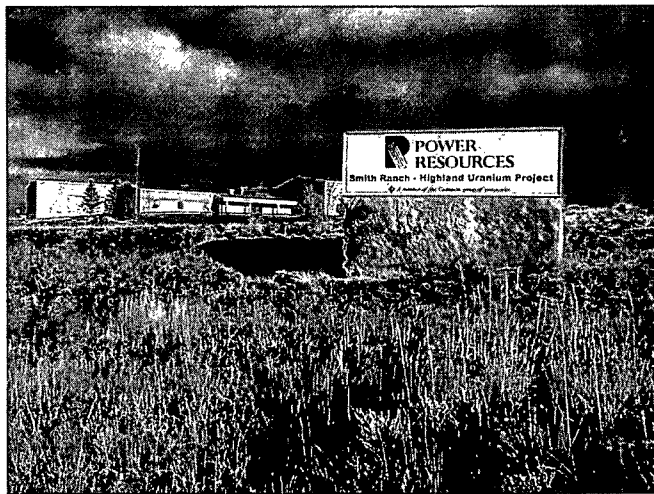


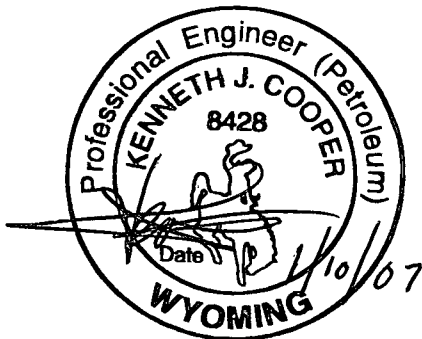


## CLASS I INJECTION WELL APPLICATION SOUTHWEST AREA

POWER RESOURCES, INC.  
SMITH RANCH/HIGHLAND URANIUM PROJECT



January 2007



Kenneth J. Cooper, P.E.

RECEIVED

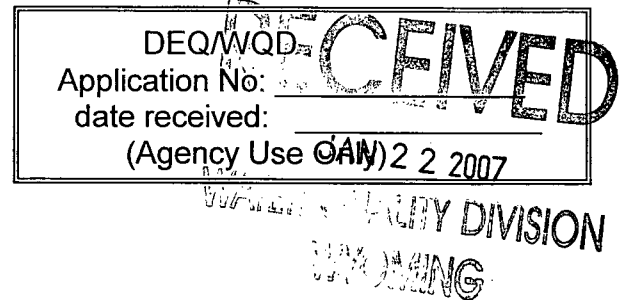
JAN 22 2007

WATER QUALITY DIVISION  
WYOMING

Prepared by:

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DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER QUALITY DIVISION  
WATER QUALITY RULES AND REGULATIONS, CHAPTER XIII (1993)



**1. Type of Application**

This application is being made for a Class I injection well permit:

New Permit XX Modified Permit       

**2. Name of Facility: Southwest Area Deep Disposal Well**

Well Location

NW ¼ NE ¼ Section 17, Township 35N, Range 74W, Sixth Principal Meridian, Converse County, Wyoming.

650 feet from the North line; 1900 feet from the East line of Section 17.

Mailing Address of the operator

Power Resources, Inc.  
Smith Ranch Highland Uranium Project  
P.O. Box 1210  
Glenrock, WY 82637

Street Address where the records will be kept

Power Resources, Inc.  
Smith Ranch Highland Uranium Project  
762 Ross Road  
Douglas WY 82633  
307-358-6541



**Name and title of responsible individual**

Steve Collings, President  
Power Resources, Inc.  
141 Union Suite 330  
Lakewood, CO 80228  
720-917-0112

**3. Name, address and telephone number of the operator on site**

Chuck Foldenauer – Mine Manager  
Power Resources, Inc.  
Smith Ranch Highland Uranium Project  
762 Ross Road  
Douglas WY 82633  
307-358-6541 ext. 11

**4. Description of the discharge**

This permit application is for the injection of wastes that are non-hazardous under the Resource Conservation and Recovery Act.

The wastes consist of operational and restoration bleed streams from commercial in situ leach uranium mining operations, including: normal overproduction (wellfield bleed) streams, yellowcake wash water, reverse osmosis brine, and groundwater sweep solutions. These waste streams are beneficiation wastes, exempt from RCRA regulation under the Bevill Amendment found in 40 CFR 261.4(b)(7).

The Standard Industrial Classification (SIC) code for this waste is 109.

**5. Area Permit**

Not applicable.

**6. Summary of the ownership**

**a. Land ownership within the Area of Review**

Land ownership within the Area of Review is shown on Figure 9 and listed in Table 11.

**b. Ownership of oil and gas lease(s) within the Area of Review**

Oil and gas ownership within the Area of Review is shown on Figure 10 and listed in Table 11.

c. Owners of mineral rights within the Area of Review

Mineral rights within the Area of Review is shown on Figure 11 and listed in Table 11.

d. Water rights within the Area of Review

Water rights within the Area of Review are shown on Figures 12 and 13 and listed in Table 12.

**7. Status as Federal, State, private, public or other entity**

Power Resources, Inc. is a privately owned company incorporated in Wyoming and a fully owned subsidiary of Cameco.

**8. Facility on Indian land?**

No

**9. CERTIFICATION**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Steve Collings  
Printed name of person signing

President  
Title

Steve Collings  
Signature of Applicant

Jan 9, 2007  
Date Signed

## ATTACHMENTS

### A. Discharge Zone(s) and Confining Layer(s)

***Name, lithologic description, depth and hydrology of all receivers from available information.***

The proposed injection well is located in the northeast quarter of Section 17, T35N-R74W (Figures 1 and 1A), Converse County, WY. The proposed disposal zone, the Lance Formation, is confined above by shales in the Fort Union Formation, and confined below by shales in the Lower Lance.

The following discussion of the geology, lithology, hydrology, and formation characteristics for the Lance Formation, and overlying and underlying confining zones is based on (1) regional and local geology from published sources and oil and gas logs, (2) logs from the Coats 1-19 well (Section 19, T35N, R74W; located approximately 1 mile southwest of the proposed PRI Class I well location), and information from the only other known Class I wells completed in the Lance (the COGEMA DW No. 1 and the Christensen 18-3; approximately 60 miles north of the PRI location).

Known economic value of the Lance sediments in the Powder River Basin includes the proven and potential hydrocarbon production and some minor potential uranium prospects on Pine Ridge (which may actually be Lower Fort Union in age). Oil production from the Lance occurs approximately 35 miles east of the proposed Class I well in the Flat Top Field (T33 & T34N, R68 & R69W, Converse County, WY). Seven wells in this field produced 320 MBO and 5.5 BCFG between 1959 and 1980; production continues to date. Based on State records, total field production from the Lance in the Powder River Basin is approximately 387 MBO and 6.1 BCFG.

#### Injection Interval

The proposed injection interval is the permeable portions of the Lance Formation, which is generically described by Connor (1992) as "*sequences of sandy, fluvial channel deposits and finer grained interfluvial deposits overlying and intertonguing with the marginal marine [and underlying] Upper Cretaceous Fox Hills Sandstone.*" The Fort Union Formation occurs above the Lance, and is composed of alternating thin sands and shales; the Fox Hills occurs conformably below the Lance Formation and is comprised of near-shore marine sands. The Lewis Shale occurs below the Fox Hills. Information pertaining to the Lance in the proposed injection well area is presented below.

The proposed injection interval includes the Upper and Mid-Lance, occurring between approximate depths of 4,750 and 7,000 feet. For calculations used in this application, a mid-point depth of 5,875 feet below ground surface (bgs) is assumed.

### **Summary of Lance Formation Data**

Data Sources:	Log data from the Coates Ranch 1-19 (surface elev. 5,774 AMSL); reservoir data from the COGEMA DW No. 1 and Christensen 18-3, both completed in the Lance.
Age:	Upper Cretaceous/Tertiary
Lithology:	Interbedded sandstones, siltstones and shales deposited under delta front/deltaic conditions
Upper Confining Zone and thickness:	Fort Union Formation (>750 feet)
Lower Confining Zone and thickness:	Lower Lance (approx. 250 feet)
Estimated Top of Lance at Well:	1,034 AMSL (approx. 4,752 RKB)
Estimated base of Lance at Well:	-1,597 AMSL (approx. 7,383 RKB)
Estimated base of Lance Injection Interval:	-1,214 AMSL (approx. 7,000 bgs; 7,033 RKB)
Gross Interval thickness:	Approx. 2,631 feet
Gross Injection Interval:	Approx. 2,281 feet
Lance Net Sand Thickness	
With Porosity >8%:	Approx. 905 feet (based on sonic log porosity)
Permeability	11.6 md (COGEMA DW #1 and CR 18-3 Falloff Tests)
Water Saturation	100%
Initial Pressure:	2,350 psi @ midpoint depth of 5,875 feet bgs (0.40 psi/ft gradient based on historic COGEMA data)

The Lance Formation is composed of terrestrial sandstones, siltstone, and shales that were deposited during initial stages of the Laramide Orogeny. The Lance Formation occurs conformably below overlying Paleocene Fort Union rocks, but may have been truncated near basin margins during Paleocene uplifts (Johnson et. al., 1997). The entire Lance sequence is of continental origin. Deposition was predominantly from east flowing, low energy, braided streams, following the final regression of the Late Cretaceous seaway.

