PRELIMINARY BASELINE SAMPLING PLAN FOR THE ROSS ISR URANIUM RECOVERY PROJECT, CROOK COUNTY, WYOMING

Prepared for:

Strata Energy, Inc.

November 2009
Revised August 2010

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PRELIMINARY BASELINE SAMPLING PLAN FOR THE ROSS ISR URANIUM RECOVERY PROJECT, CROOK COUNTY, WYOMING

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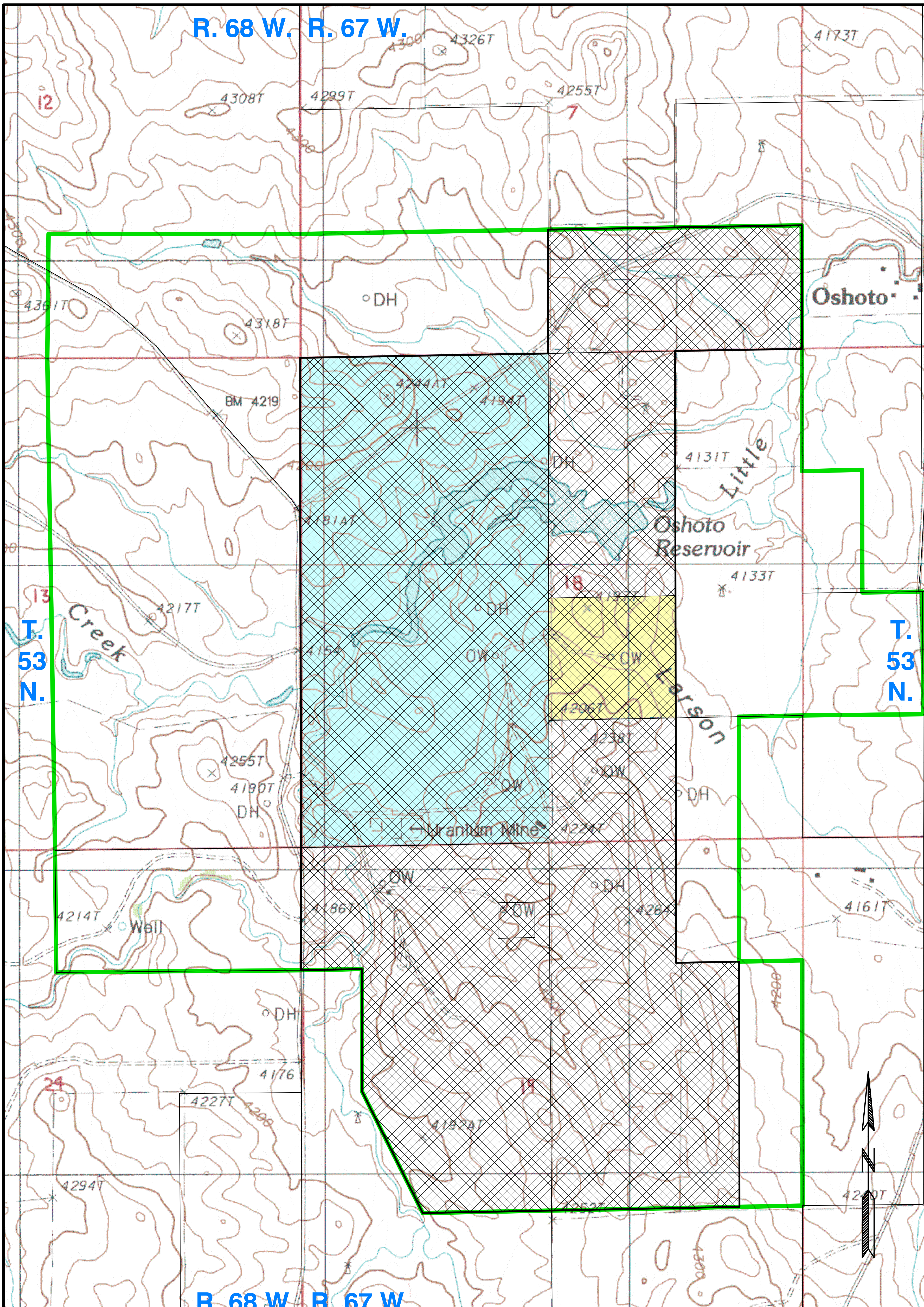
1.0 INTRODUCTION

On behalf of Peninsula Minerals Ltd, dba Strata Energy Inc. (Strata), WWC Engineering of Sheridan, WY is providing the following pre-operational baseline monitoring plan for the Ross ISR Uranium Project (Ross Project) proposed in Crook County, WY (Exhibit 1). The intent of this document is to inform the regulating community about the fundamentals of the project, establish methods and protocol for baseline data acquisition efforts given site specific attributes of the Ross Project area, generate feedback regarding specific approaches to baseline data acquisition, and facilitate communication as the project moves forward. The preliminary project schedule provides one year of data acquisition, with the permit application submittal in December 2010. In addition, quarterly meetings with both United States Nuclear Regulatory Commission (NRC) and Wyoming Department of Environmental Quality (WDEQ) personnel have been planned in order to provide updates on data collection efforts and results. This document includes a brief chronology of the project and a discussion of specific baseline components.

Key characteristics of the project are detailed below:

- Project Owner is Peninsula Minerals Ltd., of Subiaco, Western Austrailia, doing business as Strata Energy, Inc. of Gillette, WY (a wholly owned U.S. subsidiary).
- The Ross ISR Uranium Project is located in Crook County, Wyoming, 24 miles north of Moorcroft, WY and adjacent to the ranching community of Oshoto, WY (Exhibit 1).
- Surface ownership within the proposed license area is comprised of 1,278 acres of deeded, 320 acres of State of Wyoming and 40 acres of Department of Interior lands managed by the Bureau of Land Management.
- Ore-body locations within the license area are depicted on Figure 1 with an estimated 4+ million pounds (lbs) of uranium delineated to date.



LEGEND

PROPOSED ROSS PERMIT BOUNDARY

GENERALIZED ORE-BODY LOCATIONS

SURFACE OWNERS

BLM

STATE OF WYOMING

PRIVATE

STRATA ENERGY

ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

PRELIMINARY BASELINE SAMPLING PLAN
FIGURE 1

GENERALIZED ORE-BODY LOCATIONS

REVISIONS

Date	Description
7/27/10	UPDATE PERMIT BOUNDARY
7/20/10	UPDATE PERMIT BOUNDARY

Drawn By: MBM
Checked By: BJS
Date: 11/1/09

FILE: ROSS_POP_ORE_BODIES

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K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_POP_ORE_BODIES.dwg, POP_FIGURE_1, 8/20/2010 4:46:49 PM

- Strata proposes to utilize *in situ* recovery of the uranium contained in permeable sandstones of the Late Cretaceous Lance and Fox Hills Formations.
- To attain the proposed production of 0.75 to 1.5 million lbs annually, a throughput of 5,000 gallons per minute (gpm) of water will likely be required.
- Allowable pre-license construction activities are scheduled to begin in November 2009 with the installation of regional baseline monitoring wells. License dependent activities are anticipated to begin in 2012 with full production by 2013.
- Management of liquid waste from uranium recovery will utilize evaporation ponds and two deep disposal wells. A feasibility study regarding deep disposal of liquid waste will be initiated in November 2009. Solid waste management agreements have not been finalized at this time.
- Preliminary plans for groundwater reclamation entail a sweep phase, reverse-osmosis treatment phase, and stability phase. Strata will demonstrate that these activities can be conducted concurrently with production. Land reclamation will follow WDEQ/LQD requirements.
- Bonding of the surface infrastructure, surface disturbance, and groundwater reclamation will be conducted through the WDEQ/LQD.
- It is Strata's intent to minimize impacts to human health and the environment, receive a satisfactory return on their investment, and reclaim the proposed license area to adequately support future land uses.

2.0 HISTORY AND BRIEF SITE CHARACTERIZATION

Uranium exploration efforts in the 1950s and 1960s in the Powder River Basin of Wyoming led to a number of discoveries, starting in the Pumpkin Buttes Uranium District of Johnson and Campbell counties. Nuclear Dynamics and Bethlehem Steel Corporation formed the Nubeth Joint Venture (Nubeth), to develop new uranium mining districts in the western U.S. with specific attention focused on Northeastern Wyoming's Powder River Basin. Beginning in late 1970, airborne radiometric surveys in an area north of Moorcroft, Wyoming indicated large, low-order gamma ray anomalies in an area encompassing over 350 square miles. Host formations were believed to be the Late Cretaceous Lance and Fox Hills Formations. The following discussion highlights key points since delineation of the gamma anomalies.

- Beginning in late 1970 and continuing in 1971, anomalous gamma ray areas were mapped and sampled with low-grade mineralization and alteration fronts discovered.
- A review of conventional oil and gas drilling in the area confirmed anomalous gamma intercepts at depths above the regional confining layer (Pierre Shale).
- An aggressive land and mineral acquisition phase followed along with an exploration drilling program covering more than 110,000 acres and 3 million feet of drilling.

- Nubeth received a WDEQ/LQD License to Explore (No. 19) in August 1976 with modifications to accommodate the research and development activities in 1978.
- Nubeth filed for an NRC source materials license in November 1977 with approval in April 1978 (SUA-1331).
- A five spot pattern, consisting of four injection wells with one recovery well, was operated from August 1978 through April 1979.
- Final approval for the Research and Development (R&D) site decommissioning was granted by the regulatory agencies in 1983 through 1986 (letters in Appendix A).
- Peninsula Minerals Ltd initiated mineral acquisition in the Lance District in 2007 and 2008.
- Exploration drilling programs conducted in 2008 and 2009 confirmed significant uranium resources in the Ross area.
- Strata Energy incorporated in the summer of 2009 to facilitate drilling and regulatory foundation for NRC source materials license and WDEQ/LQD Permit to Mine application.

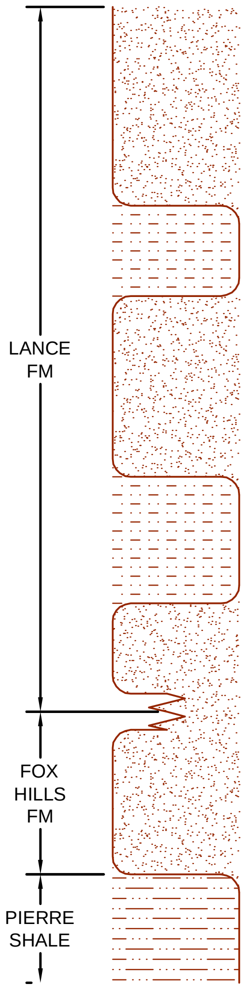
The proposed Ross Project is located in an area primarily utilized for livestock grazing and dry land hay production. The project is adjacent to the community of Oshoto, with four residences within 1 mile of the proposed license area (Exhibit 1). Access to the site is on a county road (D Road), which proceeds north of Interstate 90 approximately 23 miles to the project area. Bentonite mining, conventional oil development, and recreation are other activities in the vicinity of the project.

Studies completed by Nubeth for both state and federal licensing were completed in 1977 and 1978. Periodic updates containing new data were provided to the regulatory agencies throughout the life of the Nubeth project. Baseline studies were completed for the following disciplines: climatology/meteorology, historic/scenic/cultural, radiation, seismology, vegetation, soils, wildlife, land use, geology, and hydrology. Of particular interest for this document is the nature and extent of baseline hydrological activities.

Baseline water quality and quantity inventories were developed based on 20+ surface water and groundwater sites within three miles of the R&D site, in addition to the monitoring wells installed within the test site area. Investigators identified three primary water-bearing systems present at the test site; a surficial aquifer, an 'A zone' aquifer, and a 'B zone' aquifer. Figure 2 depicts a generalized hydro-stratigraphic column based on the original test site data. In general, the R&D site data indicated the following characteristics of the subsurface hydrologic system:

- The B zone aquifer or ore-bearing intervals (lower Lance Formation and upper Fox Hills Sandstone) indicated an industrial type water quality with exceedances of drinking water standards for uranium, radium and gross alpha. A trend plot of key water quality constituents for the B zone system is portrayed on Figure 3. The surficial aquifer and underlying A zone aquifer indicated water quality of livestock use, with total dissolved solids (TDS) exceeding drinking water quality criteria.
- Vertical hydraulic gradients were downward at the test site, with water table conditions present in the surficial aquifer and confined conditions present in both the A and B zone aquifers. Static heads in the B zone sand were measured at 20-40' below levels in the A zone sand.
- Groundwater flow direction was determined to be west-northwest into the Powder River Basin at a gradient of 32 ft/mile or 0.006 ft/ft. Given that the Fox Hills outcrop is just east of the test site and that the Lance is the bedrock unit exposed at the surface, these data appear logical and will in part drive the regional baseline groundwater monitoring program.
- The underlying aquiclude was comprised of the Pierre Shale, a thick sequence (1,000 to 2,000 ft) of marine clays. Due to the known confining capabilities of the Pierre Shale, a deep or underlying monitor well was not installed at the test site.

GEOLOGIC UNIT



LITHOLOGY THICKNESS (FEET) (METERS)	HYDROLOGIC PROPERTIES	GEOCHEMICAL PROPERTIES/USES
SANDSTONE (FLUVIAL) 150'-250' (45-76m)	SURFICIAL AQUIFER (LIKELY UNCONFINED)	TDS = 288-599 mg/L LOCAL LIVESTOCK WATER SUPPLY
MUDSTONE-CLAYSTONE >130' (>40m)	CONFINING AQUITARD	N/A
SANDSTONE (FLUVIAL) 150'-250' (45-76m)	"A" ZONE AQUIFER MODERATE CONFINEMENT WITH LEVELS LOWER THAN SURFICIAL AQUIFER	TDS = 900-1000 mg/L LOCAL LIVESTOCK AND DOMESTIC SUPPLY
MUDSTONE-CLAYSTONE >30' (>10m)	UPPER CONFINING AQUITARD	N/A
SANDSTONE (FLUVIAL ABOVE MARINE) 150'-250' (45-76m)	"B" ZONE AQUIFER (ORE ZONE) WELL CONFINED THOUGH LEVELS LOWER THAN "A" ZONE	TDS = 939-1860 mg/L WITH BOTH SELENIUM AND RADIUM 226 EXCEEDING LIVESTOCK STANDARDS LOCAL SUPPLY FOR CONVENTIONAL OIL RECOVERY WATER FLOOD SYSTEM
CLAYSTONE (MARINE) >800'-1000' (>244-305m)	LOWER CONFINING AQUICLUDE	N/A

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ROSS ISR PROJECT
CROOK COUNTY, WY
P.O. BOX 2318
GILLETTE, WY 82716

PRELIMINARY BASELINE SAMPLING PLAN
FIGURE 2

GENERALIZED HYDRO-STATIGRAPHIC COLUMN

REVISIONS	
Date	Description

Drawn By: MBM
Checked By: BJS
Date: 11/1/09
FILE: ROSS_POP_HYD_STRAT_COL

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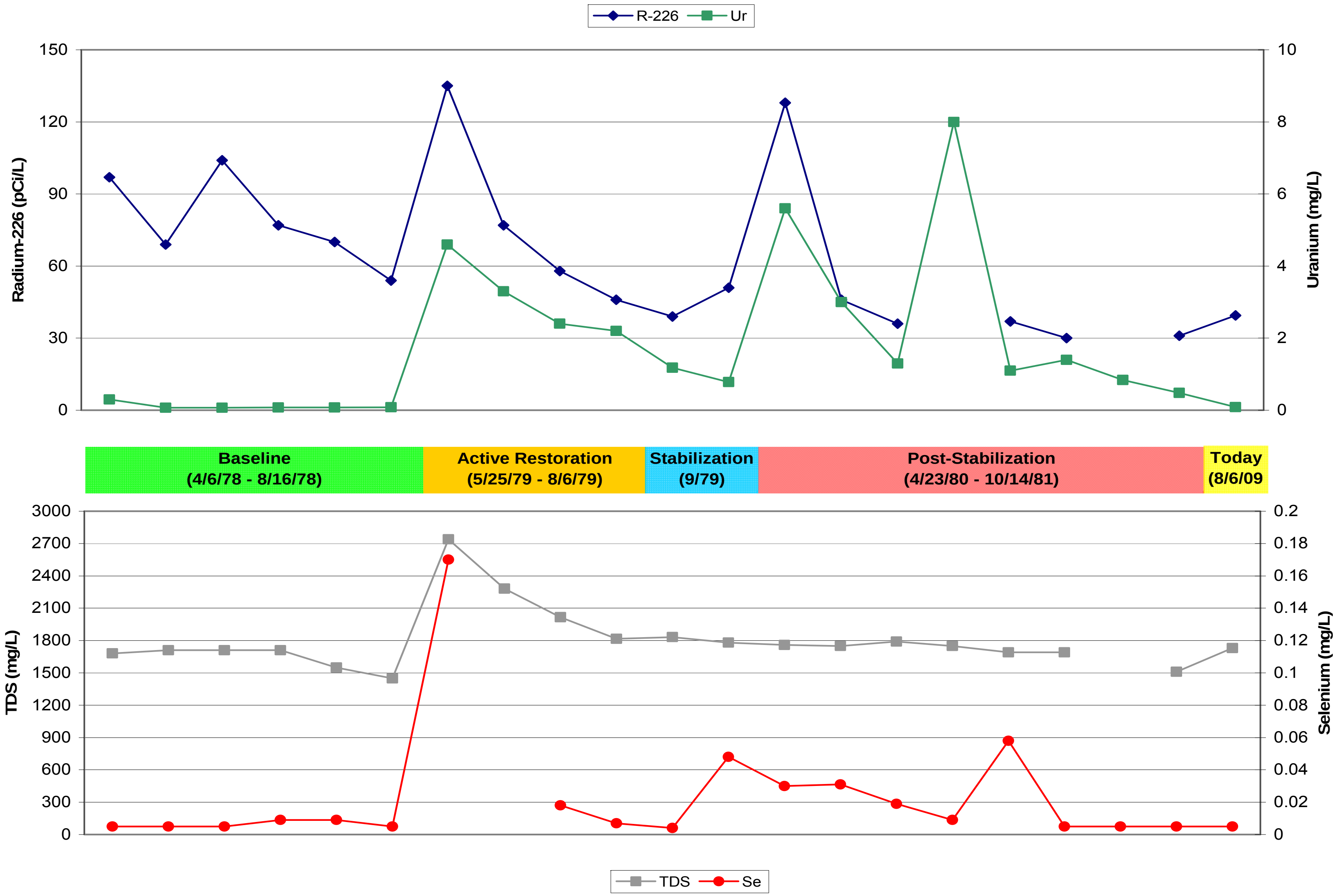
Figure 3. Well 19XX (B zone aquifer, ore bearing)



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- Confining shales were determined to be present overlying the B zone sand throughout the test site area and beyond, as portrayed in cross-sections A-A' (Exhibit 2) and B-B' (Exhibit 3), which were constructed for the test site license application.

