.16	0.18
RFA-B02	0.82	0.15
RFA-B13	1.16	0.17
RFA-B15	1.17	0.15
RFA-B17	0.93	0.16
RFA-B21	0.62	0.14
RFA-B30	1.21	0.17
RFA-B36	0.66	0.16
RFA-B37	1.06	0.14

	Avg. Radon
Location	Conc. (pCi/L)
AMS-1*	0.9
AMS-2	1.7
AMS-3	1.2
AMS-4	1.2
AMS-5	1.6
AMS-6	1.8
AMS-7	1.3
AMS-bkg*	1.8
Rn 01	1.7
Rn 02	5.5
Rn 03	1.1
Rn 04	1.7
Rn 05	1.3
Rn 06	2.3
Rn 07	2.4
Rn 08	1.4



^{*} Duplicate measurements taken, average reported

Vegetation Data

Radio-	Concentration in Vegetation (pCi/kg)						
nuclide	Minimum	Maximum	Average				
U-nat	9	40	22				
Ra-226	22	74	37				
Th-230	3	19	10				
Pb-210	330	2100	1254				
Po-210	18	150	78				



Remaining Work

- → Two more quarters of air particulate data
- → Two more quarters of Rn-222 concentration data
- → Two more quarters of Exposure Rate monitoring
- → One more Rn-222 flux measurement event (summer 2008)
- → One more vegetation sampling event (summer 2008)
- → Collection and analysis of locally grazed beef sample (summer 2008)
- → Correlation of gamma detection equipment to Pressurized Ion Chamber (PIC) (summer 2008)



MILDOS-Area Preliminary Evaluation

- Source Terms (routine operations only)
 - → Dewey Area (268 Ci/y Rn-222)
 - One Production Wellfield (132 Ci/y Rn-222)
 - 3945 gpm (annual average)
 - IX Resin Transfer (2 columns per day)
 - One Restoration Wellfield (136 Ci/y Rn-222)
 - 986 gpm (annual average)
 - One New wellfield (0.01 Ci/y)
 - → Burdock Area (268 Ci/y Rn-222)
 - One Production Wellfield (132 Ci/y Rn-222)
 - 3945 gpm (annual average)
 - IX Column, no transfers
 - One Restoration Wellfield (136 Ci/y Rn-222)
 - 986 gpm (annual average)
 - One New wellfield (0.01 Ci/y)
 - One process plant
 - No Rn-222 release (pressurized system)
 - Vacuum rotary dryer (no uranium releases)



MILDOS-Area Preliminary Evaluation

- Receptors
 - → Existing air monitoring locations
 - → Permit boundary in 16 compass directions from center of Dewey and Burdock ore zone
- Meteorological Information
 - → Used site specific meteorological data
 - Collected from August 2007 to February 2008
 - → Evaluated Stability classes from wind speed and solar radiation (SRDT method)
 - Exception is for nighttime
 - Evaluation was based on wind speed only
 - → Incomplete data set, missing summer conditions
- Population Data
 - → Site specific population data out to 80 km in 16 directions



MILDOS-Area Preliminary Evaluation Results

Air Monitoring Receptors

- → TEDE ranged from 0.4 to 1.9 mrem/y
- → Average TEDE = 1.0 ± 0.5 mrem/year
- → Highest TEDEs observed AMS-2 (1.3 mrem/y) and AMS-5 (1.9 mrem/y)

Permit Boundary

- → TEDE ranged from 0.22 to 7.3 mrem/y
- → Average TEDE = 1.7 ± 1.6 mrem/y
- → Highest TEDEs observed on southwestern to southeastern boundary of Dewey and Burdock sites



MILDOS-Area Preliminary Evaluation Results

Population Doses

- → Population within 80 km of site = 26943
- → People within 80 km of site 0.15 person rem/year
 - Average of 5.6 μrem/y from site activities
 - Average US background dose = 360 mrem/y (NCRP 93)
 - 1000 times less than average US background
- → People beyond 80 km of site -1E-8 rem/year



Radiation Protection Program

- Corporate Organization and Administrative Procedures
 - → Consistent with USNRC Regulatory Guide (RG) 8.31,8.2, and 4.15
 - → 90% complete
- Management Control
 - → Consistent with USNRC 8.31 and 10 CFR 20
 - → 100% complete (assumes a performance based license)
- Management and Audit Program
 - → Consistent with RG 3.11, and 8.31
 - → 95% complete (assumes a performance based license)
- Personnel Qualifications
 - Consistent with RG 8.31
 - → 95% complete