The contact between the Lance and the overlying Tertiary Fort Union Formation is distinguished by the K - T marker bed that has been identified in outcrops by a thin anonymously iridium rich-claystone. While the Lance Formation consists of braided fluvial deposits, the deposits can be correlated regionally between oil and gas wells. Geologic cross-sections showing the Lance Formation, surrounding oil and gas wells and underlying and overlying confining zones are shown on Plates 1 through 4.

The underlying Fox Hills is predominantly deltaic /delta front sandstones and is underlain by the marine shales of the Lewis Shale (laterally equivalent to the Pierre

Shale). The Fox Hills is described as sands deposited *"along a regressive, northeast-trending, low-energy, tidally affected, wave dominated coastline...[and] consists of rocks deposited successively in marine transitional-lower shore face, upper shore face, foreshore, and tidal flat environments"* (Dodge and Crandall, 1990). Connor (1992) describes the Fox Hills as including *"coarsening upwards"* sand sequences typical of marine sequences, with the Lance Formation occurring conformably above, in association with regression of the Lewis Ocean at the end of the Cretaceous Period.

Connor (1992) indicated that the Lance Formation is about 3,000 feet thick in the proposed injection well area (Figure 2A). Henderson (1985) described the Lance Formation as being up to 500 meters thick (1,640 feet) elsewhere in the Powder River Basin. The thickness estimates described by Henderson and Connor are verified by site-specific data; Figure 3 is a regional isopach map in the vicinity of the proposed Class I well location showing the Lance thickness as approximately 2,500 to more than 3,000 feet within the AOR.

As indicated above, the Lance Formation is composed of interbedded fluvial sandstones, siltstones, and shales. At the proposed well location, the Lance Formation contains at least 900 feet of porous sandstones that are laterally continuous. Connor (1982) verifies this estimate, stating: *"...Based on geophysical logs, channel sandstones 20 feet (6m) thick or thicker make up an estimated 30% of the Lance [on a basin-wide basis]. The other 70% is composed of thinner sandstones and finer grained interfluvial sedimentary rocks."*

The Lance Formation exhibits relatively high porosities, particularly in the cleaner sandstone lenses. Hinaman (2005) assessed the groundwater volumes within the Lance/Fox Hills in the Powder River Basin, and assumed porosities of 35% for sand sequences and 30% for non-sand sequences. Sonic logs in the study area, summarized below, show that the Lance Formation exhibits a sonic porosity range from 16% to 22%.

<u>Well</u>	<u>Popskull 79-163-1</u>	<u>Coates Ranch 1-19</u>	<u>Keenan Ranch No.1</u>	<u>Smith Ranch No.1</u>
Lance Porosity	16-18%	18-20%	18-24%	16-22%

Plates 1 through 4 are local cross-sections constructed through the proposed well location. Plates 1 and 2 are SW-NE structural and stratigraphic cross-sections, respectively. Plates 3 and 4 are NW-SE structural and stratigraphic cross-sections. These cross sections show the Lance to be laterally continuous across the proposed well location. The cross-sections also verify that there is 800 to more than 900 feet of permeable sand throughout the Lance unit. These cross-sections also demonstrate confinement of the Lance by the underlying Lower Lance and the overlying Fort Union Formation.

### Structural Geology and Depth

The proposed well location is in the western portion of the Powder River Basin, approximately 2.5 miles east of the Basin axis (Figure 4; Conner, 1982). As shown on Figure 4, and Figure 5, the Lance in the vicinity of the proposed well location occurs between 600 and over 5,000 feet below ground surface. The shallow occurrences of the Lance are due to the structure of the Basin southwest of the well location. The Lance dips about 0.5% to the east/northeast toward the basin axis (Plate 1).

Figure 5 is a regional cross section that extends through the study area to the northeast, across the basin axis. Figure 5 also shows the proximity of the site to the closest nearby subdivision, Rolling Hills, which will be addressed in Attachment E of the application. Note that Rolling Hills occurs at/near the Lance formation outcrop, and the Lance is approximately 4,700 feet below ground surface at the proposed well location.

### Hydrology

Henderson (1985) described the hydrology of the Lance Formation within the Powder River Basin, stating that there are three hydrologically distinct ground-water systems that overlie the Lewis (Pierre) Shale. The lowermost aquifer system is composed of the upper part of the Fox Hills Sandstone and Lower Lance Formation that occurs above the Lewis Shale. The Fort Union and Wasatch Formations are isolated from the permeable (upper-mid) Lance by interbedded siltstones and shales of the Fort Union Formation. Henderson calculated the average flow rate of groundwater within the Lance in an area about 60 miles north of the study area to be about 0.5 to 3.5 ft/yr, with a porosity of 10-15%, a hydraulic conductivity of 0.45 ft/d, and hydraulic gradient of 0.0022 ft/ft (11.6 ft/mi). Groundwater flow is from western recharge areas to the east, with a northern component at the basin axis. In the study area, recharge occurs over 10 miles west of the proposed well location. Groundwater flow occurs from this outcrop toward the proposed well location and the basin axis, where northerly regional flow is dominant.

### Confining Layers

As shown on the geologic cross-sections (Plates 1 through 4), the Lance Formation is confined above by shales of the Lower Fort Union Formation. Confinement below the Lance injection interval is provided by shales in the Lower Lance. The continuity of these confining layers is evident on the cross-sections (Plates 1 through 4).

It is expected that the overlying shales will exhibit low permeabilities, based on laboratory analysis of cores taken from much shallower shales in the Fort Union and overlying Wasatch Formations, where PRI and COGEMA have conducted ISL mining operations. The Fort Union shale hydraulic conductivity values have been reported by PRI in the range of  $10^{-7}$  to  $10^{-8}$  cm/sec. Based on COGEMA data, the Wasatch shales exhibited a hydraulic conductivity on the order of  $10^{-8}$  cm/sec to  $10^{-9}$  cm/sec. Based on

understanding of the regional deposition in the Power River Basin, it is anticipated that the much deeper Lower Lance shales will exhibit at least the same order magnitude of permeability, or lower.

## **B. Wells Penetrating Receiver**

***A tabulation of data on all wells within the area of review which penetrate the proposed receiver. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, water quality and use, and other relative data.***

As discussed in Attachment D, the cone of influence, and subsequently, the Area of Review, for the proposed injection into the Lance Formation is small. No oil and gas production or plugged exploratory wells penetrate the receiver (the Lance Formation) within the Cone of Influence or the minimum (¼-mile AOR).

A list of wells outside the minimum AOR for the injection well, but within a 2-mile radius of the proposed Southwest Area well, is included in Table 1; the well locations are shown on Figure 6.

## **C. Geologic Cross Sections**

***a. Regional Cross Section showing the position of the well in relation to the overall structure of the basin.***

A regional cross section constructed to the east of the proposed PRI well location is presented in Figure 5. This cross section shows that the proposed Class I well location is in the deeper portion of the Powder River Basin, just east of the Basin axis.

***b. Local Cross Sections, 2 Sections at more or less right angles showing the local structure around the well for at least 3 miles.***

Plates 2 and 4 are stratigraphic cross sections through the proposed well location. Structural cross sections through the proposed well location, using the same wells as Plates 2 and 4, are presented in Plates 1 and 3. Because these cross-sections include well logs that cannot be further reduced in size without loss of clarity, the cross-sections are presented in an 11 x 17 inch format.

## **D. Area of Review (AOR)**

The Area of Review (AOR) for the proposed injection operations in the Lance Formation has been evaluated in accordance with Chapter XIII, Section 5. Determination of the Lance Formation AOR requires calculation of the cone of influence (COI), which has been performed in accordance with Chapter XIII, Section 5(b)(iv)(A), and calculation of the volumetric fillup (also referred to as the ultimate area of emplaced waste [ULEW]) as stated in Chapter XIII, Section 5(b)(iv)(B).

The equations required for these calculations, including the input data and assumptions are presented below. Input variables are listed on Table 2. The calculated values for the COI and volumetric fillup are summarized in the following section, and shown in detail on Table 3. This information is followed by the identification of the final AOR.