The monitoring program detailed in the following sections will more fully explore and expand on the data developed from the initial test site area.

3.0 REGULATORY BASIS AND REFERENCES

United States Nuclear Regulatory Commission (NRC)

- Code of Regulations – Title 10 - Energy
  PART 20--Standards for the Protection Against Radiation. The regulations in this part establish standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the U.S. Nuclear Regulatory Commission (NRC).
  PART 40--Domestic Licensing of Source Material. The regulations in this part establish procedures and criteria for the issuance of licenses to receive title to, receive, possess, use, transfer, or deliver source and byproduct materials, as defined in this part, and establish and provide for the terms and conditions upon which the NRC will issue such licenses.
  PART 51--Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions. This part contains environmental protection regulations applicable to NRC's domestic licensing and related regulatory functions.
  PART 70--Domestic Licensing of Special Nuclear Material. The regulations of this part establish procedures and criteria for the issuance of licenses to receive title to, own, acquire, deliver, receive, possess, use, and transfer special nuclear material; and establish and provide for the terms and conditions upon which the NRC will issue such licenses.
- Atomic Energy Act of 1954 and the Uranium Mill Tailings Radiation Control Act of 1978 (authorize the (NRC) to issue licenses for the possession and use of source material and byproduct material). The statutes require NRC to license facilities that meet NRC regulatory requirements that were developed to protect public health and safety from radiological hazards. *In-situ* leach (ISL) uranium recovery facilities must meet NRC regulatory requirements in order to obtain a license to operate.
- REGULATORY GUIDE 3.46 (Standard Format and Content of License Applications, Including Environmental Reports, for In Situ Uranium Solution Mining) – Research and Development only.

- REGULATORY GUIDE 3.63, (Onsite Meteorological Measurement Program for Uranium Recovery Facilities – Data Acquisition and Reporting). This guide provides guidance acceptable to the NRC staff regarding the meteorological parameters that should be measured, the siting of meteorological instruments, system accuracies, instrument maintenance and servicing schedules, and the recovery, reduction, and compilation of data.
- REGULATORY GUIDE 3.8 (Preparation of Environmental Reports for Uranium Mills) - This guide has been prepared to provide specific and detailed guidance for the preparation of environmental reports for uranium mills.
- REGULATORY GUIDE 4.14 (Radiological Effluent and Environmental Monitoring at Uranium Mills) - This guide describes programs acceptable to the NRC staff for measuring and reporting releases of radioactive materials to the environment from typical uranium mills.
- NUREG 1569 (Standard Review Plan for In Situ Leach Uranium Extraction License Applications) – Contains the format to be used in NRC *in situ* leach uranium extraction license application.
- NUREG 1748 (Environmental Review Guidance for Licensing Actions Associated with NMSS Programs). Contains basic methodology to be used in NRC *in situ* leach uranium extraction license application baseline data collection.
- NUREG-1910 (Generic Environmental Impact Statement (GEIS) for *In Situ* Leach Uranium Milling Facilities). The GEIS provides a starting point for NRC's NEPA analyses for site-specific license applications for new ISL facilities, as well as for applications to amend or renew existing ISL licenses.

Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD)

- Wyoming Statute § 35-11-406(a)(xv) Application for permit
- Land Quality Division Rules and Regulations:

  Noncoal Chapter 2, Section 2.(a)(i). Application Content Requirements - In addition to that information required by W.S. § 35-11-406(a), each application for a surface coal mining permit shall contain: A description of the lands to be affected within the permit area, how these lands will be affected, for what purpose these areas will be used during the course of the mining operation, and a time schedule for affecting these lands.

  Noncoal Chapter 2, Section 2.(a)(i)(J). General Application Content Requirements - A description of any significant artifacts, fossil or other article of cultural, historical, archaeological or paleontological value.

  Noncoal Chapter 3, Section 2.(l)(ii)(E)). General Environmental Protection Performance Standards - Unanticipated conditions - A discovery of significant archaeological or paleontological importance.

  Guideline 1 - Topsoil and Overburden

  Guideline 2 - Vegetation

Guideline 3 - Radiological Survey
Guideline 4 - In-Situ Mining
Guideline 5 - Wildlife
Guideline 6 - Organization and Topic Guideline for an Application for a "Permit to Mine" or an "Amendment"
Guideline 8 - Hydrology
Guideline 10 - Fencing
Guideline 11 - Reporting Cultural and Paleontological Resources Within Mine Permit Areas
Guideline 12 - Standardized Reclamation Performance Bond Format and Cost Calculation Methods
Guideline 15 - Alternative Sediment Control Measures

Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD)

- Air Quality Division Rules and Regulations:
  Chapter 6, Permitting Requirements
  Chapter 7, Monitoring Regulations

Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD)

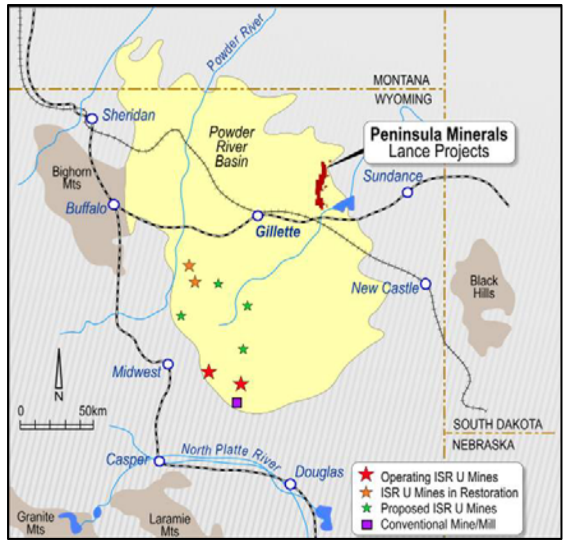
- Water Quality Division Rules and Regulations:
  Chapter 1, Wyoming Surface Water Quality Standards. Section 10. Testing Procedures, Section 22. Radioactive Material
  Chapter 2, Permit Regulations for Discharges to Wyoming Surface Waters Section 7(f)(i). Wetlands, Section 9(a)(i). Issuance or Denial of Permit
  Chapter 8, Quality Control for Wyoming Groundwaters
  Chapter 9, Groundwater Pollution Control Permit. Section 3(C)(i)(G). Applicability – General
  Chapter 13, Class I Hazardous Waste and Non-Hazardous Waste Wells Underground Injection Control Program Section 13(l)(f)(ii). Environmental Monitoring Program to Groundwater of the State
  Chapter 16, Class V Injection Wells and Facilities Underground Injection Program. Section 12(a)(ii) & (b)(i). Abandonment of Class V Facilities

4.0 GEOLOGY

4.1 Introduction

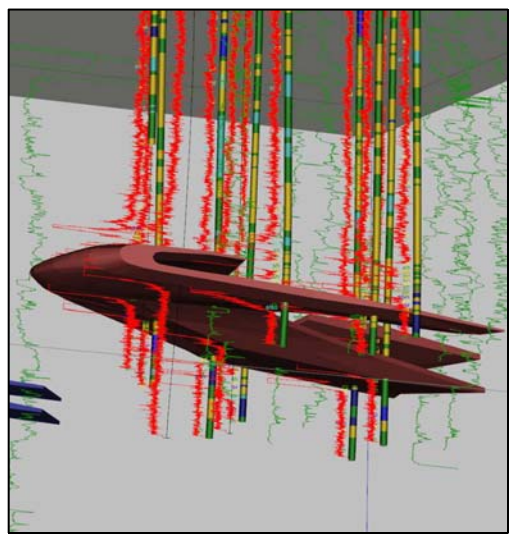
Extensive literature regarding the Late Cretaceous Lance, Fox Hills Sandstone, and Pierre Shale formations is available. Section 2.2 Geology of the Nubeth License Application described the following:

The proposed project lies on the northeastern margin of the Powder River Structural Basin. Formations dip gently at 3° to 5° to the west. Three primary bedrock units comprise the area at the Ross Project; the Lance Formation, Fox Hills Sandstone and Pierre Shale, all of which are of Late Cretaceous in age. The Lance Formation is comprised of fine to medium-grained, fluvially deposited sandstones interbedded with sandy shales and claystones. Thickness of the Lance ranges from less than 500 feet (east side of basin) to in excess of 2,400 feet on the west side of the basin. The lower Lance is generally gradational with the top of the Fox Hills Sandstone. With thickness ranging from 0 to 200 feet, these fine to medium-grained sandstones are marine in origin, with sporadic thin beds of sandy shale common. The underlying Pierre Shale contains only local occurrences of sandy shale and sandstones. Thickness of the Pierre Shale at the Ross project area is in excess of 2,000 feet.



4.2 Methods

Development of geologic data for the site will utilize both historic and contemporary results of exploration/delineation drilling programs. Data from more than 2,000 historic holes, providing both lithologic and downhole geophysical information, will be utilized in conjunction with the results of on-going drilling programs. The immediate focus of geologic interpretation efforts is in support of subsurface hydrological characterization at proposed regional baseline well cluster locations. Briefly, cross-sections developed from the logs of exploration holes immediately adjacent to the proposed monitor well clusters will be utilized in combination with more aerially extensive sections (north-south and east-west across the site) in order to confirm continuity of aquifers and confining intervals throughout the project area. A more generally comprehensive long-term approach to geologic characterization of the site will utilize a model developed from Gemcom Software International Inc's, Gemcom Surpac application. The foundation for Gemcom's Surpac is a geologic database comprised of electric logs (natural gamma, prompt fission neutron, spontaneous potential and resistivity), lithologic, and mineralization/roll-front interpretive data. Beyond the roll-front and mining implications, the Gemcom model will enable development of crucial planar surfaces (i.e., top of Pierre Shale), isopachs (i.e. thickness of mineral bearing sandstones, confining shale intervals, etc), and extensive cross-sections in an infinite number of directions and offset distances. An up-to-date model is anticipated to be available by December 2009.



5.0 HYDROLOGY

5.1 Surface Water Hydrology

The Ross Project is located in the upper reaches of the Little Missouri River Basin (Hydrologic Unit Code 101102). The Little Missouri River originates in northeastern Wyoming, flows into southeastern Montana, into northwestern South Dakota, and into North Dakota where it empties into the Missouri River. Total stream length is 405 miles and the drainage area is approximately 9,470 square miles. Two

United States Geological Survey stations are downstream of the Ross area (Alzada, MT - #06334000 and Camp Crook, SD - #06334500). Mean monthly discharge at the Camp Crook station, based on a period of record of 56 years, ranges from a low of 6.4 cubic feet per second (cfs) in December to a high of 334 cfs in May. The following subsections describe the methods and approaches to the surface water quality and quantity baseline data acquisition.

Surface water hydrology adjacent to and within the proposed Ross permit/license area is dominated by the northeastward flowing Little Missouri River and associated tributaries. The most significant tributary to the Little Missouri River near the Ross Project is Deadman Creek. Noteworthy abstractions to the watershed hydrology include man-made reservoirs and Wyoming Pollutant Discharge Elimination System (WYPDES) discharge sites from conventional oil and gas facilities. Exhibit 4 depicts reservoirs and WYPDES sites in the Ross area along with proposed monitoring sites and a conceptual station layout.

5.1.1 Surface Hydrology Methods

The baseline surface water hydrology section will include a brief discussion of the general hydrologic setting of the site. Where applicable, data from the Nubeth R&D site will be incorporated into the baseline surface water discussions. To meet the specific requirements established by the federal and state regulations and guidelines, the following information will be provided in the baseline surface water hydrology documents:

- Meteorology (climatology) data will be cross-referenced to the meteorology section.

- Evapotranspiration data will be cross-referenced to the meteorology section.
- Measurements of surface water quantity will be taken between April and October 2010. Exhibit 4 indicates the proposed surface water monitor sites. Surface flow gaging stations capable of continuous monitoring are proposed on Deadman Creek and Little Missouri River. Exhibit 4 also presents the conceptual layout for the gaging stations. Table 1 provides a summary of the sites.

- The following procedure will be followed for the establishment of surface water monitoring stations:
  - Step 1: A field investigation will be conducted to determine the best location for the stations. Criteria for location will include: 1.) Straight reach of the channel. 2.) Channel should be close to an elevated bank that has a fairly steep grade. This will ensure the instruments can be placed at a location where they will not be flooded. 3.) The distance from the center of the channel to the instruments has to be less than 50 feet, due to sensor cable length constraints. 4.) Submerged channel reaches (pools) will be avoided.
  - Step 2: The installation of instruments and equipment (instrument shelter, sampler, flow monitor, staff gage, crest gage, solar panel, battery, sensors, sample tubing, and precipitation gage if applicable).
  - Step 3: A survey of the cross-section and profile (channel geometry and slope) will be conducted of the site where the equipment was installed. An evaluation of the channel roughness will be conducted for the establishment of the Manning's coefficient for rating curve development.
  - Step 4: Develop a rating curve.
  - Step 5: Program instruments (flow meter and sampler).
- The baseline write up will include the flow data gathered at the sites and will also include flow records from the nearest USGS gaging sites on the Little Missouri River.
- Watershed and stream channel characteristics will be discussed. The discussion will include a map showing the channels, a listing of stream types (e.g., perennial, intermittent, and ephemeral), watershed boundaries, the locations of stream gages, areas that contain alluvium and alluvial terraces, playas, reservoirs, and other hydrologic features.

Table 1. Summary of Surface Water Monitoring Sites

Site I.D.	Facility Name	Location	Monitoring Devices	Type and Frequency of Measurements
SW-1	Little Missouri River - Downstream	SESE, Sec. 7, T53, R67	R, PS	R, G
SW-2	Little Missouri River - Upstream	SENW, Sec. 24,T53, R68	R, PS	R, G
SW-3	Deadman Creek	NESW, Sec. 13,T53, R68	R, PS	R, G
MET-UPWIND	Met Station	SESW, Sec. 12,T53, R68	P	P
R-1	TW RES 01	SESE, Sec. 7,T53, R67	None	G
R-2	Oshoto Reservoir	SWNE, Sec. 18,T53, R67	None	G
R-3	CS RES 03	SESE, Sec. 18,T53, R67	None	G
R-4	CS RES 04	SESE, Sec. 18,T53, R67	None	G
R-5	CS RES 02	SWNE, Sec. 19, T53, R67	None	G
R-8	P15508S	NESE, Sec. 13, T53, R68	None	G
R-9	P15507S	NWSE, Sec. 13, T53, R68	None	G
R-10	Unknown	NWSE, Sec. 13, T53, R68	None	G
R-12	TW RES 02	SESE, Sec. 12, T53, R68	None	G

Monitoring Devices
R = Continuous stage recorder
C = Crest-stage gage
S = Staff gage
PS = Pump sampler
P = Rain gage

Type and Frequency of Measurements
R = Continuous stage recorder and pump sampler water quality sample on event basis
C = Crest stage gage measurement (monthly)
S = Staff gage measurement (monthly)
P = Continuous rainfall data
G = Grab sample (quarterly)

Note: Continuous stage recorders, pump samplers, and rain gages inactive from first hard freeze or October 1, whichever is first, through approximately April 30, weather permitting.