Radiation Protection Program

- Radiation Safety Training
 - → Consistent with RGs 8.29, 8.31, and 8.13
 - → 100% complete
- Site Security
 - → Complies with 10 CFR 20, Subpart I
 - → 50% complete
- Radiation Safety Controls and Monitoring
 - → Consistent with RGs 8.10, 8.37, 8.31, and 3.56
 - → 50% complete
- Occupational Monitoring Program
 - → Consistent with RGs 8.15 8.30 8.31,8.34, 8.7,
 - → 80% complete
- Scheduled Complete by May, 31 2008



Soils

- Field Mapping Completed
 - → Fall 2007
- Initial Sampling for Analysis Completed
 - → Fall 2007
- Draft Soil Map Completed to Reflect Latest Permit Boundary
- Final Sampling
 - → Spring 2008
- Final Map and Report
 - → Late Spring/Early Summer 2008



Vegetation

- Mapping Completed
 - → Summer 2007
- Quantitative Field Sampling Completed
 - → Summer 2007
- Final Map Completed based on Latest Permit Boundary
- Draft Report Completed



Wetlands

- Delineation Fieldwork Completed
 - → Summer 2007
- Draft Wetland Delineation Map completed
- Draft Report Completion
 - → May 2008
- Site Tour with USACE Summer 2008
 - → If necessary



Wetlands

- Wetlands were Found along Beaver Creek
 - → Classified as Riverine Lower Perennial Emergent (R2EM) Wetland
 - Total of 13.1 acres
 - Most Common Vegetation Identified along the Drainage
 - Spartina pectinata (prairie cordgrass)
 - Juncus balticus (Baltic rush)
 - Schoenoplectus pungens (common threesquare)
 - These plants have an indicator status of FACW (facultative wet), FACW, and OBL (obligate)





Abandoned Mine Pits

❖ Some Abandoned Mine Pits are also Wetlands



Palustrine Unconsolidated Bottom
PUB



Open Water OW



Species

- → Upland Game Birds
- → Raptors
- → Breeding Birds
- → Other Avian Species
 - Waterfowl, shorebirds, etc.
- → Small Mammals
- Other Mammals
 - Big game, lagomorphs, predators, furbearers, bats
- Reptiles and Amphibians
- → Vertebrate Species of Concern
- → Fish
 - Sampling and radiological testing
- → Aquatic Macro-invertebrate Sampling/stream Habitat Characterization







- Surveys Completed through April 2008
 - Small Mammal Trapping
 - Fall 2007
 - Lagomorph Surveys
 - Fall 2007
 - Raptor prey abundance
 - → Bald Eagle Winter Roost Surveys
 - Winter 2007/2008
 - Former T&E
 - High Flow Aquatics Sampling
 - Fisheries, macro-invertebrates, stream characterizations, radiological testing





Photo by Rob Guild



- Surveys to be Conducted and/or Completed Second Quarter 2008 (April June)
 - → General Surveys and Documentation of Terrestrial Wildlife and Habitat Use
 - Each site visit
 - → Complete Grouse Lek Searches
 - April early May
 - → Continue Nesting Raptor Surveys and Monitoring
 - April June
 - → Conduct Breeding Bird Belt Transect Surveys
 - Late May-early June





- Surveys to be Completed Third Quarter 2008 (July August)
 - → Raptor Nest Surveys and Monitoring
 - All species-completed
 - General surveys and documentation of terrestrial wildlife and habitat use (each site visit)
 - → Base Flow Fisheries Sampling and Radiological Testing
 - → Base Flow Macro-invertebrate Sampling
 - → Base Flow Stream Habitat Characterization
 - General Reptile and Amphibian Surveys
 - Bat surveys
 - General presence/absence



UIC Permits

USEPA

- → Close contact with EPA Project Manager
- > Preliminary aquifer exemption boundary defined
- → Draft permit application 50% complete

DENR

- → Board of Minerals and Environment
- → Board of Water Management

Schedule

→ Submit to EPA/DENR July 1, 2008



SD DENR Permits

- Critical or Unique Lands Determination
- Water Rights
- Water Board UIC Class III
- Large-Scale Mine
- Other (PSD, NPDES)



Other Permits

- National Pollutant Discharge Elimination System (NPDES)
 - → Required for surface discharges (i.e. evaporation ponds)
- Operating Air Quality Permits
 - → New Source Review (NSR) or
 - → Prevention of Significant Deterioration (PSD)
 - → Permit dependent upon results of baseline survey



USINRC License

- Technical Report (NUREG-1569) and Environmental Report (NUREG-1748) sections in progress
- Third progress meeting with USNRC on April 28th
- Submit license application October 1, 2008



Schedule

- USEPA/DENR UIC Permit Submittal
 - → July 1, 2008
- Unique and Special Lands Permit Application
 - → May 1, 2008
- USNRC Source Materials License Application
 - → October 1, 2008
- Large Mine Permit Application
 - January May 2009
- Water Rights/Other DENR Permit Applications
 - January May 2009