All depths in this section are based on data from the Coates 1-19 well (Section 19, T35N, R74W; surface elevation 5,754 feet AMSL). The top of the Lance Injection zone is 4,750 bgs, and the bottom is 7,000 feet bgs; the midpoint depth is 5,785 feet bgs.

a. Cone of Influence (COI)

***The radius of the cone of influence as required by Chapter XIII, Section 5(b)(iv)(A).***

Section 5(b)(iv)(A) states that the cone of influence is calculated as follows:

$$r = ((2.25 KHt)/(S10^x))^{1/2}$$

$$\text{where: } x = (W/G - B) \times (4\pi KH/2.3Q)$$

- r = Radius of the cone of influence of an injection well (feet)
- K = Hydraulic conductivity of the injection zone (feet/day)
- H = Thickness of the injection zone (feet)
- t = Time of injection (days)
- S = Storage coefficient (dimensionless)
- Q = Injection rate (cubic feet/day)
- B = Original hydrostatic head of injection zone (feet) measured from the base of the injection zone
- W = Hydrostatic head of underground source of drinking water (feet) measured from the base of the injection zone
- G = Specific gravity of fluid in the injection zone (dimensionless)
- $\pi$  = 3.142

To convert intrinsic permeability (in millidarcies) to the permeability (or hydraulic conductivity) in ft/day, the following formula is used:

$$K = K_i (\rho g / m \mu)$$

where:

- K = Permeability (cm/sec)
- $K_i$  = Intrinsic permeability (millidarcies)
- $\rho$  = 0.999099 gm/cm<sup>3</sup> - the density of water
- g = 980 cm/sec<sup>2</sup> - the acceleration of gravity
- $\mu$  = 0.48 centipoise



$$m = 0.01 \text{ gm}/(\text{sec cm})$$

$$\text{and } 1 \text{ Darcy} = 9.87 \times 10^{-9} \text{ cm}^2 \text{ and there are } 2835 \text{ ft/day per cm/sec}$$

Based on falloff testing information from the COGEMA Lance wells, the average intrinsic permeability of the Lance Formation is estimated to be 11.6 millidarcies (md). The calculated permeability value was converted to hydraulic conductivity as follows:

$$K_i = 11.6 \text{ millidarcies} = 0.0116 \text{ darcies}$$

$$K_i = (0.0116 \text{ darcies})(9.87 \times 10^{-9} \text{ cm}^2/\text{darcy})$$

$$K_i = 1.14 \times 10^{-10} \text{ cm}^2$$

$$K = \frac{(1.14 \times 10^{-10} \text{ cm}^2)(0.999099 \text{ gm/cm}^3)(980 \text{ cm/sec}^2)}{(0.0048 \text{ gm/sec cm})}$$

$$K = 2.3 \times 10^{-5} \text{ cm/sec}$$

$$K = (2.3 \times 10^{-5} \text{ cm/sec})(2835 \text{ ft/day} / \text{cm/sec})$$

$$K = 0.066 \text{ ft/day}$$

Other assumptions and input parameters used for calculations in this section are summarized below:

- Per the EPA Guidance Document on Area of Review (page V-14), the Coefficient of Storage (S) is the thickness of the injection zone multiplied by  $10^{-6}/\text{ft}$ .
- The value for B (the original hydrostatic head of injection zone in feet measured from the base of the injection zone) was based on the results from the DST in the Christensen 18-3, and subsequent falloff tests in the Christensen 18-3 and DW No. 1 wells, which indicate a pressure gradient in the Lance Formation of 0.40 psi/ft.
- Since the information for USDWs in the area is limited, it is assumed that the head in the overlying USDWs (W) can be approximated by a water level 140 feet below ground surface, using a fluid gradient of 0.433 psi/ft. The head (W) was measured from the base of the Lance Formation.
- Based on log analysis, the net thicknesses of the injection zone for the proposed well is 905 feet. This thickness is based on an eight percent porosity cutoff. The average formation porosity (based on evaluation of the sonic curve from the Coats 1-19 well), is 17 percent.
- The estimated injection period is 10 years.

- The requested injection rate is 5,143 bbl/day (150 gpm), or 28,877 cubic feet per day.
- The total dissolved solids (TDS) concentration of the injection zone fluid is calculated to be approximately 2,000 mg/l; the specific gravity is 1.001 (Dowell Fluids Reference Manual).
- The injection zone fluid viscosity (0.48 cp) was estimated from Figure 16D in the text "Well Testing" (John Lee; Society of Petroleum Engineers of AIME, 1982).
- Based on the COI equations, and the input variables shown above and listed in Table 2, the COI for the PRI SWA No. 1 well in the Lance Formation is 150 feet. The detailed calculations are shown on Table 3; the COI for the well is shown on Figure 6.

b. Area of the ultimate limit of emplaced waste (ULEW)

***The volumetric fillup calculation as required by Chapter XIII, Section 5(b)(iv)(B).***

The following formula was used for this calculation:

$$R = (Qt/\pi Hp)^{1/2}$$

where: R = Radius of volumetric fillup (feet)  
H = Thickness of the injection zone (feet)  
t = Time of injection (days)  
Q = Injection rate (ft<sup>3</sup>/day)  
 $\pi$  = 3.142  
p = porosity expressed as a pure decimal

Using the assumptions listed in the previous section, the ULEW for the SWA No. 1 in the Lance Formation is 467 feet. This calculation is shown on Table 3.

c. Minimum area of review

***Fixed area of review: A minimum of ¼ mile radius from the injection well if the application is for non-hazardous waste only; a minimum of 2 mile radius from the injection well if the application is for the injection of hazardous waste.***

The minimum ¼-mile radius applies.

d. Final area of review

***The area of review is the greatest of the three values determined in a, b, and c above.***

In accordance with Chapter XIII, Section 5(b)(iv)(C) and (D), the minimum area of review for a Class I non-hazardous well shall never be less than one-quarter ( $\frac{1}{4}$ ) mile, the cone of influence, or the area of emplaced waste, whichever is greatest. As such, the minimum AOR in the Lance Formation is  $\frac{1}{4}$  mile (1,320 feet).

e. Final Area of Review justified to Land Survey

***All areas of review should be justified to the General Land Office Survey. In other words, if you use a  $\frac{1}{4}$  mile radius, the area of review should be a square of at least  $\frac{1}{4}$  mile to the nearest side from the well. The area of review can therefore be described by section, township, and range. This is required by Chapter XIII, Section 5(b)(iv)(E).***

In accordance with Chapter XIII, Section 5(b)(iv)(E), the final areas of review conform to the public land survey and are legally described by Township, Range and Section to the nearest  $\frac{1}{4}$  section. The final AOR is presented below and shown on Figure 6:

Township 35 North, Range 74 West, 6th P.M

Section 8: SW  $\frac{1}{4}$  SE  $\frac{1}{4}$

Section 8: SE  $\frac{1}{4}$  SE  $\frac{1}{4}$

Section 8: SE  $\frac{1}{4}$  SW  $\frac{1}{4}$

Section 17: NE  $\frac{1}{4}$

Section 17: NE  $\frac{1}{4}$  NW  $\frac{1}{4}$

Section 17: SE  $\frac{1}{4}$  NW  $\frac{1}{4}$

**E. Water Quality Information - Proposed Injection Zone**

a. Water quality data

***Analysis of water within the receiver, clearly labeled with source of the water, date sampled, assay laboratory.***

A thorough evaluation was performed to identify all drinking water wells within a three-mile radius surrounding the proposed well location. Data were obtained from the Wyoming State Engineer's office. Available data show there to be no permitted wells that utilize the Lance Formation for drinking water within a 3-mile radius of the proposed PRI injection well. It is likely that the closest use of the Lance is at Rolling Hills (Table 9).

There are no water wells that penetrate the Lance in the  $\frac{1}{4}$ -mile AOR. To assess Lance water quality, regional water quality data were obtained for the Lance in the southern Powder River Basin from the Wyoming Oil and Gas Conservation Commission

Website (<http://wogcc.state.wy.us> ). Table 4 presents a summary of data obtained from this source, including the individual well data sheets downloaded from this website. As shown in Table 4, these data show that the average TDS for wells was 2,049 mg/l. Data from these sources were selected from wells in the southern Powder River Basin, including wells outside of Converse County.

Water quality data for the Lance also were obtained from the USGS Produced Water Database (<http://energy.cr.usgs.gov/prov/prodwat/intro.htm>). All of the Lance water quality data for Converse County from this source are presented in Table 5, including the water source, date of analysis (if available), and analytical laboratory. The data indicate the Lance TDS ranges from 1,089 to 3,019 mg/l TDS, with an average of 1,763 mg/l TDS. All the wells are more than nine miles from the proposed PRI well location.

Regional geochemistry data have also been assembled for the Lance Formation in the central and northern portions of the Powder River Basin (Henderson, 1985). In Henderson's study, which focused on groundwater data obtained throughout the Powder River Basin, Lance-Fox Hills groundwater pH ranged from 6.85-9.21. For the same water samples, total calcium, magnesium, sodium, potassium and other constituents indicates that the TDS for the Lance groundwater is less than 10,000 TDS. This relatively low TDS is consistent with geochemistry data obtained about 60 miles northeast of the Study Area in the Christensen Ranch area which showed that Lance groundwater exhibits a TDS of 1,400-2,400 mg/l at depths comparable to that expected at the PRI well location (i.e. 3,900 to 6,800 feet bgs).

The most specific sampling and water quality data for the Lance are from the COGEMA Class I Lance wells (DW No. 1 and Christensen 18-3). Table 6 includes a summary of the COGEMA water quality sample analyses obtained from the Lance formation. The Lance formation data also were compared to Wyoming groundwater standards, or an EPA standard, if applicable. As can be seen from the comparisons in Table 6, the water quality in the Lance exceeds many standards for domestic, agricultural and livestock use. It is essentially unusable due to high concentrations of hydrocarbon related constituents and qualifies for exemption as described later in this application.

Comparing the quality of the water to be injected into the Lance (Table 7) with the existing Lance quality from COGEMA, the two have very similar TDS and sodium bicarbonate levels. With respect to the similarity of water quality and water quality compatibility issues, the Lance Formation is an ideal receiver for PRI's sodium bicarbonate-based waste streams.

b. Analysis of water from any usable aquifer within the AOR

***Analysis of water from any useable aquifer within the area of review. Generalized published data is usable for the purpose provided it is correctly interpreted and referenced. Water quality data should be sufficient to classify the water according to Chapter VIII, of the Wyoming Water quality Rules and Regulations.***

Information from the Wyoming State Engineer's Office indicates that there are 1 stock well, and 2 monitoring wells completed at depths less than 931 feet within the ¼-mile AOR (Table 8). Two applications for solution mining and/or groundwater monitoring wells in PRI's Southwest Expansion Area are pending. Water quality data from the southwest portion of Mine Unit 15 (approximately 1.5 miles from the proposed Class I well location) are presented in Table 8a.