- Watershed geomorphology will be discussed. This will include tabulation of pertinent channel information, each listing data for the area of the watershed, the basin relief ratio, the valley and channel slope, the channel sinuosity, and the drainage density.
- Longitudinal profiles and cross sections for the major drainages will be developed, including surveyed profiles and cross sections of the Little Missouri River and Deadman Creek. Manning's roughness coefficients for the channels will be included in this evaluation.
- The proposed surface water quality monitoring stations are presented on Exhibit 4 and summarized in Table 1. The monitoring devices and the monitoring frequency at each site are also indicated in Table 1. The constituents to be monitored are listed in Table 2.
- Surface water quality analysis results will be reported in a format consistent with WDEQ/LQD Uranium Mining Data Submission Spreadsheets (http://deq.state.wy.us/lqd/uranium_data.htm).
- The results of the monitoring will be summarized in the baseline hydrology portion of the mining permit application. A discussion of the surface water quality (including existing reservoirs) will be included in the mining permit application.
- A discussion of the sediment transport and loading of the channels and reservoirs will be included.
- A map showing all surface water rights within and adjacent to (within 0.5-mile radius) the permit boundary will be submitted. Also, a table will be prepared containing water rights information for the area within 0.5 mile of the permit boundary. This information will include the water source, the permit number, the location of the water right, the priority date, the facility name, the applicant name, the volume (acre-feet), and the water use.
- A discussion of the historic surface water use will be prepared.
- Laboratory analysis of collected grab and storm water samples will be conducted by Inter-Mountain Laboratories, with raw laboratory data sheets provided.
- Field parameters to be collected during both grab sample events and from storm water samples include; pH, electrical conductivity (EC), temperature, turbidity, dissolved oxygen and discharge or level where appropriate.
- Field observations (including photographic documentation) will be recorded on the field site sampling forms (example provided in Appendix B).
- Polonium-210, lead-210, and thorium-230 will be included in the analytical suite at sites that indicate elevated dissolved uranium, radium, or gross alpha based on an initial screening evaluation.
- A quality assurance and quality control program will entail duplicate samples (~10%), sample preservation blanks (~10%), relative percent difference statistical analysis on duplicates, comparison of field EC to laboratory EC, comparison of field turbidity to laboratory turbidity,

Table 2. Surface Water/Groundwater Monitoring Constituents

Constituent	Holding Time	Analytical Method
pH	At time of sample	SM 4500 H B
Electrical Conductivity	28 Days	SM 2510B
Total Dissolved Solids (180)	7 Days	SM 2540
Total Suspended Solids	7 Days	SM 2540
Alkalinity, Total (As CaCO3)	14 Days	SM 2320B
Nitrogen, Ammonia (As N)	28 Days	EPA 350.1
Oxygen, Dissolved	8 Hours	SM 4500-O G
Oil & Grease	28 Days	EPA 1664A
Gross Alpha	6 Months	SM 7110B
Gross Beta	6 Months	SM 7110B
Radium 226	6 Months	SM 7500-Ra B
Total Radium 228	6 Months	Ra-05
Turbidity	48 Hours	SM 2130
Alkalinity, Bicarbonate as HCO3	14 Days	SM 2320B
Alkalinity, Carbonate as CO3	14 Days	SM 2320B
Chloride	28 Days	EPA 300.0
Fluoride	28 Days	SM 4500FC
Nitrogen, Nitrate-Nitrite (As N)	28 Days	EPA 353.2
Sulfate	28 Days	EPA 300.0
Calcium	180 Days	EPA 200.7
Magnesium	180 Days	EPA 200.7
Potassium	180 Days	EPA 200.7
Sodium	180 Days	EPA 200.7
Aluminum	180 Days	EPA 200.7
Arsenic	180 Days	EPA 200.8
Barium	180 Days	EPA 200.8
Boron	180 Days	EPA 200.7
Cadmium	180 Days	EPA 200.8
Chromium	180 Days	EPA 200.7
Copper	180 Days	EPA 200.8
Iron	180 Days	EPA 200.7
Lead	180 Days	EPA 200.8
Mercury	28 Days	EPA 245.1
Molybdenum	180 Days	EPA 200.8
Nickel	180 Days	EPA 200.7
Selenium	180 Days	EPA 200.8
Uranium	180 Days	EPA 200.8
Vanadium	180 Days	EPA 200.8
Zinc	180 Days	EPA 200.7
Manganese	180 Days	EPA 200.7
Polonium 210	6 Months	OTW01 (modified)
Lead 210	6 Months	OTW01 (modified)
Thorium 230	6 Months	ACW10 (modified)

comparison of measured total dissolved solids (TDS) to calculated TDS, ion balance analysis and holding time/preservation evaluations. All quality control data will be provided in the permit and license applications.

5.2 Groundwater Hydrology

As discussed previously, three primary aquifers were the focus of groundwater hydrological characterization at the Nubeth R&D site. Due to the increased acreage within the proposed permit/license area a more rigorous examination is required for the development of a network of regional baseline monitoring wells. Criteria utilized to develop the proposed locations and completions included: regulatory considerations (as detailed in WDEQ/LQD Guideline 4, In Situ Mining, WDEQ/LQD Guideline 8, Hydrology, WDEQ/WQD Chapter 8, and NRC Regulatory Guide 4.14), consistent/continuous water bearing interval above mineralization, satisfactory thickness of shale confining intervals, proximity to existing drilling data, minimization of surface disturbance, and sufficient aerial coverage to develop potentiometric surfaces of aquifers for characterization.

In addition to the baseline hydrologic characteristics, a discussion of the historical uses of groundwater within 3 miles of the permit boundary will be provided. This discussion will include map and table listing of the groundwater rights within the 3-mile buffer, which can be cross-referenced with the Adjudication portion of the permit application document.

Strata is proposing six clusters of up to four monitoring wells per cluster. Table 3 provides site descriptions and anticipated completion intervals while Exhibit 5 depicts the spatial distribution of proposed well clusters. Appendix C provides a description of the proposed methods for well installation.

Table 3. Regional Baseline Monitor Well Location Summary

Cluster ID*	Monitor Well ID	Anticipated Completion Depth (ft)	Qtr-Qtr	Section	Township	Range
12-18	DM12-18	620	SWNW	18	53N	67W
	OZ12-18	580				
	SM12-18	450				
	SA12-18	160				
14-18	DM14-18	580	SWSW	18	53N	67W
	OZ14-18	550				
	SM14-18	410				
	SA14-18	100				
21-19	DM21-19	580	NENW	19	53N	67W
	OZ21-19	500				
	SM21-19	390				
	SA21-19	170				
34-18	DM34-18	545	SWSE	18	53N	67W
	OZ34-18	500				
	SM34-18	360				
	SA34-18	140				
34-7	DM34-7	540	SWSE	7	53N	67W
	OZ34-7	470				
	SM34-7	340				
	SA34-7	150				
42-19	DM42-19	650	SENE	19	53N	67W
	OZ42-19	570				
	SM42-19	380				
	SA42-19	200				

* Wyoming State Engineer (WSEO) permit applications (UW 5 forms) were submitted in early October 2009.

Groundwater quality and quantity monitoring is proposed to be conducted in four primary water bearing intervals at the Ross project. These include a 10-20 foot thick sandy shale in the Pierre Shale below the ore zone (designated as DM), ore zone wells completed in the lower Lance/Fox Hills (designated as OZ), a shallow Lance sandstone that is the first water bearing unit above all mineralized zones (designated as SM), and the shallow surficial aquifer (designated as SA).

5.2.1 Groundwater Hydrology Methods

Procedures and protocol for monitoring:

- A water level and well head inspection will be completed upon arrival. Strata is evaluating the use of dedicated pressure transducers and/or water quality (pH, temperature and EC) probes to be installed with the dedicated submersible pumps.
- Based on the yield determined during well development, the well would be pumped at the rate required to evacuate the casing of stagnant water and draw in formation water for at least three casing volumes.

- Field observations (including photograph) will be recorded on the field site sampling forms (example provided in Appendix B). All groundwater quality site details will be provided in a format consistent with WDEQ/LQD Uranium Mining Data Submission Spreadsheets (http://deq.state.wy.us/lqd/uranium_data.htm).
- Field parameters such as pH, EC, temperature, dissolved oxygen and turbidity would be measured throughout purging to determine geochemical stability. Three values with less than 10% difference would provide an indication that the water was stable and representative of the aquifer.
- Field filtered and preserved samples would be collected in clean, unused plastic containers provided by the laboratory.
- Samples would be kept on ice until arrival at the laboratory (no more than two days following sample collection).
- Laboratory analysis of collected groundwater samples will be conducted by Inter-Mountain Laboratories, with raw laboratory data sheets provided. The proposed parameter suite is detailed on Table 2. As with surface water samples, Strata proposes a screening run prior to analyzing for polonium-210, lead-210, and thorium-230 based on concentrations of uranium, radium 226, and gross alpha. In addition, Strata is evaluating methods to collect radon samples.
- Groundwater quality analysis results will be reported in a format consistent with WDEQ/LQD Uranium Mining Data Submission Spreadsheets (http://deq.state.wy.us/lqd/uranium_data.htm).
- Groundwater quality and levels samples will be collected on a quarterly basis for 1 year, starting in the fourth quarter 2009, for baseline characterization.

- A quality assurance and quality control program will entail duplicate samples (~10%), sample preservation blanks (~10%), relative percent difference statistical analysis on duplicates, comparison of field EC to laboratory EC, comparison of field turbidity to laboratory turbidity, comparison of measured TDS to calculated TDS, ion balance analysis and holding time/preservation evaluations. All quality control data will be provided in the permit and license applications.

In addition to the regional baseline monitor wells to be installed in November and December 2009, observation wells for a multi-well aquifer test will also be installed. The aquifer test is scheduled to be completed in late spring 2010 to coincide with development of a groundwater model. The testing program will measure the hydraulic parameters of:

- transmissivity (T),
- storativity (S),
- hydraulic conductivity (K).
- direction of major transmissivity (T_{xx}) or
- direction of minor transmissivity (T_{yy}), and
- leak and confining layers, if present.

The aquifer test plans are shown in Appendix E.

5.2.2 Groundwater Well Completion

Groundwater monitor wells will be completed using one of the following three methods.

Method 1 is the underreaming method utilized for the injection and recovery wells. The underreaming method offers advantages for the installation of solution mining wells as follows:

1) The decisions on the intervals to be opened to leach solutions can be delayed until the geologic and uranium intercept information has been interpreted and correlated for a group of wells. This minimizes hasty field decisions and results in higher solution grades and better overall uranium recovery.
2) The method is very selective in regard to zones opened to receive leach solutions. Mineralized intercepts can be completed separately to minimize the injection of solutions into barren intervals. This decreases dilution and reagent consumption.
3) A cement seal remains in the annulus above and below the completion interval. Also a cement plug is left in the bottom of the casing decreasing the potential for dilution of the solution grade due to injection into excess pilot hole.

Method 2 is the preferred method for the installation of the perimeter monitor wells and the shallow and deep monitor wells. This method is generally utilized where the planned completion interval is unusually thick and at least the bottom depth can be determined adequately from adjacent drill holes to assure a minimal amount of pilot hole is drilled below the completed interval.

Method 3 is also an option for the installation of the perimeter monitor wells and the shallow and deep monitor wells. This method is suited for conditions where the planned completion interval is unusually thick and both the top and bottom of the planned completion interval can be determined adequately from the adjacent drill holes. The geophysical logging must be completed in two stages with this method.

5.2.3 Groundwater Model

A three-dimensional groundwater model will be developed to assess the impacts the Ross Project may have on the groundwater resources within the region, as well as provide operational feedback. The hydrogeologic model proposed is the USGS Three Dimensional Finite Difference Modular Groundwater Flow Model (MODFLOW)

(MacDonald and Harbaugh 1988) and the pre/post processor, Groundwater Vistas (Rumbaugh and Rumbaugh, 2007). MODFLOW is a model code widely used and accepted by regulatory agencies.

Based on a preliminary assessment of the project area's hydrogeology, the model will include six distinct layers consisting of 3 aquifers and 3 confining layers. The results of the model will provide predictions on groundwater movement within the project area. Some of the key elements that the groundwater model will include:

1) The results of the model can be used to determine adequate perimeter well offset/setback distances on the up-, side-, and down-gradient portions of the project area.
2) Based on the locations of the well offset/setback distances, the model can be used to demonstrate the ability to identify and remedy a lateral excursion (i.e., mining lixiviants moving out of the ore zone).
3) The groundwater model will demonstrate what, if any, impacts are expected to occur within the surficial aquifer and the surface impoundments.
4) The groundwater model will be used to estimate how much time will be needed to fully remediate the project area after ISR mining is complete.

Prior to construction of the model, meetings with the regulatory community will be held to discuss the conceptual flow model, initial boundary conditions, grid spacing, and input parameters. As development progresses, additional data such as well flow rates, hydraulic conductivity, leakance between layers, etc. can be either inferred or directly measured and used to continuously update the model. Further refinement of the model can be used to assess the adequacy of the existing monitoring network and make recommendations on the need for additional monitoring wells. The groundwater model will be a valuable tool in helping to understand the subsurface interactions within the Ross ISR mine area and will help ensure that the monitoring network is adequate, the production well configuration and operation minimizes the chance the lixiviants will migrate beyond the active mining region, and that the time devoted to reclamation is adequate to ensure the system is returned as nearly as possible to preexisting conditions.

5.2.4 Baseline Monitoring

Although not required by federal or state regulations, Strata initiated a plan to monitor selected existing wells in the Ross Project area in July 2009. Table 4 contains a list of these proposed stock and domestic wells included in the monitoring plan. Pre-mining groundwater quality and quantity data will be obtained and conditions will be monitored on a quarterly basis to detect possible impacts to these existing wells. Procedures and protocol are similar to baseline groundwater quality and quantity monitoring mentioned above. All water quality and monitoring well details will be provided in a format consistent with WDEQ/LQD Uranium Mining Data Submission Spreadsheets (http://deq.state.wy.us/lqd/uranium_data.htm).

6.0 AIR QUALITY

6.1 Introduction

The Ross Project proposes the following baseline monitoring approach in order to characterize the meteorology and air quality of the project site. The plan has been reviewed and approved by WDEQ/AQD and correspondence will be provided to WDEQ/LQD. The results of this monitoring program will be:

Table 4. Existing Stock and Domestic Wells Proposed for Quarterly Monitoring

SEO Permit Number	Owner	Use[1]	Legal Description
P74302W	John/Rondi Yard	DOM, STO	NESE, Sec. 7, T53N, R67W
9103666W	Vesta Louisa Wesley	DOM, STO	SWSW, Sec. 8, T53N, R67W
DW WELL 01	Dale Wood	DOM	SWNW, Sec. 17, T53N, R67W
P67747W	Merit Energy	IND	SESW, Sec. 18, T53N, R67W
P22582R	Grace Reynolds	STO	SWSW, Sec. 19, T53N, R67W
P50917W	Burlington Northern	IND	SWNW, Sec. 19, T53N, R67W
P132537W	George/Carol Strong	DOM, STO	NWNW, Sec. 20, T53N, R67W
P619W	Ray Robinson	STO	NENE, Sec. 30, T53N, R67W
P68906W	Gerald Morel	STO	SESW, Sec. 13, T53N, R68W
P99263W	David/Betty Reynolds	DOM	NESE, Sec. 24, T53N, R68W
P50883W	Gerald Morel	STO	NWNE, Sec. 24, T53N, R68W

[1] DOM = Domestic, STO = Stock, IND = Industrial

- twelve months of on-site hourly meteorological data to support NRC licensing, air permitting through the Wyoming Department of Environmental Quality/Air Quality Division (WDEQ/AQD), dispersion modeling, and
- four quarters of particulate sampling and radionuclide analysis for five project locations to support NRC licensing.

6.2 Monitoring Plan

Meteorological monitoring will be supplemented with hourly National Weather Service (NWS) data available from two meteorological data sources within 50 miles of the project area. These include a NWS station at the Gillette, Wyoming airport (approximately 35 miles from the project), and a Remote Automated Weather Station (RAWS) station operated by the Bureau of Land Management (BLM) near Devils Tower (approximately 15 miles from the project). The nearest available upper air data will be obtained from the NWS station in Rapid City, South Dakota (approximately 100 miles from the project). As much as possible, comparison between local and regional air/meteorological data will be conducted.

6.2.1 On-Site Meteorological Monitoring Plan

Meteorological data collection, management, and reporting methods will conform to NRC atmospheric dispersion modeling requirements for uranium milling operations and will meet the acceptance criteria established in the NRC's NUREG-1569. The on-site monitoring program will be developed according to NRC Regulatory Guide 3.63, *Onsite Meteorological Measurement Program For Uranium Recovery Facilities – Data Acquisition and Reporting*. The meteorological monitoring program will also meet the WDEQ requirements for land and air quality permit applications and compliance.

The project site meteorology will be monitored for a minimum of 12 months, at the site labeled "Met-Upwind" on Figure 4. A collocated air sampler will collect air particulates as part of the air quality baseline monitoring program (see below). Prevailing winds at the Gillette airport are typically from the southwest and northwest.

According to Section 2.5.3 of the original Nubeth NRC exploration license application, winds at the project site are predominantly westerly. Based on these information sources, the "Met-Upwind" location will represent conditions upwind from the project area.