On a regional scale, the depth of groundwater wells within a nine-township area surrounding the proposed well location typically range from 120 to 160 feet bgs, producing from an alluvial aquifer. One of the of the shallow water wells within the nine township area is 930 feet deep, and likely produces from the Wasatch.

The Rolling Hills subdivision, located approximately 9 miles south of the proposed Class I well location, operates two municipal water wells that produce from the Fox Hills/Lance Formations. As shown in Table 9, only the two municipal wells produce from the Lance; all others produce from much shallower geologic units in the Fort Union Formation. It is critical to note that, (1) the Rolling Hills subdivision is over 9 miles upgradient from the proposed well location (Figure 5), (2) the Lance outcrops west of Rolling Hills, and (3) the Lance at the PRI well location is approximately 2,800 deeper at the PRI well location than at Rolling Hills. Further, the outcrop and recharge area for the Lance and Fox Hills Formations occurs only 1-2 miles from the municipal wells, indicating that, while Rolling Hills obtains water from the Lance, water at this location is very close to the formation recharge area and is dominated (hydrologically and geochemically) by local recharge (Lowry & Wilson, 1986).

c. Quality assurance data

***Quality assurance data for all samples taken should be included. Documents showing how the sample was obtained, including information on how much fluid was purged prior to obtaining the sample; documentation of the methods used in making the analysis; and a description of the laboratory quality assurance procedures are required.***

Data quality information is available on the WOGCC and USGS websites.

d. Aquifer Exemption

Based on the information presented above, it is apparent that the TDS of the Lance Formation is less than 10,000 mg/l. As such, use of the Lance Formation will require an aquifer exemption.

Two previous exemptions have been approved for Class I wastewater disposal to the Lance in the Power River Basin. Those applications, which required a major modification to the State of Wyoming UIC program, were published in the Federal Register as follows:

COGEMA Mining, Inc: March 1999

Reference: <http://www.epa.gov/EPA-WATER/1999/March/Day-26/w7432.htm>

COGEMA Mining, Inc: July 2002

Reference: <http://www.epa.gov/fedrgstr/EPA-WATER/2002/July/Day-22/w18410.htm>

The criteria for exempted aquifers are presented in 40 CFR 146.4 as follows:

*An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in §146.3 may be determined under 40 CFR 148.8 to be an "exempted aquifer" if it meets the following criteria:*

*(a) It does not currently serve as a source of drinking water; and,*

*(b) It cannot now and will not in the future serve as a source of drinking water because:*

*(1) It is mineral, hydrocarbon, or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.*

*(2) It is situated at a depth or location that makes recovery of water for drinking water purposes economically or technologically impractical;*

*(3) It is so contaminated that it would be economically or [sic] technologically impractical to render that water fit for human consumption; or*

*(4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or*

*(c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.*

The data obtained for the Lance Formation by COGEMA (1997, 2000) indicate that the exemption criteria stated under §146.4 (a) and (b [1, 2, and 3]) are satisfied. Support for classification according to these criteria is summarized below. Reference to the COGEMA applications is included as warranted.

§146.4 (a): The Lance Formation does not currently serve as a source of drinking water in the vicinity of the PRI Southwest Area Project or the final AOR for the disposal well. The nearest documented well completed in the Lance is over 9 miles to the south of the Southwest Area Project (Figure 5). The nearest use of Lance water by Rolling Hills is in, or just downgradient of the Lance recharge area on the western flank of the Powder River Basin. In contrast, the PRI well location is near the Basin Axis, and structurally 2,800 feet below the Lance Formation elevation at Rolling Hills.

The proposed use of the Lance as a disposal zone is distant from, structurally downdip of, and hydrogeologically down gradient of, the nearest Lance use at Rolling Hills (Figure 5).

In this regard, the top of the proposed Lance injection zone for the PRI well is approximately 2,800 feet below the deepest Lance well used by Rolling Hills.

§146.4 (b[1]): The Lance Formation cannot and will not serve as a source of drinking water because it is hydrocarbon producing.

The Lance is an established oil and gas producing formation in the Powder River Basin, and other Wyoming basins of the same depositional time period and environment. Production from the Lance in the Powder River Basin (Flat Top field) began in 1959 and continues to date; production from the Lance in the Green River Basin began in the late 1980's and is increasing with time. Concentrations of phenols, oil and grease, and benzene observed in the samples from the DSTs in the COGEMA Christensen 18-3 (Table 6) are consistent with sand deposits that are either (1) in the near vicinity of source rock, or (2) located at a structural low in a formation through which oil and gas have migrated. Based on the location of the disposal well relative to the structure and setting of the Powder River Basin, both scenarios apply. Additional data from a Tom Brown well in the immediate vicinity of COGEMA confirmed elevated levels of benzene in the Lance (COGEMA, 1998).

§146.4 (b[2]): The Lance Formation cannot and will not serve as a source of drinking water because it is situated at a depth that makes recovery of water for drinking water purposes impractical.

As discussed in Attachment A and shown on Figure 5, the depth of the proposed injection interval in the Lance Formation is about 4,750 to 7,000 feet below ground surface. Water at this depth is considered economically impractical to produce and treat (COGEMA, 1997; EPA, 1999). Additionally, there are high quality water-producing aquifers in the vicinity of the proposed PRI well that are shallower than the Lance (e.g., in the overlying Fort Union and Wasatch Formations [surface to approximately 1,200 feet deep]; Table 8).

The Wasatch and Fort Union formations in the vicinity of the proposed PRI well can supply a large population such that Lance development as a water supply at the PRI well location would not be considered. For example, based solely on recharge from infiltration over a 5-mile radius from the PRI well, the Wasatch/Fort Union (depths of surface to 1,200 feet) could supply water for over 1,800 people in perpetuity (Table 6a). Based on a 1% depletion rate, and neglecting recharge, the Wasatch/Fort Union could supply more than 400,000 people.

The town of Wright (approximately 50 miles north of the PRI well location) currently utilizes the Fort Union as a water supply; Gillette (approximately 90 miles north of PRI), also uses the Fort Union for part of the municipal supply.

It is noted that the population of Converse County (12,052 residents in the 2000 census) declined by more than 2,000 residents from 1980 to 2000 (Northeast Wyoming Economic Development Commission website; US Census Bureau data). As such, the current water supplies for the population centers (Glenrock, Douglas and Rolling Hills) would be

expected to continue to meet current and near-term future demands. The only exception could be Rolling Hills (2000 Census population of 449 residents), which likely will continue to have limited capacity from wells completed in the Lance outcrop approximately 9 miles from the proposed PRI well. The Wyoming Water Development Commission data (2004 Water Use report) indicate that the average use for Rolling Hills was approximately 70,300 gallons/day (48.9 gpm).

§146.4 (b[3]): The Lance Formation cannot and will not serve as a source of drinking water because it is so contaminated that it would be impractical to render that water fit for human consumption.

As presented in 1997 COGEMA application, the Lance water contains elevated concentrations of various constituents that exceed Wyoming Class I, II or III groundwater standards. Those data indicate that: (1) chloride, TDS, pH and ammonia exceed several Wyoming standards; (2) trace metals and organic compounds exceed Wyoming Class I, II, or III groundwater standards; and (3) elevated concentrations of oil and grease (18.9 mg/l) were detected that are in excess of all Wyoming classification standards. Most importantly, benzene was detected in the Christensen Ranch CR 18-3 DST #2 water sample at 6,900 µg/l (Table 6), which greatly exceeds the EPA drinking water standard of 5 µg/l. In addition, significant concentrations of mercury (0.004 mg/l) were detected in the DST # 2 sample (Table 6). Based on the COGEMA data, the Lance does not qualify for classification as a USDW in Wyoming (i.e., Class I, II, III or IV waters). Because of the PRI well location with regard to depth and the Basin axis, it is anticipated that the Lance water at the PRI location will be similar to that tested at the COGEMA location. Water quality will be confirmed by fluid sampling and testing during the drilling and completion of the proposed well.

COGEMA (1997) conducted an extensive analysis of treatment options for Lance water. The results of that analysis indicated that, due to the extreme depth of the Lance Formation, the remoteness of the injection sites, and the associated cost of the required water treatment, development of the Lance Formation in western Campbell County was not economically feasible. That evaluation also directly applies to the PRI location.

It was noted by COGEMA that the required water treatment likely would include both an air stripper (for benzene removal) and a reverse osmosis (RO) unit (TDS removal). Based on the observed concentrations, the bleed (waste stream) from the RO unit would be approximately 25 percent of the throughput. As such, a high-TDS waste stream on the order of 12 and 50 gpm for domestic and municipal applications, respectively, would require disposal.