6.2.2 Baseline Monitoring

Hourly meteorological values will be recorded for wind speed, wind direction, standard deviation of wind direction (sigma theta), ambient temperature, relative humidity, precipitation and evaporation. These values will

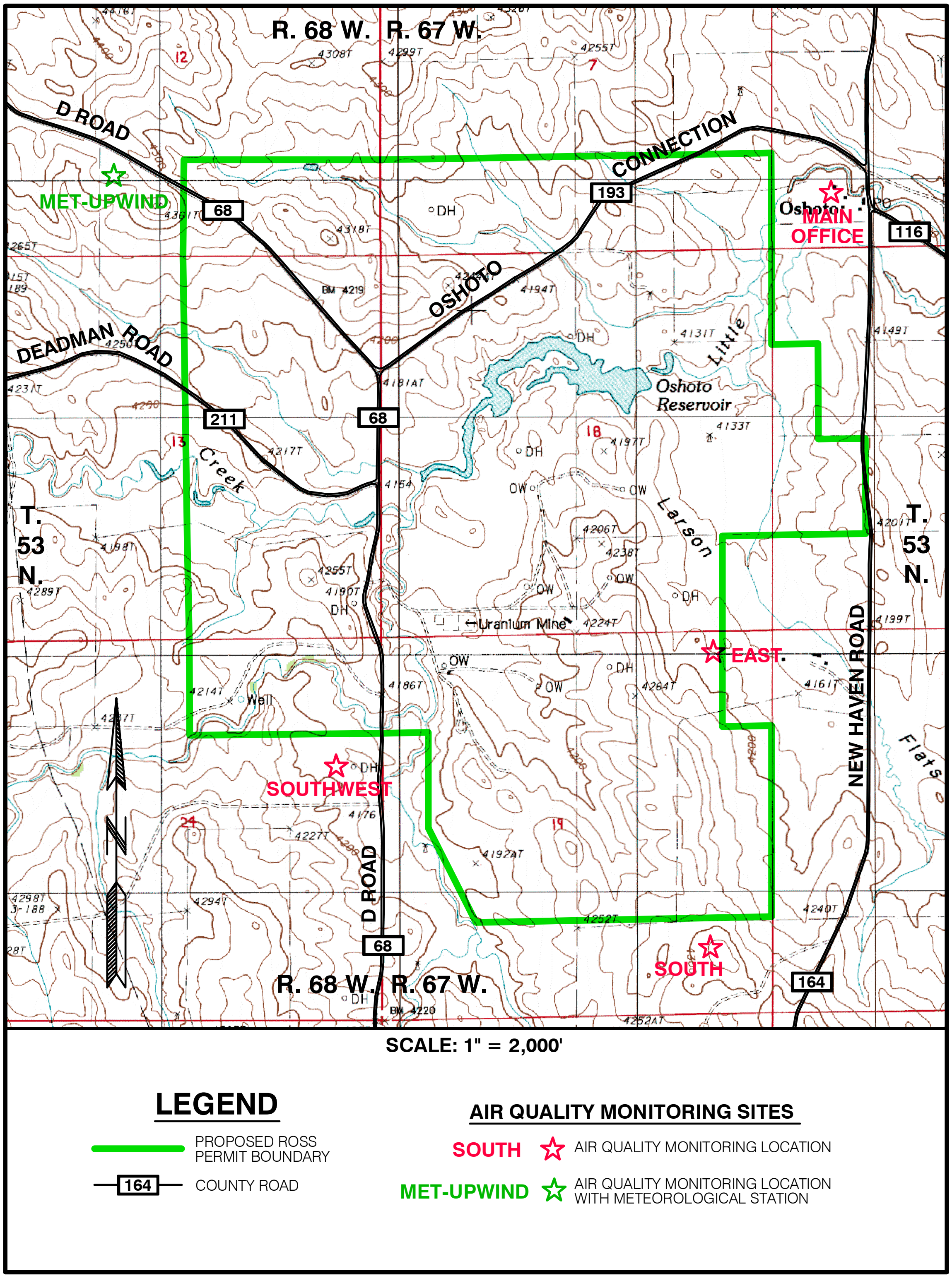


Figure 4. Air Quality Monitoring Sites..

K:\Peninsula_Minerals\09142\DWGS_WY83E\ROSS_POP_AQ_MON.dwg, POP_FIGURE_4, 8/20/2010 4:39:38 PM be generated by field instruments and recorded by a continuous data logger, all operated and maintained by IML Air Science.

6.3 Meteorological Data Quality Assurance

Meteorological instruments will be audited twice per year, according to EPA's accuracy and threshold specifications listed in the agency's *On-Site Meteorological Program Guidance For Regulatory Modeling Applications*. Table 5 presents specifications for each instrument. Audit procedures are specified in EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 4: Meteorological Measurements*. All hourly data will be downloaded periodically from the data logger to a relational database. The database software provides quality assurance, invalidation of suspect or erroneous data, and various forms of data presentation. Data will be summarized in quarterly reports, which also include data recovery statistics and diagnosis of invalidated records. The level of rigor associated with collecting and validating on-site meteorological data is comparable, if not superior to NWS standards. Data recovery typically exceeds 95% for meteorological monitoring conducted by IML Air Science.

6.4 NRC Licensing Reports and WDEQ-AQD Permit Application

Meteorological data from on-site monitoring and nearby NWS sites will be validated, compiled and analyzed according to the approved Monitoring Plan. A meteorological report will be prepared to serve as Section 2.5 of the NRC License Application, in accordance with Regulatory Guide 3.46. The report will include:

Table 5. Ross ISR Met Station Instrument Specifications

Parameter	Instrument	Range	Accuracy	Threshold	Instrument Height
Wind Speed	RM Young 05305 Wind Monitor AQ	0 to 112 mph	±0.4 mph or 1% of reading	0.9 mph	10 meters
Wind Direction	RM Young 05305 Wind Monitor AQ	0 to 360°	±3°	1.0 mph	10 meters
Temperature	Vaisalla HMP50-L15 Temp and RH Probe	-25° to 50°	±0.5° C @ given Range	--	2 meters
Relative Humidity	Vaisalla HMP50-L15 Temp and RH Probe	0 to 98%	±3% at 20° C	--	2 meters
Precipitation	Hydrologic Services TB3/0.01P Tipping Bucket Rain Gauge	Temp: -20° to 50° C	±0.5% @ 0.5 in/hr rate	--	1 meter
Evaporation	Novalynx 255-100 Evaporation Gauge	0 to 9.44"	0.25%	--	1 meter
Data Logger	Campbell Scientific CR1000 Data Logger	--	--	--	--

- summary description of the project area and the regional climate,
- on-site meteorological summaries with data recovery statistics,
- on-site Joint Frequency Distribution with Pasquill stability classes based on sigma theta method (wind fluctuation),
- annual average mixing layer height (from NWS data),
- on-site seasonal and annual wind roses,
- on-site diurnal temperature and wind speed plots,
- on-site wind speed frequency distribution graph,
- summary of atmospheric conditions, precipitation and evaporation in the project area, addressing the probable influence of terrain and water bodies on local weather, and
- site maps identifying meteorological data sources.

Radiological data from on-site monitoring of air particulates and associated laboratory analysis will be reported as part of Section 2.9 of the NRC License Application, in accordance with Regulatory Guide 3.46.

An air quality permit application will be prepared in accordance with Wyoming Air Quality Standards and Regulations, Chapter 6, Section 2. The permit application will include a project description and facilities diagram, a justification of proposed emissions control technologies, an emissions inventory, and an ambient impact modeling analysis for radon gas. Dispersion modeling will be used to predict annual average radiation concentrations and human exposure levels from the proposed facility. Modeling will utilize the MILDOS-AREA model as referenced in NuReg-1569. Inputs to this model will include meteorological and air quality data from the baseline monitoring program, upper air characteristics from the NWS, and projected facility emissions obtained.

7.0 CULTURAL

7.1 Introduction

The Ross Project may affect cultural and paleontological resources. Under authority of W.S. § 35-11-406(a)(xv) and Land Quality Division Rules and Regulations, Noncoal Chapter 2, Section 2.(a)(i)(J) and Noncoal Chapter 3, Section 2.(l)(ii)(E)) and as implied in Section 6.3.8 of the NRC *In Situ* Leach Uranium Extraction License Application (NUREG-1569) each application for a NRC Uranium Extraction license application and WDEQ/LQD mining permit shall contain:

- a description and map of any significant articles of cultural, historical, archeological, or paleontological value within the permit area,
- a report describing the inventory for such articles including names of all persons consulted or responsible for the inventory, and
- measures to be taken to salvage or to minimize or prevent adverse impacts to these resources.

7.2 Monitoring Plan

The following plan will be submitted Wyoming State Historic Preservation Office (SHPO) for review and approval and any agreement with SHPO will be provided to WDEQ/LQD.

7.2.1 Methodology

Cultural resources inventory and reporting for the Ross Project will follow the current *Wyoming State Historic Preservation Office Format, Guidelines and Standards for Class II and III Reports* (Wyoming SHPO 2009). Survey and reporting requirements are consistent with methods outlined in WDEQ/LQD Guidelines No. 4 and 11.

7.2.2 Literature Search and Fieldwork Notification

Specific methods will include filing a "CRM Tracker" fieldwork notification with the SHPO and BLM prior to fieldwork. Also prior to fieldwork, a literature search, a.k.a. file search, will be conducted through the Wyoming Cultural Records Office. This database will link all previously accessioned cultural resource studies and recorded cultural resources in the area. The file search will include the entirety of each section within the study area. Copies of all relevant cultural resource documents will be obtained and a historic context will be established for the project area.

Field base maps will be produced based upon the appropriate 7.5-minute USGS topographic quadrangle(s). The field base maps will have any previously recorded cultural properties depicted.

7.2.3 Field Methods

An intensive pedestrian inventory of all the land within the defined Class III study area will be conducted. Transect intervals will not exceed 30 meters. All sources of subsurface exposure will be examined, such as cut banks, trails, ruts in two track roads, ant hills and rodent mounds. A reconnaissance of any outcrops with potential for paleontological remains is also a standard part of the Class III cultural resources inventory, although this may not be considered as a substitute for a professional paleontological survey by regulatory agencies.

Historic sites will be researched at the appropriate locations, such as the Crook County courthouse and records of the General Land Office, held at BLM.

Prehistoric sites in the study area will receive one of three recommendations. Sites considered not eligible for the National Register of Historic Places (NRHP) with no additional work required; sites recommended as eligible for the NRHP with additional mitigation or avoidance required; and, sites requiring formal testing prior to making NRHP evaluations. Formal testing is considered to include controlled, full meter test excavations, magnetometer or other remote sensing or mechanical (e.g. backhoe) testing. Formal testing may be necessary in some cases to evaluate deeply buried or large site areas. Standard shovel testing, as needed, will be conducted during site recordation.

Newly identified sites and isolated finds will be plotted using Wide Area Augmentation System (WAAS) enabled GPS and plotted on the corresponding U.S. Geological Survey (USGS) 7.5-minute topographic map. Site photographs, artifact illustrations (sketches and/or scans) and a scaled site sketch map with topography and all significant physical and cultural aspects will be included on the Wyoming Cultural Resource [site] Forms.

7.2.4 Site and Isolated Field Definitions

A prehistoric site is defined by the Wyoming SHPO as "…15 or more spatially associated artifacts within a 30 meter diameter area…" or a location with features or buried cultural material. A historic site is defined as "…50 or more associated artifacts within a 30 meter diameter…" (Nissley 2005).

Under these definitions it might become necessary, in certain favorably situated locations, to search for subsurface cultural manifestations that might go undetected during a surface examination. Such locations typically include depositional landforms with poor surface visibility, particularly those near water sources. The efficacy of modern remote sensing methods in detecting subsurface thermal features has been repeatedly demonstrated in the surrounding area. Recent magnetometer studies along School Creek, south of Gillette, Wyoming have discovered buried hearth features in terraces where only surface isolated finds were reported (Munson 2006).

7.2.5 Site Recording Procedures

Site recording procedures includes taking site photographs, making a sketch map, conducting shovel tests, drawing or photographing artifacts with a high quality digital camera, and taking general notes on the artifact assemblage. Manifestations such as stone tools or features are plotted with a high quality mirror compass and a laser range finder. A recreational grade GPS unit will be used to gather coordinates for the datum and mapping stations. Datum markers generally consist of a piece of plastic ½-inch pipe or conduit buried in the ground with an attached aluminum tag inscribed with relevant information.

7.2.6 Testing

Shovel tests will be conducted at artifact or feature locations or at locations that appear to have some soil accumulation. The purpose of the tests is to document the condition of the soil at the sites and probe for the presence of subsurface remains.

7.2.7 Rock Art Recording

All outcrops having potential to retain rock art will be inspected. Any rock art found will be recorded, at a minimum, by photographing with scale, and sketching to scale.

7.2.8 Paleontological Localities

The project area will be examined for paleontological remains as well as cultural remains. Any paleontological remains observed will be plotted and described for further investigation by a qualified paleontologist.

7.2.9 National Register of Historic Places Evaluations

Cultural sites will be evaluated within the framework of the NRHP. Each site's integrity of location, design, setting, materials, workmanship, feeling and association are considered as well as the sites ability to meet any of the following criteria:

Criterion A: The site is associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: The site is associated with the lives of persons significant in our past.

Criterion C: The site embodies the distinctive characteristics of a type, period, or method of construction, or that represented the work of a master, or that possesses high artistic values, or that represented a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: The site has yielded or may be likely to yield information important in prehistory or history.

Criterion D assessment is typically applied to prehistoric archaeological sites in this region. Cultural material content, condition and contextual integrity are critical to making a realistic determination of significance under Criterion D. Sites containing intact activity areas, dateable organics, diagnostic or unique artifacts or features in a state of good contextual preservation have research potential and may be considered as eligible for the NRHP under Criterion D. Eroded, deflated or mixed deposits, surface lithic sources, primary knapping stations (lithic reduction sites) and other cultural remains lacking a specific temporal context are unlikely to meet Criterion D.

7.2.10 Fieldwork Conditions and Problems

Fieldwork conditions are generally favorable during the primary season of fieldwork (May-October) although severe storms, particularly in May, are not unusual in this area. Fieldwork schedule will be sufficiently flexible to allow for weather interruptions. The project area terrain is gently rolling and will not cause any problems for traversing on foot.

7.2.11 Reporting

Data will be presented in Section 2.7 in the NRC *In Situ* Leach Uranium Extraction License Application (NUREG-1569) and in Appendix D-10 of the WDEQ/LQD mine permit application.

8.0 SOILS

8.1 Introduction

The Ross Project may affect soils and, as such, baseline soils inventories are required to allow Strata to:

- identify the physical and chemical characteristics of the topsoil and delineate those soils into mapping units,
- plot, on an appropriate base map, the boundaries of those mapping units,
- identify those mapping units that will be salvaged as topsoil for reclamation purposes,
- estimate the volumes of topsoil that will be salvaged for reclamation purposes,
- provide a basis for the evaluation of the achievability of the proposed post-mining land use, and
- prepare Sections 2.6, 4.2, 5.7, 6.2, 6.4, and 7.4 of the NRC *In Situ* Leach Uranium Extraction License Application and Appendices D-7 and D-11 of the WDEQ/LQD mine permit application.

8.2 Monitoring Plan

Specific methods outlined in WDEQ/LQD Guidelines No. 1 and implied by Section 6.3.3 in the NRC *Environmental Review Guidance* (NUREG-1748) will be followed.

8.2.1 Soil Mapping

A reconnaissance of the project area will be done by field personnel during October/November of 2009. Soil profiles will be examined on a widely scattered basis according to physiographic configuration. Information derived from these profiles will used to determine which soils are likely to occur on specific landscape positions.

Following the reconnaissance survey, a higher intensity Order 1-2 soil survey will be conducted during November 2009. Actual soil boundaries will be identified in the field by exposing additional soil profiles to determine the nature and extent of soil series on the permit area. The soil boundaries will be delineated on a 1"=500' topographic base map, for purposes of permit submittal.

8.2.2 Soil Sampling, Description, and Analysis

Sampling of soil series identified within the Ross Project area proposed disturbed area will generally follow WDEQ Guideline 1 recommendations: 3 sample pedons for series encompassing greater than 5% of the mine area; 2 sample pedons for series encompassing 2-5% of the mine area; and 1 sample pedon for series encompassing less than 2% of the mine area.

Since the full extent of the proposed disturbed area (ore bodies, well fields, facilities, and newly-constructed roads) is unknown at this time, sampling of the soils will occur within the entire project boundary. It is anticipated that per soil sample, an average of 4 horizons will be analyzed for laboratory analysis. This equates to 156 samples be taken for laboratory analysis.

All soil samples will be collected with a Giddings truck-mounted auger to paralithic contact or a maximum depth of 60", whichever is shallower. Sample profiles will be described in the field, to the extent possible, by the physical and chemical nature of each profile horizon. Backhoe pits will not be utilized for soil sampling.

Sample locations will be identified on a base map, and GPS positions will be collected with hand-held Garmin GPS units. Soil samples will be placed in clean, labeled, polyethylene plastic bags, and sealed to limit sample drying. Samples will be kept as cool as possible but will not be stored on ice. Samples will be delivered to Intermountain Laboratories in Gillette, Wyoming when the sampling is completed for later shipment to Sheridan, Wyoming. The soil samples will be analyzed for pH, SAR, EC, Saturation %, Texture (S, Si, C), coarse fragments, Boron, Selenium, and organic matter. Soil samples will also be analyzed for appropriate radionuclides, according to NRC Guide 4.14.

Additional sampling for analysis may be warranted at a later date when additional major disturbed areas are defined, e.g., ore body extension.

8.2.3 Soils Quality Assurance

Field data collection quality assurance methods:

- Natural Resource Conservation Service (NRCS) soil mapping for Crook County will be utilized as the baseline for field mapping and subsequent report writing. Any mapped discrepancies or conflicts in mapped polygons and series designations between the NRCS mapping and project mapping will be resolved.
- At least one soil scientist will be part of the two-person crew for fieldwork.
- Pictures will be taken of all soil profiles for documentation.

- GPS coordinates of soil locations will be recorded in the field and overlain on the soil map unit polygons. This allows verification of drawn soil map unit boundaries.
- Field notes will be compared to laboratory analysis and the lab will be contacted for clarification or rerun of that particular parameter when field notes disagree with lab results.
- The report will be written and map unit polygons will be delineated by a soil scientist.
- The report and map will be reviewed by a second soil scientist to ensure accuracy.
-

Laboratory data analysis quality assurance methods:

- Sample Handling and Transport:
  - Samples should not be exposed to temperatures above 35^{o} C.
  - Samples will be labeled in numerical sequence.
  - Sufficient quantities of each sample will be collected to meet sample split needs.
- Sample Preparation and Storage:
  - All analyses will be performed on air-dried samples.
  - Drying will be initiated as soon as possible after receipt in laboratory.
  - Samples will be mixed daily for faster drying
  - Core Crushing:
    - Entire core will be crushed to < 2mm.
    - Samples for APA/Leco will be ground to 0.25mm.
- Splits:
  - Samples will be split and recombined four to five times to insure sample homogeneity.
  - Three splits – lab, client, and regulatory authority.
- Storage:
  - Samples will be stored in lab at temperature of between 10^{o} and 30^{o} C.
- Time between sample collection and preparation will not exceed 30 days.
- Quality Control Program Elements:
  - Blank and Matrix Spikes:
    - A blank spike will be included with each analytical batch. The blank spike is exposed to the same procedure as the soil samples and spiked with an appropriate volume of standard some time during the procedure. The results of a blank sample should not exceed +/- 20% or two standard deviations. Failure to achieve this objective will result in rerun of the entire batch.
    - A matrix spike will be included with each analytical batch when applicable. The matrix spike will be also exposed to the same procedure as soil sample or the blank spike described above and is spiked with an appropriate volume of standard some time

during the procedure. The matrix spike sample should achieve between 70 and 130 percent or three standard deviations. Failure to meet this objective will result in intense scrutiny of the results for the entire batch and is reported to the client via a case narrative and/or Quality Control Report.

- A duplicate sample will be extracted for 10 percent (1 out of 10) of the samples in each set. The precision associated with the extraction procedure will be monitored using the similarity between the results determined for the sample and its corresponding duplicate. A precision objective has been established at 20 percent or less relative difference between a sample and its duplicate. Failure to meet this objective will result in intense scrutiny of the results for the entire batch and is reported to the client via a case narrative and/or Quality Control Report.
- An in-house laboratory control standard (LCS) will be analyzed with each batch of samples. The accuracy associated with the extraction procedure will be evaluated using the similarity between the value of the analyte of interest for the LCS of a given batch and its corresponding reference (known) value. An accuracy threshold for has been established at 20 percent or less relative difference between the LCS value for a given batch and its corresponding reference value. Failure to achieve this objective will result in rerun of the entire batch.
- If a sample is limited or otherwise unavailable for repeat analysis, failure to meet the accuracy threshold will be reported to the client via a case narrative and/or Quality Control Report.

9.0 VEGETATION

9.1 Introduction

The Ross Project may affect vegetation and, as such, baseline vegetation inventories are required to allow Strata to determine:

- the composition of the vegetation community, species diversity, and land use prior to mining,
- the mining impacts upon vegetation, land use, and habitat, and
- the effectiveness of mitigation and reclamation proposals.

The acceptable procedures for generation, analysis and presentation of vegetation data and revegetation practices listed below are specific to the permit application requirements of W.S. § 35-11-406(a)(vii), (b)(i) and (b)(iii), Sections 2.(a)(i)(A), (a)(i)(B), and 2(b)(iii)(C) of Chapter II of LQD Rules and Regulations and Sections 2(a)(i), 2(a)(ii), 2(d)(i) through (ix) of Chapter III of LQD Rules and Regulations.

This document outlines the proposed procedures for:

- designing and executing premining baseline vegetation inventories,
- documenting the premining land uses and the capability of the existing plant communities to support those uses,
- establishing and evaluating appropriate postmining land uses,
- formulating a sound revegetation plan by choosing appropriate plant species and plant community types which will support the postmining land uses,
- establishing quantitative and qualitative vegetation parameters which serve as reclamation success standards for purposes of final bond release,
- preparing sections of Appendices D-1, D-8, and D-11 and the Reclamation Plan of the WDEQ/LQD mine permit application,
- preparing Sections 6.2 and 9.0 of the NRC *In Situ* Leach Uranium Extraction License Application, and
- evaluating the success of revegetation efforts and for eventual request of full bond release.

9.2 Monitoring Plan

The vegetation baseline sampling will be conducted with the expectation that the Extended Reference Area (EXREFA) concept will be utilized during revegetation success evaluations. Discussion pertaining to the EXREFA commitment will be presented in the Reclamation Plan.

9.3 Baseline Monitoring

9.3.1 Mapping

Mapping for the proposed permit area was initiated in November 2009 using high quality 2009 aerial photography. Additional mapping will be completed in 2010, as needed. The mapping will include the proposed permit boundary and a 0.5-mile buffer. A table showing the acreages of each vegetation community type will accompany the mapping.

9.3.2 Species List

The study area will be surveyed monthly during the growing season of April through September to develop a representative plant species list. The species list will be presented by species (common/scientific names) and life-forms with a notation of the vegetation types in which each species is present.

9.3.3 Sample Site Location and Numbers

All sample sites will be located randomly. The random sample sites will be selected using two sets of computer generated random numbers, one set corresponding to the x-axis of a grid and the other corresponding to the y-axis. Grids will always be oriented North/South and East/West to avoid bias. Sample site grid intervals will be no more than 65 meters on the ground. The grid intersections will represent the prospective sample points and will be located in the field using aerial photograph, topographic maps, or GPS. Photographs will be taken of each vegetation community type. Photograph and transect locations will be indicated on appropriate Appendix D-8 mining permit application maps. Vegetation sampling will be conducted between the beginning of June and the end of July and will be completed within a 3-week period.

9.3.4 Percent (%) Cover Data

Cover sampling will be done for each vegetation community type within the sample area unless it is a crop or hayland community type. Cover data will be collected using 50-meter line transects with a meter-long pin dropped at one meter intervals for 50 points per transect. The tape used for the cover transect will be pulled tight over the vegetation. The sampling device will be a meter long pin (1/8 inch diameter straight rod sharpened to a point) dropped vertically at each meter mark along the 50 meter tape. The pin is dropped vertically with the point of the pin beginning at each meter mark and gravity ensures the pin drops straight down. Data will be recorded by plant species and ground cover class (lichens, litter, rock, bare ground). The minimum and maximum numbers of samples collected will correspond to LQD Guideline No. 2 (1997 Revision) or as otherwise agreed upon with the WDEQ-LQD.

Sample adequacy will be determined using the formula presented in LQD Guideline No. 2. Since this is a baseline study used for description purposes, sample adequacy will be computed using the absolute vegetation cover data and sample standard deviation value calculations for the sums inclusive of all plant species (perennials, annuals, subshrubs, shrubs, etc.). Sample adequacy will not be required or computed for total ground cover.

The absolute vegetation cover data will be presented in the report by plant species and by life-form, in a tabular format. The ground cover data for each category will also be presented in the table. Computerized field data will be included in the report by species, life-form, and ground cover class for each transect sampled.

9.3.5 Herbaceous Production Data

Production data are not required for non-coal mines and will not be collected for this permit area.

9.3.6 Shrub Density Data

Shrub density data are not required for non-coal mines and will not be collected for this permit area.

9.3.7 Wetlands

Wetland acreages may be separated from the vegetation types and will be evaluated by others following the U.S. Army Corps of Engineers (COE) wetlands inventory methodology. The wetland report is separate from the vegetation report and will be submitted in Appendix D-10.

9.3.8 Trees

Trees are present within the permit area and will be inventoried. The species, numbers, locations, and sizes (DBH and Height) will be determined and presented in the report.

9.3.9 Weedy Species

Known and observed concentrations of State of Wyoming Department of Agriculture listed Prohibited and Restricted Noxious (Designated) Weed species will be shown on a map and described by species. Any sensitive species or selenium indicator species observed will also be reported.

9.3.10 Threatened or Endangered and Sensitive Species

The Ute ladies'-tresses orchid is the only currently Threatened or Endangered (T&E) listed plant species with habitat present within the proposed permit area. Surveys will be completed for this species using the methods currently recommended by the U.S. Fish and Wildlife Service (USFWS). The results of those surveys will be described in Appendix D8 of the mine permit application. The sensitive species lists will be reviewed to determine if known occurrence or habitat for any of those species exist within the permit area. Individual species inventories will be conducted during the species list development accordingly, specifically within areas of suspected disturbance. The results of those surveys will also be described in Appendix D8 of the mine permit application.

9.4 NRC Licensing Reports and WDEQ-AQD Permit Application

The report format will follow the format outlined in LQD Guideline No.2.

10.0 WETLANDS

10.1 Introduction

Wetlands are aquatic features defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328.3(b)). The prolonged presence of water creates conditions that favor the growth of specially adapted plants and promote the development of characteristic wetland (hydric) soils (EPA 2007a). Vegetation in wetland environments is highly productive and diverse and provides habitat for many wildlife species. These systems as a whole play important roles in controlling floodwaters, recharging groundwater, and filtering pollutants (Niering 1985).

Wetlands must contain three components: hydric soils, a dominance of hydrophytic plants, and wetland hydrology. When the upper part of the soil is saturated with water at growing season temperatures, soil organisms consume the oxygen in the soil and cause conditions unsuitable for most plants. Such conditions also cause the development of soil characteristics (such as color and texture) of so-called "hydric soils". The plants that can grow in such conditions, such as marsh grasses, are called "hydrophytes". Together, hydric soils and hydrophytes give clues that a wetlands area is present. The presence of water by ponding, flooding, or soil saturation is not always a good indicator of wetlands. Except for wetlands flooded by ocean tides, the amount of water present in wetlands fluctuates as a result of rainfall patterns, snow melt, dry seasons and longer droughts.

Waters of the U.S. (WoUS) include all areas subject to regulation by the COE pursuant to the Clean Water Act (CWA), to include special aquatic sites, of which wetlands is a subset. The definition of WoUS has been broadly interpreted to include most major water bodies, streams, intermittent drainages, mud flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, and natural ponds. However, several changes have occurred to the COE regulatory program over the past several years that will have a bearing on the current status of numerous areas historically classified as jurisdictional. For example, in 2001 the U.S. Supreme Court ruled that isolated waters and playas are not WoUS. A 2006 U.S. Supreme Court decision, collectively referred to as the "Rapanos" decision, attempted to address federal jurisdiction over waters of the U.S. under the CWA (EPA 2007b). According to the Court's decision, the EPA and COE must ensure that jurisdictional determinations, permitting actions, and other relevant actions are consistent with the Rapanos decision. The decision addressed where the federal government can apply the CWA, specifically by determining whether a wetland or tributary is a "Water of the U.S.", being "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection (nexus) to" such relatively permanent waters.

The Ross Project may affect WoUS, including special aquatic sites and jurisdictional wetlands associated with the Oshoto Reservoir, the Little Missouri River, and unnamed natural and man-made water features within the project area. To determine the occurrence and distribution of potential wetlands areas within the Ross project area, sample points will be located during an onsite visit. The data will be gathered and evaluated according to the *2006 Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual*: *Great Plains Region* (COE 2008). COE will be contacted regarding the effects of the Ross Project on wetlands. Any agreement reached with COE will be submitted to WDEQ/LQD.

10.2 Background Data Review

As with any detailed field investigation, the initial step of the project is to obtain and review all pertinent, available environmental information within the project area. Existing data will likely be a digital *Wyoming Soil Survey of Crook County Area, Wyoming* (Munn and Arneson 1999), the *Western Wetland Flora Field Office Guide To Plant Species* (USDA-NRCS 1988), U.S. Fish and Wildlife Service National Wetlands Inventory mapping (USFWS 2009), and color infrared photography. All sources of information will likely provided relevant information on the occurrence and distribution of wetlands; however, they will likely not provide site-specific information. Therefore, sample point locations will be visited during a field investigation to verify if wetland characteristics are present. Findings from these sources will be integrated into the NRC and WDEQ/LQD permit application documents.

10.3 Field Reconnaissance

The site-specific wetlands field inventory will be conducted within the Ross project area in accordance with the *Interim Regional Supplement to the U.S. Army Corps of Engineer's Wetland Delineation Manual: Great Plains Region* (COE 2008). The routine site investigation method will be used for the inventory. All sample points will be placed to obtain the most relevant and optimal information possible.

Initial assessments will begin with a vegetative cover inventory of each representative species occurring. The *North American Range Plants Field Guide-Fifth Edition* (Stubbendieck *et al* 1997) will be used to assist in vegetation species identification. Vegetative species indicator status, with respect to wetland or nonwetland, will be recorded along with its percent composition within the sample area. The indicator status will be obtained using the *National List of Plant Species That Occur In Wetlands: Region 4* (Resource Management Group, Inc., 1994). When possible, soil observation pits will be dug to a depth of 20 to 24 inches. A Munsell Color Chart (Kollmorgan Corp., 1975) will be used to record soil color, texture, and other distinguishing characteristics for each site.

All sample points will be assessed and recorded on site-specific wetland delineation field forms. Photos will be taken to document the current condition of each sample point site.

10.4 Reporting

Data will be presented in Section 2.7 in the NRC *In Situ* Leach Uranium Extraction License Application (NUREG-1569) and in Appendix D-10 of the WDEQ/LQD mine permit application.

11.0 WILDLIFE

11.1 Introduction

The Ross Project may affect wildlife species and, as such, baseline wildlife inventories are required to allow Strata to:

- determine the composition of the wildlife community, species diversity, and habitat affinity prior to mining,
- determine the mining impacts upon wildlife and habitat,
- determine the effectiveness of mitigation and reclamation proposals, and
- prepare Sections 2.8 and 7.0 in the NRC *In Situ* Leach Uranium Extraction License Application and Appendices D-1 and D-9 in the WDEQ/LQD mine permit application.

The term "wildlife", as used here, means both terrestrial and aquatic species. The Wyoming Game and Fish Department (WGFD) and the U. S. Fish and Wildlife Service (USFWS) have been contacted to discuss the impacts of the Ross Project on area wildlife species and to formulate a monitoring plan. The specifics of the monitoring plan have not been finalized at this time. The approved sampling plan and letters of approval regarding the wildlife monitoring plan will be submitted to WDEQ/LQD.

11.2 Description of the Vertebrate Fauna of the Area

11.2.1 Potential

A list will be developed to indicate species likely to occur in the area according to literature sources. The list will be compiled before undertaking field studies, but after a visit to the site. Common sense will be used in preparing the list. If habitat for a particular species is not present, the species will not be listed, even though its range overlaps the mine site. The potential species lists will appear as a table in Appendix D-9 of the mine permit application.

11.2.2 Actual

This includes species recorded on the permit area based upon observations of animals or their sign during census activities, existing data for the area, and reliable reports from local observers such as state, federal, and company biologists and local ranchers. These can be indicated on the potential species list by an asterisk.

11.2.3 Habitat Mapping and Descriptions

Wildlife habitats will be mapped and defined as required with data included in Appendix D9 of the mine permit application. Any habitat information presented in

Appendix D8 of the mine permit application for this area will also be referenced in Appendix D9 of the mine permit application. Surveys already completed indicate that upland grassland is the major habitat type. Some sagebrush shrubland habitats are present also but in lesser amounts. Other habitats present are wetlands along ephemeral or intermittent streams and some eroded grasslands. No crucial or critical habitats are currently known to exist within the area.

11.2.4 Habitat Affinity

Habitat affinities for wildlife species on the area will be determined by seasonal data to be collected for each class of wildlife discussed in the following sections.

11.3 Seasonal Data Collection

Methods approved by WGFD and USFWS) will be followed. The approved sampling plan and letters of approval regarding the wildlife monitoring plan will be submitted to WDEQ/LQD.

11.4 Data Analysis/Reporting

Data will be presented in Sections 2.8 and 7.0 in the NRC *In Situ* Leach Uranium Extraction License Application (NUREG-1569) and in Appendices D-1 and D-9 of the WDEQ/LQD mine permit application.

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APPENDIX A

Letters Regarding Decommissioning of the Nubeth (ND Resources, Inc./Sundance) ISR Project

STRATA ENERGY

WWC ENGINEERING

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

LAND QUALITY DIVISION
DISTRICT IV OFFICE

·0 EAST GRINNELL STREET TELEPHONE 307-672-6488 SHERIDAN, WYOMING 82801

April 25, 1983

WATER ... DIVISION
WYOMING

Mr. Albert F. Stoick
Manager, Nubeth Joint Venture
ND Resources, Inc.
P.O.B ox 1449
Glenrock, Wyoming 82637

RE: Sundance Project, License to Explore No. 19

Dear Mr. Stoick:

On the basis of information supplied by your company and on the basis of confirmation water samples taken November 24, 1983, the Land and Water Quality Divisions concur that restoration of the groundwater at the Sundance Project has been done to meet applicable water quality standards.

Accordingly, ND Resources and the Nubeth Joint Venture are released from any further aquifer and groundwater restoration requirements for this area.

At your request, the reclamation bonding requirements will be reduced to reflect the elimination of bond coverage for groundwater restoration.

Reclamation bond coverage for the surface disturbances, including the well field, plant building, evaporation ponds and access road will continue to be required until either the area is reclaimed or the site is converted to an approved non-mining use.