Further discussion of the Lance limitations with regard to water quality was presented by the Wyoming Water Development Commission (2002). Chapter 3 of that report states the following regarding the Lance as a drinking water supply: *"TDS content in waters generally range from <500 - 3060 mg/l. Composition variable, mainly Sodium Sulfate or Calcium Sulfate. Variable iron ( 0 - 6.03 mg/l) and Sulfate (<100 - 1780 mg/l) content, SAR 1.9 - 39. Generally undesirable for domestic water source due to possible high*



*Iron, Manganese and Sulfate content. Generally fair to poor for stock use. Unsuitable for irrigation due to high salinity and / or high SAR..... Generally yields less than 15 gpm in planning area. Development limited due to uneconomical drilling depths. Water quality generally suitable for domestic supplies although undesirable constituents may make other water sources more attractive if available. Water quality suitability for stock ranges from poor to good. Generally unsuitable for irrigation due to high salinity and / or Sodium content."*

#### **F. Further description of the discharge:**

This permit application is for the injection of wastes that are non-hazardous under the Resource Conservation and Recovery Act. The anticipated water chemistry of the injected waste stream is presented in Table 7. Minor concentrations of corrosion inhibitors, scale inhibitors, and/or biocides may be used as needed to maintain the well in optimum condition.

The wastes consist of operational and restoration bleed streams from commercial in situ leach uranium mining operations, including: normal overproduction (wellfield bleed) streams, yellowcake wash water, reverse osmosis brine, and groundwater sweep solutions. These waste streams are beneficiation wastes, exempt from RCRA regulation under the Bevill Amendment found in 40 CFR 261.4(b)(7).

#### **G. Description of the Well**

A preliminary well schematic is shown on Figure 7; a preliminary wellhead schematic is shown on Figure 7a.

##### Drilling Prognosis

A general, preliminary drilling prognosis follows. Final design will be performed prior to mobilizing a drilling rig.

1. Drill and set 16" conductor casing (if needed)
2. Drill 12 ¼" surface hole to 1200' (approximately 100' below the 'K' Sand); run 8 5/8" casing to bottom; cement to surface (Class A of 50/50 Poz)
3. Drill 7 7/8" hole to approximately 7,100'
4. Run CBL on surface casing
5. Run 5 ½" casing to bottom; cement to surface; release drilling rig
6. Rig up completion rig; run CBL on production casing
7. Perforate Lance and develop as needed (swabbing and/or jetting)
8. Run 2 7/8" or 3 ½" tubing and packer
9. Run RAT log and perform pressure falloff test (discuss step-rate injection test with WDEQ – fines migration may be a significant issue)
10. Perform SAPT and release rig.

## H. Operating Data

### a. Discharge Rates and pressures

It is anticipated that drilling will commence as soon as possible following permit approval, and injection operations to the Lance Formation will commence within six months (after approval to inject) and continue for a period of 10 years. Based on the anticipated disposal requirements, the requested injection rate for the permit is 150 gpm. During initial startup operations (i.e., the first year), and depending on the results of additional formation testing, the average injection rate may be less than the permitted rate.

Based on regional information and data from WDEQ (Guidance Document #1; P. 15), the fracture gradient of the Lance Formation was assumed to be 0.60 psi/ft. This fracture gradient is consistent with a calculated gradient based on the observed pore pressure and estimated overburden and tensile stresses, and with testing data obtained from the COGEMA Lance Formation wells in Campbell County.

The following equation was used to estimate fracture pressure.

$$P = F \times D$$

Where:      P = Fracture pressure of the receiver  
              F = Fracture gradient in psi/ft of depth  
              D = Depth to the bottom of the receiver

Using the equation above, the fracture pressure of the receiver for the SWA DW No. 1 is calculated to be 4,200 psi (see Table 10 for detailed calculations).

Calculation of the limiting surface injection pressure requires input of the fracture pressure, hydrostatic head, and friction losses as follows:

$$\text{Limiting surface injection pressure (L in psi)} = (P - h + T + L)(0.90)$$

$$\text{Hydrostatic head (h)} = G \times D \times 0.433$$

Where:      h = Hydrostatic head at the bottom of the receiver  
              G = Specific Gravity of the injection fluid  
              D = Depth to the bottom of the receiver

Tubing pressure loss (T) was obtained from Western Company charts for unlined tubing. The pressure loss for the assumption of a 150 gpm injection rate is 118 psi (3 1/2"-inch tubing).

Perforation pressure loss (L) was neglected

Limiting surface injection pressure (psi) =  $(P - h + T + L)(0.90)$

Based on the above equation, and the noted assumptions, the allowable surface injection pressure for the SWA DW No. 1 is 1,156 psi (Table 10).

Since the fracture gradient was estimated, a step-rate injection test may be performed either (1) during the initial completion, or (2) within the first one year of operation. However, experience with the COGEMA wells indicates that fines migration is a significant issue in the Lance; as such, PRI may choose to continue operations at a lower (approved) pressure, rather than run a step-rate injection test to determine fracture pressure. In addition, a pressure falloff test will be run on the well within 90 days of the start of injection operations.

Since the Lance testing to date has been limited, an estimate for the average injection pressure is not available. However, this pressure will be less than, or equal to, the limiting surface injection pressure.

#### b. Proposed stimulation program

The need for formation stimulation will be assessed during the well completion. At this time, it is anticipated that the well may be stimulated with 10 to 15 percent HCl. The need for subsequent (periodic) treatments will be assessed during operation of the well.

While a hydraulic (propped) frac job is not considered necessary at this time, frac jobs may be considered in the future if the combined injection capacity of the well is not sufficient to meet PRI's requirements. A potential frac job would be (1) designed to contain the fracture within the zone of interest in the Lance Formation, and within the cemented interval of the production casing, and (2) performed after approval by WDEQ.

#### c. Injection procedure

The specific injection procedure for the well will depend on (1) the capacity of the well as determined from testing performed during the well completion operations, and (2) PRI's disposal requirements at that time. In general, it is anticipated that injection operations will commence at 25 to 50 percent of the anticipated injection capacity for a period of 1 to 5 days, with subsequent increases to the maximum rate over the next week. During the startup period, the flow monitoring and injection equipment, annulus monitoring system and the pressure shutdown systems will be checked to assure proper operation.

To protect the well tubulars, low concentrations of corrosion inhibitor and antiscalant may be added to the injection stream at the surface. In addition, periodic batch treatments with an oxygen scavenger may be performed. This type of treatment/prevention program is similar to that which has been used on the COGEMA Lance wells.

d. Surface Equipment

A schematic drawing of surface equipment including storage tanks, pumps, filters, meters, valves, recording devices, wellhead monitoring devices and control valves for the SWA No. 1 well are provided in Figure 8.

e. Description of flow monitoring devices

The surface injection facilities for the SWA DW No. 1 will include continuous recording devices to monitor injection pressure, flow rate, and annulus pressure between the long string casing and the tubing. Flow rates and total gallons injected will also be transmitted to the Smith Ranch plant computer for monitoring and data storage purposes.

f. Methods and procedures used for inspection and failure detection

The well will be equipped with a high-level shutoff switch on the injection tubing to prevent operation of the pumps at pressures greater than the Limiting Surface Injection Pressure. In addition, the well will be equipped with a low-pressure shut-down switch on the surface injection line that will deactivate the injection pump in the event of a surface leak. Finally, the well will include a high/low pressure shutdown switch with a pressure sensor on the tubing/casing annulus. This switch will stop the injection pump in the event of either (1) a tubing leak or (2) a casing, packer, or wellhead leak.

Construction and operation of the well will be performed in accordance with the State and Federal UIC regulations to prevent migration of fluids into any underground source of drinking water.

g. Staffing and training information

The Southwest Area disposal well will be staffed and operated consistent with PRI's existing Class I disposal wells (Smith Ranch #1 and #2). Operation and maintenance will be the responsibility of the Southwest Area Satellite Plant Supervisor and the site Maintenance Supervisor. The on-site organization will include a Radiation Safety Officer. The Southwest Area Satellite operating personnel will operate and monitor the disposal well pumps, valves, and scale/corrosion inhibitor systems. They will be instructed in the purpose of the continuous recording devices and procedures to implement if a fault is indicated.

Continuous and proper operation of the Southwest Area Satellite Plant that produces uranium via ion exchange resin is contingent upon the availability of a properly functioning disposal well. Hence, operation and monitoring of the well will be an integral part of the SWA Satellite and Central Plant activities.

## **I. Monitoring Plan**

### **a. Monitoring Injected Water**

A composite sample of the waste stream will be collected quarterly, or when process change occurs that could significantly alter the chemical composition of the waste stream. Samples will be collected upstream of the high-pressure injection pump. Analyses will be performed using approved methods and in accordance with WDEQ Rules and Regulations, Chapter VIII, Section 7. The proposed parameter list follows:

- Ra-226 (pCi/l)
- Uranium (mg/l)
- Chloride (mg/l)
- Carbonate (mg/l)
- TDS (mg/l)
- PH (units)
- Sulfate (mg/l)
- Bicarbonate (mg/l)
- Conductivity (u/cm)
- Ammonia, NH<sub>3</sub> as N (mg/l)

Monitoring records will be submitted to WDEQ quarterly (within 30 days after the end of the quarter) and will include:

- a. Date, location and time of sampling
- b. Name(s) of sampling personnel
- c. Date(s) of analysis
- d. Analytical laboratory and name(s) of analytical technician(s)
- e. Analytical procedures or methods used
- f. Analytical results

Reporting will include injection and annulus pressures. Further, the average reservoir pressure will be determined once per year by conducting a pressure falloff test.

Quality control/quality assurance related to sampling and pressure monitoring operations will remain consistent with those already in place for (1) PRI's analytical laboratory (Energy Labs), and (2) PRI's two other Class I disposal wells.

### **b. Monitoring wells**

Due to the significant depth of the Lance Formation, the lack of demonstrated use of shallow USDW's in the vicinity of the project, and the confining zones above and below

the injection horizon, monitoring wells within the final AOR to assess fluid migration in the Lance Formation is not necessary.

Shallow water quality monitoring for PRI's ISL operations at MU 15 (1.5 miles north of the SW Area disposal well) will continue as dictated under Permit to Mine 633. Additional shallow water quality monitoring will commence prior to startup of ISL mining operations at the Southwest Area.

## **J. Well Abandonment**

### **a. Abandonment Procedures**

Well abandonment will be performed in accordance with WDEQ and the Wyoming Oil and Gas Conservation Commission regulations. The proposed general plugging procedures include the following:

1. Rig up pulling unit/ R/D tree and R/U and 3,000 psi BOPs. Test same.
2. Latch tubing, release packer; POOH L/D tubing.
3. RIH and cement well from TD to approximately 4,000' in 2-3 runs with 325 sx 50/50 Pozmix cement (1.26 ft<sup>3</sup>/sx). Tag top of plug. Cement from 4,000' to 20' in 3-4 runs with 430 sx 50/50 Pozmix cement.

Note: This approach is proposed due to the extensive perforated interval in the Lance, and may be changed, upon approval from WDEQ, to include multiple conventional squeeze and balanced plug jobs rather than filling the casing.

4. Tie into 8 5/8" x 5 1/2" annulus and attempt to bullhead 20-40 sacks 50/50 Pozmix cement.
5. R/D BOPs and pulling unit.
6. Cut and remove wellhead at 5-10 feet below ground surface. Place a dry hole monument in a 10 sack cement plug at the surface.

## **K. Financial Surety**

Power Resources, Inc. (PRI) is presently bonded by the Wyoming Department of Environmental Quality, Land Quality Division (WDEQ-LQD), to operate its uranium in-situ recovery facility at the Smith Ranch (Permit to mine # 633). Therefore, the Smith Ranch bond will be updated as necessary to cover the costs of plugging, abandonment, and post closure care for the proposed disposal well once it is installed. The present bond estimate for the Smith Ranch Project currently includes estimates for the existing

disposal wells located in the permit area. This estimate is updated annually and submitted to the WDEQ-LQD for review and approval. The surety estimate for the Smith Ranch Project is currently \$ 22,353,000. Once constructed, costs for the proposed disposal well will be included in the bond at an estimated cost of \$ 4.87/foot (Wyoming oil and Gas Conservation cost estimate per foot). The bond for Mine Permit # 633 is provided to WDEQ-LQD through a letter of credit from the Royal Bank of Canada.

#### **L. Mechanical Integrity**

After completion in the Lance Formation, Part I mechanical integrity will be demonstrated before injection commences, in accordance with procedures specified by WDEQ.

Part II integrity will be demonstrated prior to injection by either (1) a Radioactive Tracer Log and Temperature Survey coupled with a casing pressure check, or (2) an oxygen activation log. Part II MIT will be demonstrated (1) if any abnormal annulus pressures are observed, (2) every five years at a minimum, and (3) any time the tubing and packer are removed from the well.

#### **M. Signatory Requirements**

In accordance with Chapter XIII, Section 5(b) (xiv), this permit application has been signed by Steve Collings, President, PRI.

#### **N. Reports**

The required Quarterly Reports for the Class I injection well will be filed no later than 30 days after the end of the calendar quarter. Annual reports will be submitted along with the 4<sup>th</sup> Quarterly Report. Those reports will be signed in accordance with Section 5(b)(xiv) and 5(b)(xv).

#### **O. Location maps**

Numerous tables, figures and plates have been previously referenced in this application. A list of those information sources follows.

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## P. REFERENCES

COGEMA, 1997, *Application for Modification, Christensen Ranch Disposal Wellfield, Permit UIC 95-241*, COGEMA, Harlan & Associates, Inc. and Petrotek Engineering.

COGEMA, 1998, Supplemental Technical Document in Support of Aquifer Exemption, Christensen Ranch Mine Disposal Wellfield, COGEMA, Harlan & Associates and Petrotek Engineering, April 17, 1998.

COGEMA, 2000, *Application for Modification, Christensen Ranch Disposal Wellfield, Permit UIC 97-407*, COGEMA, Harlan & Associates and Petrotek Engineering

Connor, Carol Waite 1992, *The Lance Formation; Petrography and Stratigraphy, Powder River Basin and Nearby Basins, Wyoming and Montana*, USGS Bulletin No 1917-I

Dodge, Harry W. and Thomas M. Crandall, 1990, Depositional Environments of Upper Cretaceous Fox Hills Formation, Niobrara and Weston Counties, East-Central Wyoming, AAPG Bulletin, Volume 74, No.8

Henderson, Thomas, 1985, *Geochemistry of Ground-Water in Two Sandstone Aquifer Systems in the Northern great Plains in Parts of Montana, Wyoming, North Dakota, and South Dakota*, USGS Professional Paper 1402-C

Hinaman, Kurt, 2005, *Hydrogeologic Framework and Estimates of Ground-Water Volumes in tertiary and Upper Cretaceous hydrogeologic Units in the Powder River Basin, Wyoming*, USGS Scientific Investigations Report 2005-5008

Johnson, Ronald C., William Keefer, William Keighin, and Thomas Finn, 1997, *Deposition of the Upper Cretaceous lance Formation in Central Wyoming*, AAPG Bulletin Volume 81, No. 7.

Lowry, M., and Wilson, J., 1986; Hydrology of Area 50, Northern Great Plains and Rocky Mountain Coal Provinces, Wyoming and Montana; U.S. Geological Survey Water Resources Investigations Open File Report 83-545.

US Environmental Protection Agency, 1999; Underground Injection Control Program Revision; Aquifer Exemption Determination for Portions of the Lance Formation Aquifer in Wyoming; Final Rule; *Federal Register* March 26, 1999.

US Environmental Protection Agency, 2002; Underground Injection Control Program Revision; Aquifer Exemption Determination for Portions of the Lance Formation Aquifer in Wyoming; Final Rule; *Federal Register* July 22, 2002.

Wyoming Water Development Commission, 2002; *2002 Powder/Tongue River Basin Final Water Plan*; <http://waterplan.state.wy.us/plan/powder/finalrept.html>

**Table 1**

Oil and Gas Wells within 2-Mile Radius of Proposed SWA Class I well

Well Name	Location	Well Type	Well Construction	Date Drilled	Depth	Plugging/ completion Record	Water quality data
Keenan Ranch Unit 1	T35NR74W Sec 8 NENE	P/A	9 5/8" to 1970'; 7" to 13,199'	7/4/1985	14562 (Morrison Fm)	6 cement plugs 14,400' to surface; drilling mud between plugs	None available
Smith Ranch 1	T35NR74W Sec 9 NWNE	P/A	9 5/8" to 1,490'	10/9/1979	10910 (Sussex)	7 cement plugs 10,900' to surface	None available
Coates Ranch 1-19	T35NR74W Sec 19 NENE	P/A	9 5/8" to 1,453'; 7" to 13,009'	2/17/1980	13552 (Morrison Fm)	6 cement plugs 14,500' to surface; 11.4# mud between plugs	None Available
Ridge Road Unit 1	T35N R74W Sec 20 NWSW	P/A	13 3/8" to 1,511'; 7 5/8" to 12,975'	5/31/1974	14500 (Morrison FM)	8 cement plugs 14,275' to surface	None available

**Table 2**

Estimated Physical and Chemical Data SW Area Disposal Well  
Power Resources, Inc.

<i>PARAMETER</i>	<i>VALUE</i>	<i>SOURCE/MEAS. METHOD</i>
Formation Temperature	135° F (at midpoint depth of 5,875 feet bgs)	Regional logs & COGEMA Lance well data
Formation Pressure	2,350 psi (at 5,875 feet bgs)	COGEMA Lance well data
Est. Static Water Level	448 feet, bgs	COGEMA Lance well data
Formation Fracture Grad. (estimated)	0.60 psi/ft (at 7000 feet bgs)	COGEMA Lance well data & WDEQ sources
Formation Porosity	17 percent	Regional logs and COGEMA data
Gross Formation Thickness	2631 feet	Regional logs
Net Formation Thickness	905 feet	Regional logs
Est. Formation Permeability	11.6 md	COGEMA Lance well data
Formation Transmissivity	10498 md-ft	COGEMA Lance well data & regional logs
Formation Transmissivity	59.7 ft <sup>2</sup> /day	COGEMA Lance well data & regional logs
Formation Storativity	9.05 E-4	Calculated
Formation Water TDS	2,000 mg/l	Regional data
Form. Water Sp. Grav.	1.001	Milchem Charts