If you have any questions, please contact the District IV Engineer, Richard Chancellor.

Sincerely,

William Garland
Water Quality Administrator

Nancy Freudenthal
Acting Land Quality Administrator

Robert E. Sundin
Director, Dept. of Environmental Quality

CM:kn

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

LAND QUALITY DIVISION

DISTRICT IV OFFICE

EAST GRINNELL STREET · TELEPHONE 307-672-6488 · SHERIDAN, WYOMING 82801

April 25, 1983

WATER ... DIVISION ... WYOMING

Mr. Albert F. Stoick
Manager, Nubeth Joint Venture
ND Resources, Inc.
P.O.B ox 1449
Glenrock, Wyoming 82637

RE: Sundance Project, License to Explore No. 19

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Accordingly, ND Resources and the Nubeth Joint Venture are released from any further aquifer and groundwater restoration requirements for this area.

At your request, the reclamation bonding requirements will be reduced to reflect the elimination of bond coverage for groundwater restoration.

Reclamation bond coverage for the surface disturbances, including the well field, plant building, evaporation ponds and access road will continue to be required until either the area is reclaimed or the site is converted to an approved non-mining use.

If you have any questions, please contact the District IV Engineer, Richard Chancellor.

Sincerely,

STRATA ENERGY

WWC ENGINEERING

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

JUL 1 1 1983

URFO:TLJ
Docket No. 40-8663

ND Resources
ATTN: Mr. Albert F. Stoick
P. O. Box 1449
Glenrock, Wyoming 82637

Gentlemen:

We have reviewed available ground-water restoration data for your Oshoto site project. Based on this review, we have concluded that the ground water has been adequately restored. Our review memorandum is attached.

Please note that the NRC staff must approve the adequacy of your decontamination and decommissioning before your license can be terminated. If you have any questions, please contact Mr. T. L. Johnson (301-427-4319) of my staff.

Sincerely,

John J. Linehan

John J. Linehan, Chief
Licensing Branch 2
Uranium Recovery Field Office, RIV

Enclosure:
As stated

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

JAN 10 198?

URFO:RFB
Docket No. 40-8663

N D Resources, Inc.
ATTN: A. F. Stoick
213 West Birch
P.O. Box 1449
Glenrock, Wyoming 82637

Gentlemen:

On November 26, 1984, Mr. R. F. Brich of this office visited the Sundance Project to review records associated with the decommissioning activities and to make independent gamma measurements to verify that cleanup efforts were sufficient. Enclosed is a copy of the trip report which describes the findings of this visit and also staff review of the pond decommissioning report. As discussed in the enclosed report, license termination will be contingent upon final notification by the licensee that all pertinent WDEQ requirements have been or will be met.

By letter dated December 28, 1984, Resource Technologies Group (RTG) submitted a report on the pond decommissioning work on behalf of NDR. Based on staff review of this report, we conclude that cleanup of the ponds is adequate.

If you have any questions, please contact Mr. Brich at (303) 236-2814.

Sincerely,

Edward F. Hawkins, Chief
Licensing Branch 1
Uranium Recovery Field Office
Region IV

Enclosure: As stated

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

JAN 10 1985

URFO:RFB
Docket NO. 40-8663

MEMORANDUM FOR: Docket File No. 40-8663

FROM: Randall F. Brich, Project Manager
Licensing Branch 1
Uranium Recovery Field Office, Region IV

SUBJECT: TRIP REPORT ON NOVEMBER 26, 1984 SITE VISIT - N D RESOURCES, INC., SUNDANCE ISL PROJECT

Background

On November 26, 1984, Mr. Al Stoick of N D Resources, Inc. (NDR), Mr. Bart Conroy of Resources Technology Group, Inc. (RTG), who acted as NDR's consultant and Radiation Safety Officer (RSO), and Mr. R. F. Brich of NRC/URFO met in Gillette, Wyoming, to discuss the status of the nearly completed decommissioning of the Sundance ISL project. After record review, we motored to the ISL site and observed the status of decontamination and decommissioning (D&D) of the site amidst a +40 mph cold, north wind. A slight covering of blown and drifted snow had recently accumulated in the leeward areas of the ponds, dikes, ditches, building, etc.

Discussion

I reviewed all records associated with the D&D of the site pertaining to personnel safety training, personnel monitoring, air particulate monitoring, gross alpha contamination monitoring and baseline soil radium-226 values. The records were found to be a true and accurate account of the D&D activity. Mr. Stoick stated that a decommissioning final report would be prepared and furnished to the agency.

All liners, piping and leak detection systems for the ponds had been previously removed. We walked the entire site from North to South making contact gamma measurements at the following preselected locations: north

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pond, middle pond, south pond, influent ditch to north pond, effluent ditch, open portions of the gravity delivery ditch, overflow pond (never used), wellfield drainage ditch on north side of building and the interior of the building. All measurements were found to be essentially equivalent to the natural background for the area (approximately 11-13 microRoentgens per hour (uR/hr)) with one exception. A small area in the northwest portion of the middle pond (Pond #2) appeared to contain about a 1-inch thick black residue that read approximately 40 uR/hr.

NDR had collected the required number of soil samples at all three ponds (three from each pond) and reported that all contained less than 15 pCi/g Ra-226 above background. NDR also collected soil samples at other locations in the delivery ditch and wellfield, and the results will be reported in the final decommissioning report. After returning to Denver, I informed RTG that we would require D&D of the ponds to 5 pCi/g (plus background) instead of 15 pCi/g.

In addition, NDR collected three soil samples from the base of Pond #2, four soil samples from the base of Pond #1, and two soil samples from the base of Pond #3, and analyzed them for Ra-226. Based on the results shown in Table 1, NDR elected to remove additional material from Ponds #1 and #2. A total of nine additional truck loads (approximately 108 cubic yards) of material were removed and shipped to a licensed mill for disposal.

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Table 1

BEFORE ADDITIONAL SOIL REMOVAL

Pond	Location	pCi/g Ra-226
#2	West (sludge)	55 ± 1.0
#2	South (sludge)	31 ± 0.9
#2	Center	0.9 ± 0.2
#1	Northwest corner	60 ± 1.3
#1	Center	0.9 ± 0.2
#1	Center	0.9 ± 0.2
#1	Southeast corner	0.8 ± 0.2
#3	Northeast	1.3 ± 0.2
#3	Southeast	1.6 ± 0.2

Table 2 shows the Ra-226 activity in the soil after removal of the additional material.

Table 2

AFTER SOIL REMOVAL

Pond	Location	Ra-226 (pCi/g)
#1	Northwest corner	2.6 ± 0.5
#1	Southeast corner	1.1 ± 0.9
#2	West side	0.7 ± 0.3
#2	Southeast corner	0.5 ± 0.3
#2	Northwest corner	2.7 ± 1.0
#2	Northeast corner	2.1 ± 0.9

Conclusions

Based on my review of the associated records, pond decommissioning report and independent gamma measurements, I conclude that the site has been decommissioned properly. Therefore, I recommend that the licensee be notified by letter that URFO staff has concluded that cleanup of ponds is sufficient and the license will be terminated upon final notification by NDR that all pertinent WDEQ requirements have been or will be met.

Randall F. Brich

Randall F. Brich, Project Manager
Licensing Branch 1
Uranium Recovery Field Office
Region IV

Approved by: Edward F. Hawkins

Edward F. Hawkins, Chief
Licensing Branch 1
Uranium Recovery Field Office, Region IV

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

LAND QUALITY DIVISION
DISTRICT III OFFICE

30 EAST GRINNELL STREET TELEPHONE 307-672-6488 SHERIDAN, WYOMING 82801

December 19, 1986

Mr. Albert F. Stoik
Manager
ND Resources, Inc.
P. O. Box 1449
Glenrock, Wyoming 82637

RE: Annual Inspection ND Resources, Inc., LE19

Dear Mr. Stoik:

Enclosed is a copy of my Annual Inspection Report for LE19. Any written comments you submit will be incorporated into the permit file.

I am recommending that your license to explore be terminated and the associated surety bond be released. Should you have any questions, please call me.

Sincerely,

C. L. Preston
Environmental Specialist

CLP/mw
Enclosure

ANNUAL INSPECTION REPORT

LICENSE: Exploration License No. 19, ND Resources, Inc.

DATE: 29 August 1986 1000 hrs.

INSPECTOR: C. L. Preston, Environmental Specialist, LQD District III

CONTACT: Al Stoik, ND Resources, Inc.

Reclamation activities are outlined in Mr. Glenn Mooney's 25 June 1985 inspection report. Restoration of the well-field was accepted by DEQ on 25 April 1983 and the NRC on 11 June 1983. Surface reclamation has been completed. Two small buildings cover the two wells that have been transferred to Milestone Petroleum.

Bond Evaluation

ND Resources' current bond is surety No. BD 19S35723 for $50,000. ND Resources was authorized to reduce the bond amount to $12,500 on 27 August 1985. No action was taken by the company to reduce the bond.

CLP/mw

CLP

APPENDIX B

Example Surface Water Monitoring Form

WWC ENGINEERING
WATER QUALITY SAMPLING FIELD FORM
For STRATA ENERGY

Name:_________________________________**Date:**__________**Time**:_________

Landowner
Name:________________________
Address_______________________
Phone#________________________

Legal Location
Qtr/Qtr___________
SEC_____________
TWN____________
RNG ____________

Picture #(s)_________________

Stock_________________
Domestic_______________

SEO Permitted Facility Name:_________________

Permit No._____________

Location (Decimal Degrees)
Lat_________________
Long________________
Elev.________________

Water Quality
pH____________________
Cond.__________________
Temp. ^{o} C______________
Turbidity (ntu)__________
D.O. (mg/L)____________

Water Level (ft):_________________________

% Combustible Gas: ________

Casing Height (ft):______________________

Ambient Air Temp:__________

Comments:____
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APPENDIX C

Proposed Well Installation Methods

Ross Project
Well Installation Procedures

Method 1 (See Method 1, Appendix C Drawing)
For Recovery and Injection Wells

1. A pilot hole is drilled to a diameter of 5 to 6.5 inches through the projected mineralization. Geophysical logs consisting of gamma, resistivity, self potential, and deviation are then completed. The grade of each mineralized intercept is calculated.

2. If after geophysical logging, it is determined that the mineralization is not of sufficient quality or that the ore continuity is inadequate to warrant completion, the hole is sealed from the bottom to the top with neat cement slurry. An Abandonment Record is then completed for each sealed hole.

3. Assuming the decision is reached that completion of the well is warranted, the hole is reamed to a diameter of 8 to 10 inches (A minimum of 3 inches larger than the casing O.D.) to a depth that is approximately 15 feet past the bottom of the mineralization. An option is to drill to the final diameter of 8 to 10 inches in one pass followed by the geophysical logging.

4. PVC casing (minimum rating of SDR17) with an outside diameter (O.D.) of 5 to 6.5 inches is placed in the reamed hole to a depth which is approximately 10 feet past the bottom of the mineralization. PVC centralizers are placed on the casing string at a maximum spacing of one per 40 feet.

5. A calculated amount of neat cement slurry is mixed to the required specifications (approximately weight of 15 lbs. / gallon) and placed inside the casing through a cementing head. A calculated amount of displacement water is then pumped into the casing which forces the cement slurry out the bottom of the casing and up the annulus between the casing and the reamed hole. After displacement, the valve on the cementing head is closed which holds the cement in place while hardening occurs.

6. After a minimum of four days, the well is underreamed through the mineralized zones to a diameter of 10 to 14 inches. The well annulus must be topped off with cement to the surface prior to reentry by the drilling rig. The underreaming is completed by a specialized tool utilizing retractable blades. The well may be caliper logged to verify that the correct interval has been opened.

7. If deemed necessary, PVC screen is telescoped into the casing to support sand zones that are not competent within the underreamed interval. The uppermost screen openings will be placed below the top of the underreamed interval and below the bottom of the annular seal. A PVC riser pipe is extended from the top

of the screen approximately 10 feet. A seal between the riser pipe and the casing is provided by one or more k-packer(s). Filter sand may be placed between the screen and the underreamed hole.

8. The well is developed by pumping, air lifting, and/or swabbing to clean and improve the hydraulic efficiency of the well. A Well Installation Record is completed which contains all the details on drilling, geophysical logging, completion materials, casing depth, completion interval, and the cement mix.

9. After drying, the drill cuttings contained in the pits are covered with subsoil and the separately stockpiled topsoil. The ground surface is then recontoured and reseeded.

10. The well is integrity tested using a pressure based integrity test. Inflatable packers are placed near the top and bottom of the casing string. The packers are inflated and the interval between the packers is pressurized with water to the test pressure (possibly the maximum allowable injection pressure plus a safety factor of 20%). This pressure must be maintained within a specified percentage (possibly 10%) for a specified time period (possibly 10 minutes) to pass the integrity test. An alternative to using a top inflatable packer may be utilized where the top of the casing is sealed by a specially designed flange top. A Well Integrity Record is completed for each tested well.

Method 2 (See Method 2, Appendix C Drawing)
For Monitor or Hydrologic Test Wells

1. A pilot hole is drilled to a diameter of 5 to 6.5 inches through the projected completion interval. Geophysical logs consisting of gamma, resistivity, self potential, and deviation are then completed.

2. The hole is reamed to a diameter of 8 to 10 inches (A minimum of 3 inches larger than the casing O.D.) to the top of the zone to be completed. The pilot hole below the bottom of the reamed hole is filled with drill cuttings during the reaming process.

3. PVC casing (minimum rating of SDR17) with an O.D. of 5 to 6.5 inches is placed in the reamed hole. PVC centralizers are placed on the casing string at a maximum spacing of one per 40 feet.

4. A calculated amount of neat cement slurry is mixed to the required specifications (approximately weight of 15 lbs. / gallon) and placed inside the casing through a cementing head. A calculated amount of displacement water is then pumped into the casing which forces the cement slurry out the bottom of the casing and up the annulus between the casing and the reamed hole. After displacement, the

valve on the cementing head is closed which holds the cement in place while hardening occurs.

5. After a cement-hardening period of at least two days, the designated completion interval is cleaned out below the casing to the pilot hole diameter. The well annulus must be topped off with cement to the surface prior to reentry by the drilling rig. If the sand zone is competent, the completed interval may be left open and unsupported. If PVC screen is necessary, and a clean hole has been drilled, the screen assembly may be installed immediately. Underreaming of the completed interval to a larger diameter may be completed prior to the installation of the screen. The uppermost screen openings will be placed below the bottom of the casing and the annular seal. A PVC riser pipe is extended from the top of the screen approximately 10 feet. A seal between the riser pipe and the casing is provided by one or more k-packer(s). Filter sand may be placed between the screen and the underreamed hole.

6. The well is developed by pumping, air lifting, and/or swabbing to clean and improve the hydraulic efficiency of the well. A Well Installation Record is completed which contains all the details on drilling, geophysical logging, completion materials, casing depth, completion interval, and the cement mix.

7. After drying, the drill cuttings contained in the pits are covered with subsoil and the separately stockpiled topsoil. The ground surface is then recontoured and reseeded.

8. The well is integrity tested using a pressure based integrity test. Inflatable packers are placed near the top and bottom of the casing string. The packers are inflated and the interval between the packers is pressurized with water to the agreed on test pressure. This pressure must be maintained within a specified percentage (possibly 10%) for a specified time period (possibly 10 minutes) to pass the integrity test. An alternative to using a top inflatable packer may be utilized where the top of the casing is sealed by a specially designed flange top. A Well Integrity Record is completed for each tested well.

Method 3 (See Method 3, Appendix C Drawing)
For Monitor or Hydrologic Test Wells

1. A pilot hole is drilled to a diameter of 5 to 6.5 inches to the top of the projected completion interval. Geophysical logs consisting of gamma, resistivity, and self potential are then completed.

2. The hole is reamed to a diameter of 8 to 10 inches (A minimum of 3 inches larger than the casing O.D.). An option for this method is to drill to the final hole diameter of 8 to 10 inches in one pass followed by the geophysical logging.

3. PVC casing (minimum rating of SDR17) with an O.D. of 5 to 6.5 inches is placed in the reamed hole. PVC centralizers are placed on the casing string at a maximum spacing of one per 40 feet.

4. A calculated amount of neat cement slurry is mixed to the required specifications (approximately weight of 15 lbs. / gallon) and placed inside the casing through a cementing head. A calculated amount of displacement water is then pumped into the casing which forces the cement slurry out the bottom of the casing and up the annulus between the casing and the reamed hole. After displacement, the valve on the cementing head is closed which holds the cement in place while hardening occurs.

5. After a cement-hardening period of at least two days, the designated completion interval is drilled below the casing with a bit that is smaller than the casing inside diameter (I.D.). The well annulus must be topped off with cement to the surface prior to reentry by the drilling rig. Geophysical logs consisting of gamma, resistivity, self potential, and deviation are then completed in the newly drilled hole. If the sand zone is competent, the completed interval may be left open and unsupported. If PVC screen is necessary, the completion interval may be underreamed to a larger diameter prior to the installation of the screen. The uppermost screen openings will be placed below the bottom of the casing and the annular seal. A PVC riser pipe is extended from the top of the screen approximately 10 feet. A seal between the riser pipe and the casing is provided by one or more k-packer(s). Filter sand may be placed between the screen and the underreamed hole.

6. The well is developed by pumping, air lifting, and/or swabbing to clean and improve the hydraulic efficiency of the well. A Well Installation Record is completed which contains all the details on drilling, geophysical logging, completion materials, casing depth, completion interval, and the cement mix.

7. After drying, the drill cuttings contained in the pits are covered with subsoil and the separately stockpiled topsoil. The ground surface is then recontoured and reseeded.

8. The well is integrity tested using a pressure based integrity test. Inflatable packers are placed near the top and bottom of the casing string. The packers are inflated and the interval between the packers is pressurized with water to the agreed on test pressure. This pressure must be maintained within a specified percentage (possibly 10%) for a specified time period (possibly 10 minutes) to pass the integrity test. An alternative to using a top inflatable packer may be utilized where the top of the casing is sealed by a specially designed flange top. A Well Integrity Record is completed for each tested well.

APPENDIX D

Groundwater Model Work Plan

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Appendix D

Groundwater Model Work Plan

This appendix is being provided as an update to the groundwater modeling discussion presented in the preliminary baseline sampling plan submitted to the regulatory community in November of 2009. This appendix supplements information presented to the Wyoming Department of Environmental Quality Land Quality Division staff on February 9, 2010. The plan presented herein represents the proposed groundwater modeling strategy based on current information. As additional data from ongoing geological modeling, aquifer testing, and drill hole core sample testing become available, the model and modeling strategy will be adjusted accordingly. Any significant modification to this Work Plan will be discussed with LQD prior to implementation.

A three-dimensional groundwater model has been proposed to predict impacts the Ross ISR Uranium Project may have on water resources within the area, and to provide operational feedback. The hydrogeologic model platform is the USGS Three Dimensional Finite Difference Modular Groundwater Flow Model (MODFLOW) (MacDonald and Harbaugh 1988) and the pre/post processor, Groundwater Vistas (Rumbaugh and Rumbaugh, 2007).

The Ross Area hydrogeologic information on which the model will be based includes published literature, unpublished data from the Nubeth Research and Development project conducted by Nuclear Dynamics in the late 1970's, aquifer tests conducted in 1977 and 1978, and preliminary results from recent monitor well installations (pumping tests have not been conducted on the new monitor wells as of 3/22/10). Key information that will be used to develop the groundwater model include:

- Head data from monitor wells recently constructed through the project area. The monitor wells were constructed to monitor four different zones from shallow to deep within the project area. The four zones include: 1) The surficial aquifer (SA) which, as the name implies, is the surficial aquifer within the project area, and typically displays water table conditions. 2) The shallow monitoring zone (SM). This zone corresponds to the first aquifer (typically confined) located above the ore-containing zone which is separated from the ore zone by low-permeability strata. 3) The next monitored aquifer is the ore zone (OZ), this confined aquifer contains the uranium targeted for mining. 4) The lowest monitored zone is the deep monitoring zone (DM), a thin, water-bearing confined sand located between 150 and 300 feet below the ore zone, separated from the ore zone by shale. Because of the thick isolating layer of shale between the DM and the OZ, it is anticipated that DM zone will not be included in the model, but will be monitored to demonstrate isolation from the overlying ore zone.
- Aquifer analyses by Paul Manera (1977) and Judith Hamilton (1977) prepared for NuBeth's Ross pilot ISR project. The analyses include potentiometric surfaces for the OZ and SM aquifers, aquifer parameters including (transmissivity, hydraulic conductivity, storativity and porosity), and degree of hydraulic connection (or lack there of) between aquifers. No leakage between aquifers was reported.
- Water levels from existing stock, domestic, and industrial wells available from recent sampling efforts initiated by Strata, and from existing databases (such as the database maintained by the State Engineer's office) will be used (as available) to develop potentiometric surfaces within the project area.
- Strata's GEMCOM three-dimensional geologic model assembled from borehole data from the 1970's and ongoing drilling. Geologic layers developed from this model will form the basis of the physical parameters for the groundwater model.
- 1982 South Dakota School of Mines masters thesis prepared by M.D. Buswell. Mr. Buswell was the project geologist during the initial research and development phase of the Ross area in the late 1970's. Buswell's thesis discusses uranium deposition and groundwater movement through the Ross project area. In general, he postulates that uranyl-bearing groundwater migrated down dip and then preferentially depending on ancient deposition patterns depositing the uranium bearing roll fronts that exist today.
- Numerous USGS publications and other professional papers describing the geology and aquifer characteristics within the project area. Published literature will be used to estimate aquifer characteristics in those areas where little data are available.

Based on our existing understanding of the Ross Area hydrostratigraphy, the model will include seven distinct layers consisting of four aquifers and three low permeability confining intervals. Modeling goals and objectives include:

1) Determination of adequate perimeter well spacing/setback distances on the up-, side-, and down-gradient portions of the project area as they relate spatially to proposed mining units.

2) Demonstration of the ability to identify and remedy a lateral excursion (i.e., mining lixiviants moving out of the ore zone).

3) Evaluation of potential impacts to the surficial aquifer and the surface water features.

4) Identification of potential impacts to adjacent water rights.

5) Restoration time estimates, and restoration efficiency analysis.

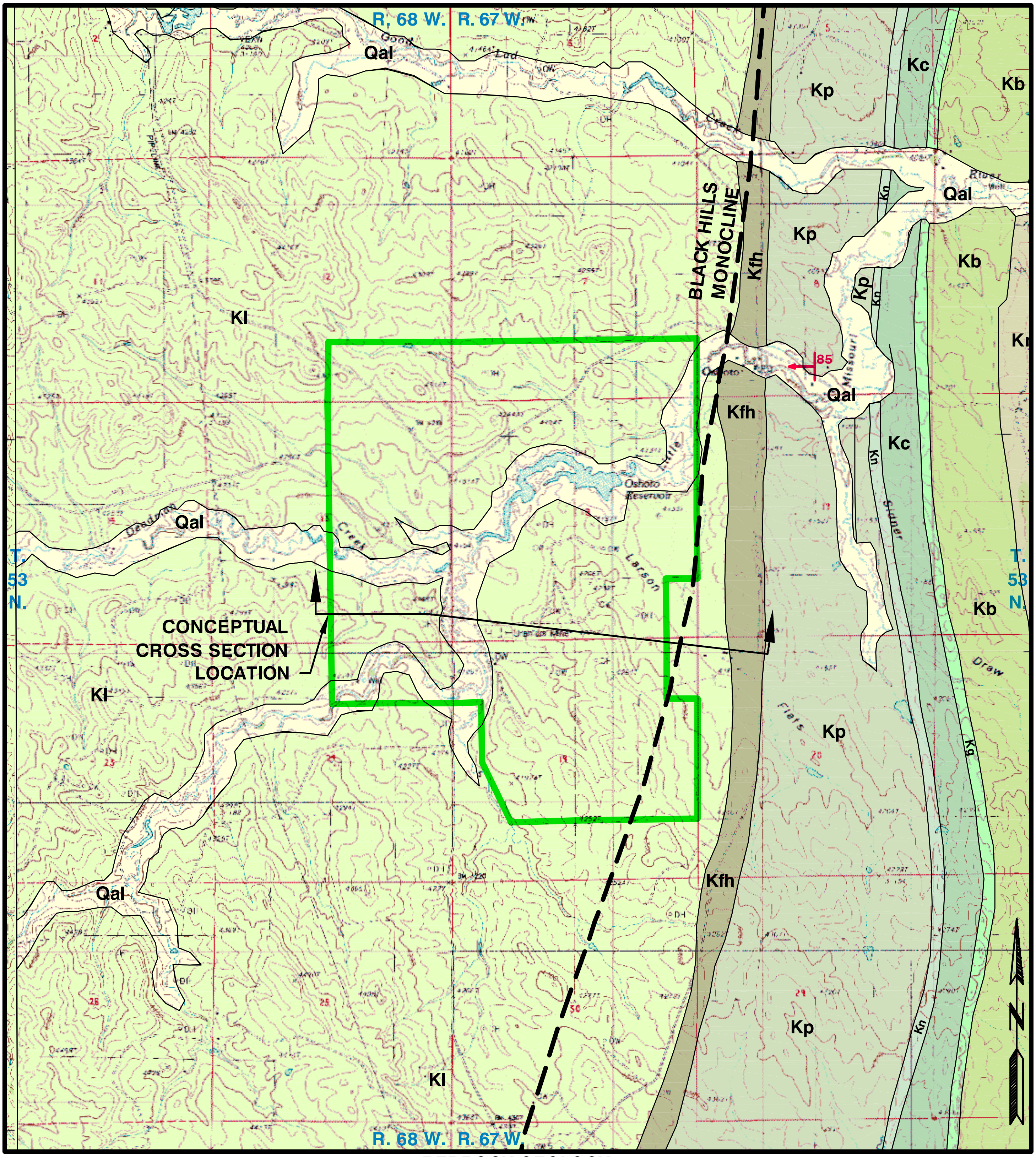
6) Wellfield optimization.

7) Evaluation of the potential role that improperly sealed exploration/delineation boreholes may play in subsurface hydrology.

8) Estimation of the bleed rate necessary to maintain a cone of depression in the well field.

9) Estimation of the long term effects to the aquifer system resulting from mining.

The dominant structural feature in the vicinity of the Ross Area is the Black Hills Monocline, an area of near vertical dip on the western flank of the Black Hills Uplift. West of the Monocline, strata are nearly flat-lying (2 degree dip westward). Figure 1 portrays the bedrock geology of the site along with the approximate trace of the Black Hills Monocline. East of the monocline the strata rise steeply with the Fox Hills Sandstone outcrop less than 1000 feet to the east. The measured dip of the Pierre Shale just east of Oshoto, WY is 85 degrees westward.



BEDROCK GEOLOGY

SCALE: 1" = 3,000'

LEGEND

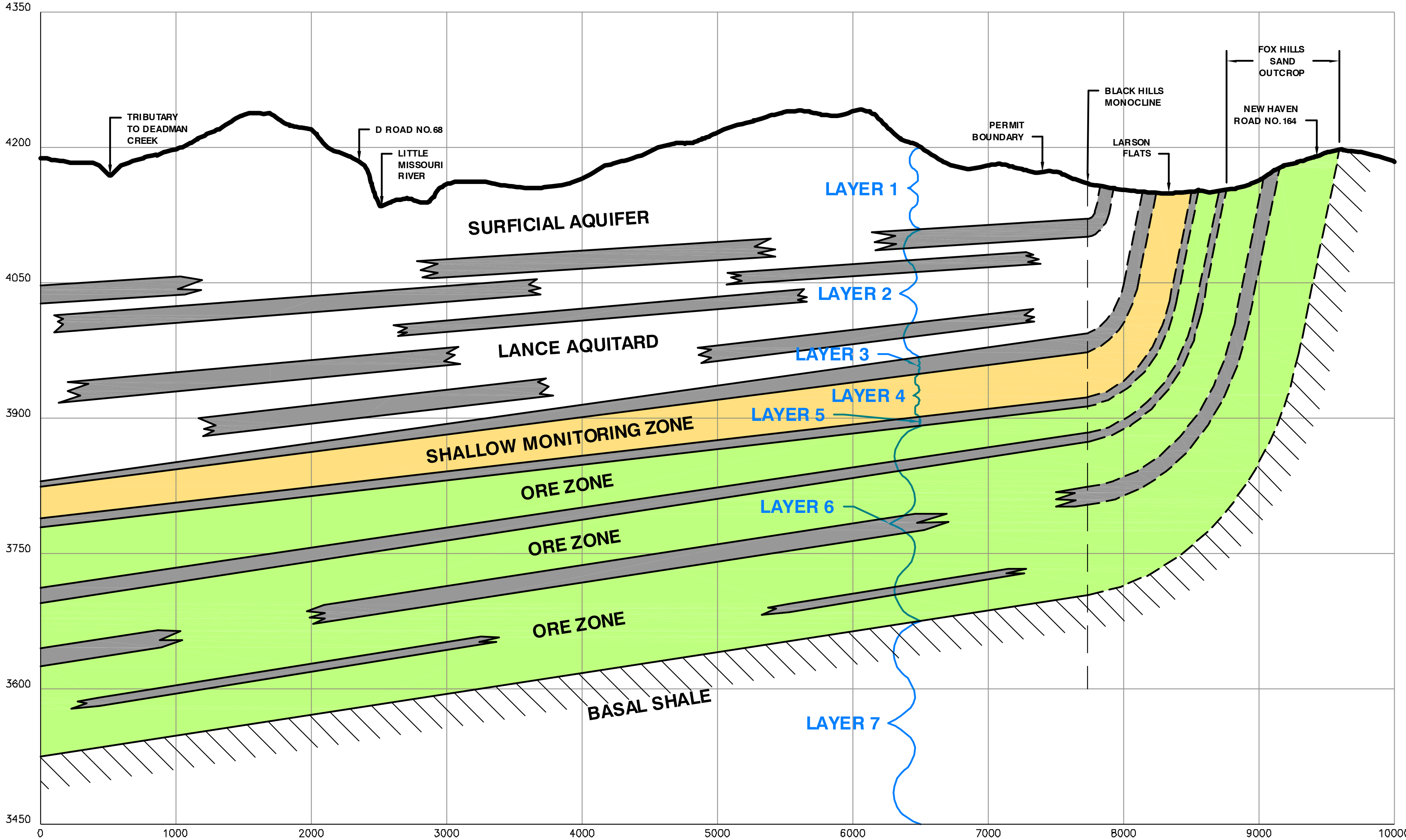
Qal	Alluvium (Holocene)
Tft	Fort Union Formation, Tullock Member (Tertiary)
Kl	Lance Formation (Upper Cretaceous)
Kfh	Fox Hills Sandstone (Upper Cretaceous)
Kp	Pierre Shale (Upper Cretaceous)
Kn	Niobrara Formation (Upper Cretaceous)
Kc	Carlile Shale (Upper Cretaceous)
Kg	Greenhorn Formation (Upper Cretaceous)
Kb	Belle Fourche Shale (Upper Cretaceous)
Kmr	Mowry Shale (Lower Cretaceous)
Knc	Newcastle Sandstone (Lower Cretaceous)
Ksc	Skull Creek Shale (Lower Cretaceous)
Kfr	Fall River Formation (Upper Cretaceous)
85	Field Verified Dip

Geology adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

Figure 1

The project area is situated on the Lance Formation outcrop. Underlying the Lance Formation is the Fox Hills Sandstone and the Pierre Shale. The Pierre Shale is a thick marine shale (roughly 2,400 feet thick in the project area) that generally yields very little water (Langford, 1964). The Fox Hills Sandstone is a sequence of marginal marine to estuarine deposits deposited during the eastward regression of the Upper Cretaceous Pierre Sea. In the Ross area, the Fox Hills Sandstone consists of an upper and a lower unit separated by 30 to 50 feet of intervening shale. The lower unit consists of offshore-marine and transitional-marine shale, siltstone, and fine grained sandstone and is not known to contain uranium. The upper unit consists of uranium bearing organic, thinly-bedded claystone, siltstone, and sandstone (Dodge and Spencer, 1977). Within the project area, mineralization primarily occurs within the upper Fox Hills sandstone, although in localized areas there is some mineralization within the overlying Lower Lance Formation sandstone. The Lance Formation depositional environment has been interpreted as being fluvio-deltaic in origin (Buswell, 1982). The Lance Formation consists of a mixture of non-marine deposited sandstones, floodplain mudstones, with thin beds of coal (Conner, 1992).

As described above, the depositional environment of the lower Lance Formation and the Fox Hills Sandstone created stratigraphy that is complicated and vertically heterogeneous. Due to the size of the project area and scarcity of data it would be impossible to model each individual sand and shale layer. As such, reasonable simplifying assumptions, based on geologic models prepared within the project area were applied to minimize the number of layers within the model. Figure 2 depicts a



CONCEPTUAL CROSS SECTION

6.67:1 VERTICAL EXAGERATION

Black Hills Monocline adapted from Sutherland, W.M., 2008, Geologic Map of the Devils Tower 30' X 60' Quadrangle, Crook County, Wyoming, Butte and Lawrence Counties, South Dakota, and Carter County Montana: Wyoming State Geological Survey Map Series 81, Scale 1:100,000.

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

Figure 2

conceptual cross section of the strata within the project area and identifies the seven model layers. A brief description of the seven units is provided below.

1) Layer 1 will consist of the surficial aquifer (SA) and associated surface water features (Oshoto Reservoir, Little Missouri River, and Deadman Creek.) The surficial aquifer is contained within the Lance Formation and the alluvium of the Little Missouri River and Deadman Creek. The surficial aquifer is under water table conditions (Hamilton, 1977). With the exception of the alluvial material which is considered to be relatively homogeneous, the SA is assumed to be vertically heterogeneous. Accordingly, the horizontal hydraulic conductivity (Kxy) is expected to be greater than the vertical hydraulic conductivity (Kz), groundwater flow is expected to be preferentially in the horizontal direction.

2) Layer 2 is termed the Lance Aquitard. The Lance Aquitard consists of numerous interbedded sandstone and shale layers within the Upper Lance Formation. The total thickness of layer 2 ranges from 100 to 250 feet within the project area. Based on geologic evaluations/interpretations, the Lance Aquitard consists of both continuous and discontinuous shale layers. The Lance Aquitard will be modeled as a single interval. The Kz will be lower than the Kxy, to simulate the heterogeneity of the interbedded shales and sands. Since the Lance Aquitard is located above the SM zone and below the SA zone and appears to be hydraulically separated from each respective zone, this layer is not considered a key hydrologic entity. However, since layer 2 represents a large portion of the model thickness, assigning it the same low permeability properties assigned to underlying layer 3 would be erroneous. As such, treating layer 2 as a heterogeneous aquitard is the most efficient way to accurately model this layer.