**Table 3**  
Calculation of COI, ULEW, and AOR  
SW Area Disposal Well - Lance  
Power Resources, Inc.

Permeability/Hydraulic Conductivity Conversion			
K =	K = Ki (p g/mu)		
u =	0.48	cp @ 135 deg. F. BHT	
mu =	0.48 cp * 0.01 gm-sec/cm =	0.0048	
Ki (md)	K (ft/day)	Assume kh =	10498 md-ft
11.60	0.066	Source: Cogema Lance falloff tests	
			Source
Base of Lance (well TD)	7000	feet; bgs	Coates Ranch 1-19
Depth to Water in USDW	140	feet; bgs	WY State Eng.
Head in USDW from base of Lance (W) =	6860	feet; bgs	WY St. Eng.
Pressure Grad. of Lance =	0.40	psi/ft	COGEMA (1997, 2000)
Pressure in Lance =	2800	psi	COGEMA (1997, 2000)
Head in Lance (B) =	6467	feet	COGEMA (1997, 2000)
W - B =	393	feet	Calculated
Thickness of Lance (H) =	905	feet	Regional Logs
Storage of Lance (S)=	9.05E-04		Calculated
Average Lance Porosity (φ) =	0.17		Regional & CMI Logs
Injection Rate =	150	gpm	Estimated
Injection Rate (Q) =	28877	ft³/day	Calculated
Injection Period (t) =	10	years	Estimated
Injection Period (t) =	3650	days	Calculated
Fluid in Inj. Zone =	2000	TDS	COGEMA, USGS
SP Gravity(G) =	1.001		
CONE OF INFLUENCE CALCULATION			
Cone of Influence (r) =	(2.25KHt/S10 <sup>x</sup> ) <sup>1/2</sup>		
Where x =	(W/G-B) * (4*π*KH/2.3Q)		
x =	4.383		
r =	150 feet		
ULTIMATE LIMIT OF EMPLACED WASTE			
R = radius of volumetric fillup (feet)			
R =	(Qt/φHπ) <sup>1/2</sup>		
R =	467 feet		
MINIMUM AREA OF REVIEW			
Cone of Influence =	150 feet		
Radius of Volumetric Fillup (ULEW) =	467 feet		
Minimum Radius (1/4 mile) =	1320 feet		

**Table 4**  
Summary of Lance Water Quality Data for the Southern Powder River Basin  
(<http://wogcc.state.wy.us>)

Compound <sup>1</sup>	Maximum (mg/l)	Minimum <sup>2</sup> (mg/l)	Average (mg/l)
Sodium	1140.0	530.0	762.8
Potassium	283.0	3.0	75.8
Calcium	17.0	4.0	10.1
Magnesium	7.0	2.0	3.5
Sulfate	363.0	16.0	165.8
Chloride	508.0	145.0	370.3
Carbonate	11.0	0(11)	2.8
Bicarbonate	4393.0	0(1093)	1098.3
Total Dissolved Solids	2740.0	1304.0	2049.0
Observed pH	8.3	7.8	8.0
<i>Data for T47N-T33N through R69W-R77W</i>			

1- Lithium, hydroxide, hydrogen sulfide, iron, total anion, total cations and NaCl equivalent included on reporting sheets. However, all values for lithium, iron, hydroxide or hydrogen sulfide and most values for total cations, total anions, and NaCl equivalent are posted as "0".

2- Data sheets indicated a "0" value for some compounds, but it is unclear whether this was an actual measured value or a placeholder inserted by the database when the compound was not analyzed for. The number in parenthesis (x) is the lowest measured value presented on the data sheets. The 0 values were used to determine the average compound concentration.

**Table 5**

Summary of Water Quality Data for Lance Formation - Converse County  
(USGS Produced Waters Database)

ID No.	County	Section	Town.	Range	Well Name	Sample Formation	Upper Depth	Lower Depth	Method	Sample Date	TDS
49010017	Converse	26	N 34	W 70	F 41-26-P LE BAR UNIT NO. 1	Lance	5550	5573	DST NO. 1	1/8/57	1,089
49010018	Converse	8	N 34	W 75	1-8 WERNER	Lance	3155	3206	DST NO. 1 (TOP)	11/18/64	1,820
49010019	Converse	8	N 34	W 75	1-8 WERNER	Lance	3480	3530	DST NO. 2 (TOP)	11/18/64	1,593
49010364	Converse	7	N 34	W 75	1-A-7 WERNER	Lance	3564	3585	DST (TOP)	12/22/64	1,295
49011049	Converse	7	N 34	W 75	B-1 WERNER	L. Lance	3252	3278		8/7/64	3,019
Average TDS =											1,763

**Table 6**  
Summary of Lance Formation Water Quality Data - COGEMA Christensen 18-3

	LANCE FORMATION WATER QUALITY			WDEQ
	18-3 DST #1 (Dissolved) 09-Aug-97	18-3 DST #1 (Total Metals) 13-Aug-97	18-3 DST #2 (Totals) 13-Aug-97	Class Exceedances in the Lance Formation
Sample Date:				
<b>Major Ions mg/l:</b>				
Ca	6.8	17	7.2	---
Mg	< 1.0	2.91	< 1.0	---
Na	652	667	532	---
K	16.90	17.0	6.5	---
CO3	44	---	0	---
HC03	994	---	1010	---
SO4	228	---	61.5	---
Cl	327	---	256	I, II
NH3 (N)	1.66	---	1.67	I
NO2 (N)	< 0.10	---	< 0.10	---
NO3 (N)	< 0.10	---	< 0.10	---
F	4.54	---	5.12	I
SiO2	26.80	44.1	27.0	---
<b>Non-Metals mg/l:</b>				
TDS @ 180 C	1947	---	1430	I
Oil and Grease	---	---	18.9	I, II, III
Hydrogen Sulfide	---	---	< 1.0	---
Phenols	0.33	---	0.33	I
Benzene (ug/l)	---	---	6900	I
Cond. (umho/cm)	3043	---	2380	---
Alk. (as CaCO3)	875	---	831	---
pH (units)	8.89	---	8.19	III
<b>Trace Metals mg/l:</b>				
Al	< 0.10	2.98	0.44	---
As	0.004	0.003	0.006	---
Ba	< 0.10	---	0.68	---
B	< 0.10	1.04	0.78	I, II
Cd	< 0.01	< 0.01	< 0.01	---
Cr	< 0.05	< 0.05	< 0.05	---
Cu	0.02	2.39	0.29	I, II, III
Fe	0.08	8.36	27.8	I, II
Pb	< 0.05	< 0.05	0.07	I
Mn	0.09	0.27	0.47	I, II
Hg	0.0002	---	0.004	I, III
Mo	< 0.10	< 0.10	< 0.10	---
Ni	< 0.05	< 0.05	< 0.05	---
Se	0.006	< 0.001	< 0.001	---
V	< 0.10	< 0.10	< 0.10	---
Zn	0.01	14.1	0.83	I, II
<b>Radiometric pCi/l:</b>				
U (mg/l)	0.0005	---	0.0009	---
Ra 226	< 0.20	---	0.8	---
Ra 226 +/-	---	---	0.3	---

<sup>(1)</sup> Source of Data: COGEMA Mining, Inc. Class I Disposal Well Application (2000); Analysis by Energy Laboratories, Inc.

**Table 6a**  
Shallow Water Supply within 5 Miles of the PRI Well Location

<b>INFILTRATION TO WASATCH/FORT UNION</b>				
Infiltration in Powder River Basin Ranges from 0.1 to 0.3 inches per year				
Infiltration @ 0.1 in/yr =		0.0083	ft/yr	
Infiltration @ 0.3 in/yr =		0.025	ft/yr	
Area = $(\pi)r^2$				
r (miles) =	5	26400	feet	
Area =		2,189,564,657	feet <sup>2</sup>	
Infiltration @ 0.1 in/yr =		18,246,372	ft <sup>3</sup> /yr	1.36E+08 gallons/yr
Infiltration @ 0.3 in/yr =		54,739,116	ft <sup>3</sup> /yr	4.09E+08 gallons/yr
Per Capita Use @ 200 gal/person/day =		73,000	gal/year/person	
Sustainable Population @ 0.1 in/year =		1,870	people	
Sustainable Population @ 0.3 in/year =		5,609	people	
<b>WATER IN STORAGE - WASATCH/FORT UNION FORMATIONS</b>				
Volume = $(\pi)r^2h \times \text{porosity}$				
From Above, area =		2,189,564,657	feet <sup>2</sup>	
Net Thickness (h) =		700	feet	
Effective Porosity =		0.27	(percent)	
Pore Volume =		4.138E+11	ft <sup>3</sup>	
Pore Volume =		3.095E+12	gallons	
Depletion Volume @ 1%/year =		3.095E+10	gal/year	
Per Capita Use @ 200 gal/person/day =		73,000	gal/year/person	
Sustainable Use (Depl. Vol./Per Cap.) =		424,032	people	



**Table 7**  
Summary of Anticipated Injectate Water Quality (PRI data) and  
Comparison to Lance Water Quality (COGEMA data)

Chemical Species	Minimum (mg/l)	Maximum (mg/l)	Average Concentrations from COGEMA CR 18-3 (mg/l)
pH	6	9	8.5
Ammonia as Nitrogen	1,000	3,000	na
Sodium	25	36,000	617
Calcium	0	1,000	10.3
Potassium	10	10,000	13.4
Bicarbonate as HCO <sub>3</sub>	1,500	3,000	1,002
Carbonate as CO <sub>3</sub>	0	500	22
Sulfate	80	25,000	145
Chloride	1,000	55,000	292
Uranium as U <sub>3</sub> O <sub>8</sub>	1	100	na
TDS	40,000	60,000	1,689