3) Layer 3 is the shale separating the Lance Aquitard from the shallow monitoring (SM) zone. Existing data suggest that the SM zone is confined by a low permeability shale that appears to be contiguous throughout the project area. Layer 3 is believed to be the upper confining layer for the SM zone described below. Layer 3 ranges in thickness from 5 to 30 feet within the project area.

4) Layer 4 is referred to as the shallow monitoring zone (SM). The first continuous aquifer above the ore zone. As with the Lance Aquitard in Layer 2, the SM zone is contained within the Upper Lance Formation, is fluvio-deltaic in origin, with Kxy>>Kz. Several inter-tongued discontinuous shales have been identified in the bore logs within the shallow monitoring zone. To simulate the heterogeneity Kxy will be much greater than Kz. The ratio will be determined from aquifer tests performed on newly

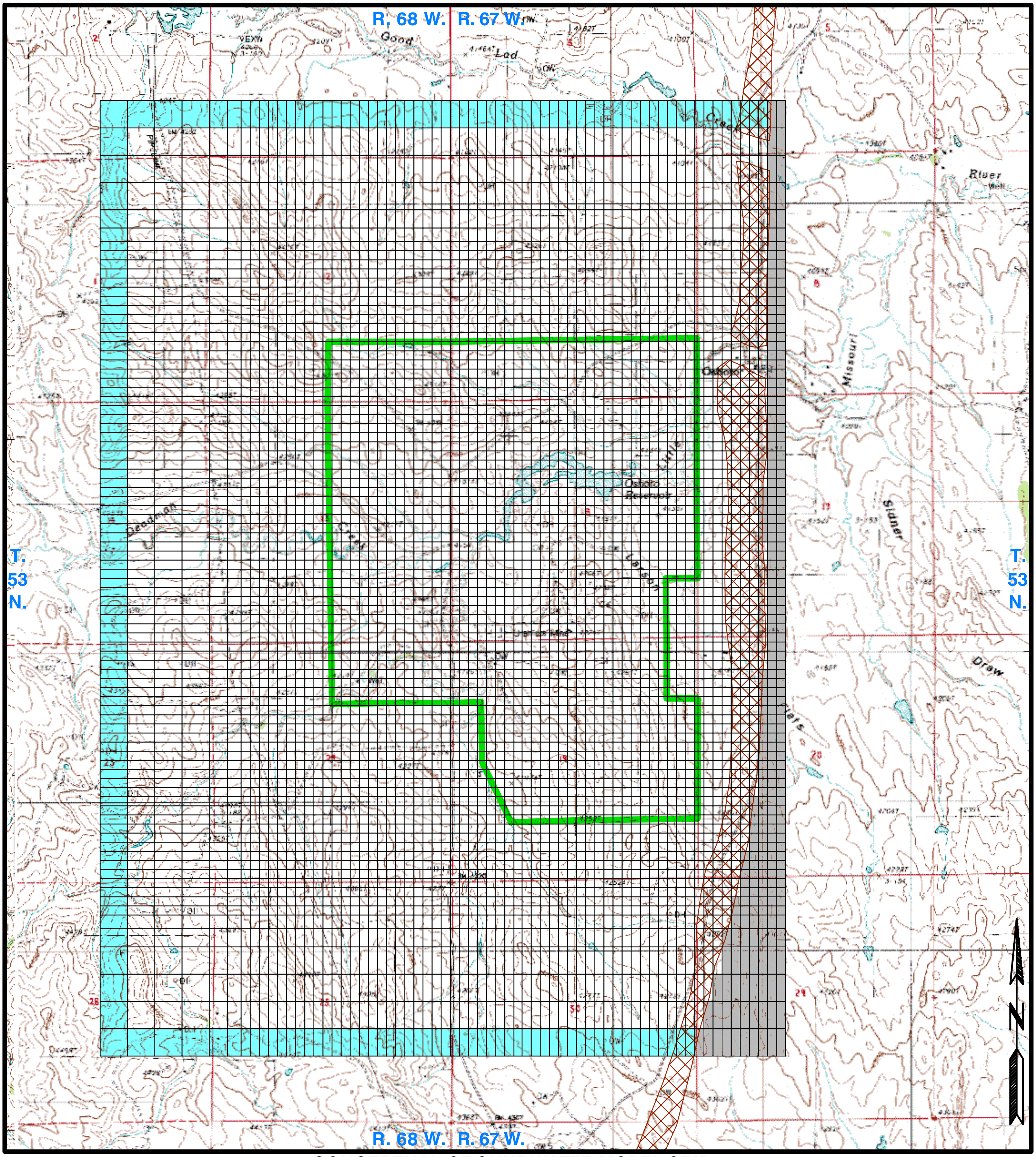
installed monitoring wells. Thickness of the SM zone ranges from 15 feet to in excess of 100 feet.

5) Layer 5 is the shale separating the shallow monitoring zone from the zone. This shale serves as the upper confining layer for the ore zone and is laterally contiguous across the site. Hydraulic conductivity in Layer 5 is very believed to be low due to the lack of leakance observed during pump tests (Hamilton, 1977) and the differences in potentiometric head in the OZ and SM zones recently recorded in the monitor wells. The shale composing Layer 5 ranges from 5 feet to 30 feet in thickness.

6) Layer 6 is the ore zone (OZ). The ore bodies lie primarily within the upper Fox Hills Formation with minor mineralization occurring in the lower Lance Formation. Available data indicates the ore zone is primarily comprised of sandstone with sporadic low permeability intervals and includes the entire mineralized zone which occurs in only a portion of the hydrologic layer. Therefore this layer will be modeled as one zone. The entire thickness of the ore zone layer ranges from 125 to 200 feet thick within the project area.

7) Layer 7 is the basal confining layer. This layer, believed to be a marginal marine clay of the lower Fox Hills Sandstone (Buswell, 1982) is continuous throughout the project area. Thickness ranges from 30 to 50 feet. Because this layer is thick and the potentiometric surfaces measured in the monitor wells indicate hydraulic separation from the DM zone, it will serve as the base of the model.

Proposed model extents and grid spacing are shown on Figure 3. As currently conceived, the model area extends approximately 5000 feet north, south, and west of the project boundary. The model domain size was based in part on observed drawdowns from oil field water flood supply wells currently operating inside the project area. These drawdowns have occurred in large part since 1985, and will be replicated with the model as part of the verification process. On the east side of the project area the model will extend slightly past the Fox Hills Sandstone outcrop (approximately 2000 feet east of the project boundary). Within the project area, the grid spacing will initially be 200 feet by 200 feet. The 200 foot square grid spacing was chosen because much



CONCEPTUAL GROUNDWATER MODEL GRID

SCALE: 1" = 3,000'

LEGEND

- MODEL GRID
- FOX HILLS OUTCROP (RECHARGE ZONE)
- CONSTANT HEAD BOUNDARY
- NO FLOW BOUNDARY

Fox Hills sand outcrop adapted from Halberg, L.L., Et. Al., Geologic Map of the Sundance 30' X 60' Quadrangle, Crook and Weston Counties, Wyoming and Lawrence and Pennington Counties, South Dakota: Wyoming State Geological Survey Map Series 78, Scale 1:100,000.

Figure 3

of the drilling within the project area was performed on 200 foot or greater spacing. The grid density of the model will be increased as necessary to achieve accurate results. Approximately 2,000 feet outside of the project boundary, the model grid spacing will be increased, telescoping out to grid cells that are 200 by 600 feet near the outer fringes of the model.

The proposed boundary conditions for the groundwater model are based on our current understanding of the local hydrogeology. The Fox Hills Sandstone outcrop east of the project area is believed to be the principle recharge area within the ore zone and will be modeled as a prescribed flux boundary. Recharge for some of the lower Lance Formation sandstones may also come from outcrops to the east as well. Based on information presented by Buswell (1982) recharge is also expected to enter the project area from the south. The east side of the project is bounded by the low permeability Pierre Shale and will be modeled as a no-flow boundary. In all of the aquifers, a constant head boundary will be assigned to the northern, southern, and western edges of the model. Since the northern, southern, and western edges of the model are more than 1 mile from any potential mining model, edge effects from the constant head boundaries are not expected. If, during the course of the modeling effort, edge effects are noted the size of the model will be increased accordingly.

Model preparation will be a four step process comprised of steady state, calibration, mine simulation, and long term recovery. The steady state model will be constructed to simulate the pre-1978 potentiometric surface. To prepare the steady state model, initial hydraulic parameters for each layer will be estimated based on published literature along with measured values from core and aquifer testing, and adjusted, within reason during the modeling process.

Starting with potentiometric surfaces created from the steady state model, the calibration model will be prepared to simulate influences to the ore zone potentiometry that have occurred since 1978. Currently within the project area there are three wells completed in the ore zone that are providing water for an oil flood operation. One of these wells is also screened in the deep monitoring zone. These source wells have been in operation since about 1985 and have impacted ground water levels in the ore zone within the project area. Based on water level sampling at the recently constructed monitor wells in the project area, only the ore zone appears to have been impacted by the water flood supply wells. During calibration, pumping from the source wells will be simulated for 25 years. The predicted potentiometric surface after 25 years of pumping will then be compared to the measured 2010 potentiometric surface. If the modeled potentiometric surface does not match the 2010 potentiometry, adjustments will be made to hydraulic parameters in the model until the two surfaces match. The calibrated model and potentiometric surface developed during calibration will then be used to simulate mining within the project area.

To simulate mine operations, a series of five-spot well patterns (four injection, one withdrawal) configured like those that will be used during mining will be inserted into the model, and turned on and off through time to simulate mine progression. The model will enable users to optimize well spacing, discharge and injection rates to increase ore recovery effectiveness. If necessary, the grid spacing within the model will be tightened in the portions of the model where mining will be simulated. Ore zone restoration will be occurring concurrently with mining as additional modules are brought on-line. As such, the bulk of the restoration will likely occur during the mine simulation portion of the modeling effort.

The recovery portion of the model will assess long term impacts hydrologic (if any) to the project area. As mentioned above, it is anticipated that much of the aquifer restoration will occur during mining. As such, the recovery portion of the model will be focused primarily on the long term impacts to the aquifer within the project area.

During modeling, sensitivity analyses will be performed to establish model credibility. The sensitivity analyses will consist of varying hydraulic parameters to determine those parameters most critical to the model results, thereby focusing future data collection efforts.

As development progresses, additional data such as well flow rates, hydraulic conductivity, leakage between layers, etc. can be either inferred or directly measured and used to continuously update the model. Further refinement of the model can be used to assess the adequacy of the existing monitoring network and make recommendations on the need for additional monitoring wells. The groundwater model will be a valuable tool in helping to understand the subsurface interactions within the Ross ISR mine area and will ensure that the monitoring network is adequate, the production well configuration and operation minimizes the potential for excursions, and that the time devoted to reclamation is adequate to ensure the system is returned as nearly as possible to preexisting conditions.

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APPENDIX E

Aquifer Testing Work Plan

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Appendix E

Aquifer Testing Work Plan

Revised May 13, 2010

INTRODUCTION

Aquifer testing at the Ross ISR facility will be conducted at each of the six baseline monitoring well clusters. Well cluster locations are depicted on Exhibit 5. The six monitoring well clusters consist of four wells completed in zones comprised of the ore zone (OZ - the mining target), deep monitor (DM - completed in the first discrete aquifer beneath the ore zone), shallow monitor (SM - completed in the first discrete aquifer above the ore zone) and surficial aquifer (SA - completed in the water table). At a minimum, the ore zone well at each respective cluster will be pumped with drawdown recorded in the ore zone well, and the cluster monitoring wells.

The testing program will determine the hydrologic parameters of hydraulic conductivity (K), transmissivity (T), and storativity (S) within the ore zone. Additionally, vertical and horizontal anisotropy within the ore zone and leakance of confining layers above and below the ore zone will be measured. At each cluster, the ore zone well will be pumped and water levels will be measured in the surficial, shallow, and deep monitoring wells. At the 12-18 well cluster, three additional observation wells will be completed in the ore zone in order to conduct tests to measure horizontal and vertical anisotropy within the interval. Strata proposes to conduct more extensive testing at this cluster because it is located nearest to the area where mining will begin. Data acquisition and analysis will be in accordance with ASTM methods (ASTM, 1996) for analysis of hydrologic parameters.

WELL COMPLETIONS

Three additional ore zone observation wells (piezometers) will be constructed at the 12-18 cluster. The wells will be completed in the ore zone using methods and designs used on the existing baseline wells (see Appendix C for well completion details). The wells will be located approximately 70 feet from the existing ore zone well in three of the four cardinal directions. All new wells are permitted through the WSEO.

PUMPING TEST PROGRAM

Antecedent Conditions

An aggressive exploration hole finding program has been initiated at the Ross project starting in early 2009. Prior to test pumping, all exploration/delineation holes that can be located within 500 feet of the pumping well will be re-entered and plugged with cement from the bottom to ground surface. Plugging/abandonment records will be kept on file at Strata's Oshoto field office.

Excepting the surficial aquifer wells, all monitoring wells at the site are outfitted with recording pressure transducers. These transducers collect background water level and temperature data continuously. Data collection was initiated in January 2010 and will continue through permit approval. Background measurements are collected hourly. During stress periods (i.e. sampling or testing) data are collected by the minute. The pressure transducers are non-vented, which means they measure barometric effects in the aquifer. Barometric pressure is recorded at the site hourly to evaluate the barometric response of the wells. Barometric effects on well response will be separated from pumping stress.

To the extent practicable, abstractions from all wells in the area will be measured during the pre-test period, and through the testing period, including the recovery period.

Test Discharge Rate and Duration

Based on air lift discharge rates during development, discharges from the ore zone wells will be variable. With the exception of the SA wells, all wells are outfitted with dedicated submersible pumps set approximately 23 feet above the screen interval. The OZ wells are equipped with 2.5hp pumps. These pumps are capable of discharging up to 20 gpm. Anticipated pumping test constant discharge rates will range from 5 gpm to 15 gpm. The duration of the tests will range from 8 to 72 hours. Ultimate test duration will depend on a number of factors, including response in the observation wells and drawdown in the pumping wells. Ultimate test duration will be determined in the field based on actual well response. Field data will be collected and analyzed in real time to determine if boundary or equilibrium conditions are encountered. Example field forms are included in this appendix.

Discharge Management

The handling of pumping test discharge water will be permitted through WDEQ/WQD temporary WYPDES program (Permit No.WYG720229 approved on April 23, 2010) The permit will require effluent monitoring for TDS, TSS, pH, radium and dissolved uranium. Daily maximum limits for these parameters are:

- TDS 5,000 mg/L
- TSS 90 mg/L
- pH 6.5-9.0 s.u.
- Radium 60 pCi/L
- Uranium 5 mg/L

TEST PROCEDURES AND METHODS OF ANALYSIS

Test Types

All well tests conducted at the Ross site will be of the multi-well variety. The OZ wells at each cluster will be pumped with drawdown measured in the associated DM, SM, and SA wells. These tests will measure T in the OZ wells and leakance (Kv) in the confining layers above and below the OZ. A multi-well test including three OZ observation wells will also be conducted at the 12-18 cluster to measure T, S, and directional T. The OZ observation wells will be purposely completed in a partially penetrating fashion so that one observation well can be pumped and drawdown measured in neighboring wells in order to measure vertical anisotropy in the ore zone using the method of Way and McKee (1982).

Water Level Measurement

Water levels will be measured with Insitu® level troll 500 data logging pressure transducers. Application information is included in the following table. Prior to each pumping test, water levels will be measured to the nearest hundredth foot with an electronic water level probe. Prior to testing well transducers will be set to record head changes once per minute through drawdown and recovery. All well response and discharge data will be kept in a spreadsheet which will be furnished with the permit application.

Monitor Well Transducer Specifications

Well Type	Transducer	Parameters Measured	Accuracy/Resolution
SA, SM	Level Troll 500 100 psi	temp, pressure level	Temp ±0.1° C/0.01°C Press. ± 0.1%/± 0.005%
OZ DM	Level Troll 500 300 psi	temp, pressure level	Temp ±0.1° C/0.01°C Press. ± 0.1%/± 0.005%

Discharge Measurement

Given the relatively small discharge, a calibrated bucket and stopwatch will be used to measure flow. Flow will be measured at least hourly through the first eight hours of the test, and then on four- six hour intervals for the remainder.

Flow management

Flow will be regulated with a Dole orifice valve and gate valve combination.

METHODS OF ANALYSIS

Pumping test data will be analyzed using the method(s) appropriate to the observed well responses. Depending upon the response recorded in the observation and pumping wells, i.e. confined, unconfined, leaky confined, partial penetration, and determination of anisotropy, one or more of the following techniques will be used:

Non-leaky confined, Theis (1935); Cooper and Jacob (1946)

Leaky confined, Hantush and Jacob (1955)

Leaky confined with storage in confining layer, Hantush (1960)

Partial penetration, Hantush (1964)

Unconfined, Neuman (1972, 1975)

Resolution of ansotropy Papadopulos (1965), Neuman and others (1984), and Way and McKee (1982).

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EXHIBITS