**Table 8**  
List of Water Wells Within 1/4-mile AOR

Permit #	Priority	Status	Town	Range	Sec.	Qtrqtr	Applicant	Facility Name	Uses	Yld Act	Well Depth	Static Depth	Mwbz Top	Mwbz Bottom	Well Log	Chemical Analysis
P5000P	3/20/1938	GST	35 N	74 W	8	SWSE	SMITH LAND COMPANY	SMITH #27	STO	8	80	36	Unknown	Unknown	Yes	No
39/7/176W	7/20/2006	UNA	35 N	74 W	17	SWNE	POWER RESOURCES, INC	SWMP-002	MON						No	
39/8/176W	7/20/2006	UNA	35 N	74 W	17	SENE	POWER RESOURCES, INC	SWMP-003	MON						No	
P70184W	5/21/1985	GST	35 N	74 W	17	SWNE	POWER RESOURCES INC	OM 17 422	MON	0	670	452	362	491	Yes	Yes
P70185W	5/21/1985	GST	35 N	74 W	17	NENW	POWER RESOURCES INC	KM 17 421	MON	0	930	424	420	504	Yes	Yes

**Table 8a**  
Summary of Ft. Union Water Quality Data  
in SW Portion of MU 15

**Smith Ranch Project**  
**Mine Unit-15**  
**Wells M-1521 through M-1528**

Analyte	Units	Well ID	M-1521	M-1522	M-1523	M-1524	M-1525	M-1526	M-1527	M-1528
		Round	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1
		PQL	08/18/04	08/18/04	08/19/04	08/18/04	08/18/04	08/18/04	08/19/04	08/19/04
<b>Major Ions</b>										
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	1	162	192	141	126	144	167	171	167
Carbonate as CO <sub>3</sub>	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate as HCO <sub>3</sub>	mg/L	1	197	235	172	153	175	204	209	204
Calcium	mg/L	1	84	98	90	72	80	91	96	91
Chloride	mg/L	1	7	6	6	6	4	5	5	5
Fluoride	mg/L	0.1	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3
Magnesium	mg/L	1	19	22	10	14	14	22	18	20
Nitrogen, Ammonia as N	mg/L	0.05	0.09	0.06	0.23	0.51	0.41	0.34	0.26	<0.05
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrite as N	mg/L	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Potassium	mg/L	1	10	10	15	12	12	11	16	13
Silica	mg/L	0.1	16.6	17.4	15.1	14.5	14.6	17.3	17.1	17.2
Sodium	mg/L	1	32	32	33	34	33	31	33	32
Sulfate	mg/L	1	178	173	174	170	159	179	183	185
<b>Physical Properties</b>										
Conductivity	umhos/cm	1	657	697	596	495	610	672	608	661
pH	s.u.	0.01	7.47	7.47	7.95	7.71	7.61	7.49	7.75	7.46
TDS @ 180 C	mg/L	10	470	498	444	421	432	486	486	477
<b>Trace Metals</b>										
Aluminum	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	mg/L	0.001	0.027	0.026	0.006	0.002	0.003	0.016	0.012	0.038
Barium	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/L	0.03	<0.03	<0.03	0.03	0.05	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/L	0.01	0.02	0.03	<0.01	<0.01	0.01	0.02	0.01	0.03
Mercury	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<b>Radionuclides</b>										
Uranium	mg/L	0.0003	0.0241	0.0303	0.0164	0.0159	0.0275	0.0342	0.0318	0.0252
Radium 226	pCi/L	0.2	6.7	2.5	3.4	2.4	1.6	2.4	4.4	6.4
<b>Quality Control</b>										
A/C Balance (± 5)	%	250	1.7	4.39	3.96	2.57	4.57	4.8	4.93	4.03
Anions	meq/L	250	7.14	7.61	6.59	6.22	6.3	7.22	7.37	7.32
Cations	meq/L	250	7.39	8.31	7.13	6.55	6.9	7.95	8.14	7.94
TDS Calc.	mg/L	250	443	473	427	398	403	457	471	464
TDS Bal. (0.80 - 1.20)	dec. %	250	1.06	1.05	1.04	1.06	1.07	1.06	1.03	1.03

9  
Summary of Well and Water Quality Data - Rolling Hills  
(WY State Eng. Office)

Well No.	Active Permit No	Compl. Date	Surface Elevation	Total Well depth	Compl Intervals (ft; bgs)	Static Water Level (ft; bgs)	Screen Intervals (ft, est.)	Elev. Of Production Interval	TDS (mg/l)	Water Quality summary	Comments
Rolling Hills #1	P125023W	Jan-78	5370	1000 (casing to 900)	700-800	220	None	4670-4570	500	No metals detected above EPA standards most except zinc less than MDL	Original Permit P64211W cancelled and replaced with active permit number. A 1989 memo stated well drilled to 1500 feet with slotted casing, but contradicts completed State Well Completion Form
Rolling Hills #2	P125024W	1-Jun-80	5270	1200 (steel casing to 830)	700-800	50	None	4570-4470	367	1980 analysis: Total cations 6.01 meq; total anions meq;7.6. Toluene detected at 0.8 (above the MDL) in 2001 analysis, but less than the EPA MCL of 1,000 ug/l	Original Permit Nos. 51639W and P64210W cancelled and replaced with active permit number. A 1989 memo stated well drilled to 1500 feet with slotted casing 500-600 feet and bottom of hole filled with gravel, but contradicts completed State Well Completion Form.
Rolling Hills #3	N/A	19-Jan-83	5250	500 (pvc casing to 500)	320-360 430-460	60	None	4930-4890 4820-4790	No data	No data	Permit P62947W cancelled. No abandonment records provided.
Rolling Hills #4	P70662W	1-Oct-86	5395	1540 (steel casing to 1540)	913-950 1117-1130 1413-1433 1500-1512	350	None	4482-4445 4278-4265 3982-3962 3985-3883	No data	Limited analytical suite drinking water sample shows metals and inorganics less than MCLs and generally less than MDLs.	First sandstone encountered app. 600 ft below ground surface; may be top of Lance.
Rolling Hills #5	P81833W	18-Aug-90	5420	1763 (steel casing to 1750)	none	230	851-861 892-902 1010-1015 1111-1131 1424-1429 1471-1481 1521-1531 1572-1582 1618-1648 1670-1700 1730-1740	4569-4559 4528-4518 4410-4405 4309-4289 3996-3991 3949-3939 3899-3889 3848-3838 3802-3772 3750-3720 3690-3680	350	Metals analysis typically less than MDLs; Pesticide, herbicide, and volatile organics analysis showed no analytes greater than MDLs.	Fort Union base at approximately 575 ft below ground surface; producing formation identified as Lance
Rolling Hills #6	P125025W	10-Oct-95	5450	1785.91 (carbon steel to 810; carbon steel and welded screen to 1785.91)	none	272	1127-1132 1228-1238 1292-1312 1339-1370 1371-1402 1430-1446 1472-1482 1503-1508 1575-1601 1678-1674 1720-1730 1750-1776	4323-4318 4222-4212 4258-4138 4112-4081 4079-4048 4020-4004 3978-3968 3947-3942 3875-3849 3802-3776 3730-3720 3700-3674	No data	No data	Original Permit P99726W cancelled and replaced with active permit number

**Table 10**  
**Calculation of Limiting Surface Pressure**  
**SW Area Disposal Well**  
**Power Resources, Inc.**

**Fracture Pressure**

$$P = F \times D$$

P = fracture pressure at the bottom of the receiver (psi) (0.6 psi/ft)

F = Fracture gradient (psi/ft)

D = Depth to the bottom of the receiver (7000 feet; bgs)

**Hydrostatic Head**

$$h = G \times D \times 0.433 \text{ psi/ft}$$

h = hydrostatic head at the bottom of the receiver (psi)

G = specific gravity of the injection fluid

D = Depth to the bottom of the receiver (feet; bgs)

**Limiting Surface Injection Pressure**

$$L = (P - h + T + L_p) \times 0.90$$

L = limiting surface injection pressure (psi)

P = fracture pressure at the bottom of the receiver (psi)

h = hydrostatic head at the bottom of the receiver (feet)

T = tubing pressure loss (psi)

L<sub>p</sub> = perforation pressure loss (psi)

Assume:      L<sub>p</sub> = 0  
                  Injection Rate = 150 gpm  
                  Tubing length = 4700 feet  
                  From charts, friction loss is 25 psi/1000 feet (3 1/2" tubing at 150 gpm)

	F	D	P	G	h	T	L
Well	(psi/ft)	(ft)	(psi)		(psi)	(psi)	(psi)
SWA DW #1	0.60	7000	4200	1.001	3034	118	1156

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 3: Lot 9, fka SW<sup>4</sup>SW<sup>4</sup>**

**Section 6: Lot 17, fka NW<sup>4</sup>SE<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 4: Lot 5, fka NE<sup>4</sup>SE<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**LEASE OWNER:**

(oil & gas)

W.A. Moncrief, Jr.  
950 Commerce Street  
Ft. Worth, Texas 76102-5418

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 4: Lots 6, 7, 8, fka W<sup>2</sup>SE<sup>4</sup>, SE<sup>4</sup>SE<sup>4</sup>**

SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	RINCON EXPLORATION LLC 410 17 <sup>th</sup> Street, Suite 1320 Denver, Colorado 80202

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 4: S<sup>2</sup>NE<sup>4</sup>**

SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER: All Minerals	THE STATE OF WYOMING Office of State Lands & Investments 122 West 25 <sup>th</sup> Street Cheyenne, Wyoming 82002
LEASE OWNER: (oil & gas)	MAURICE W. BROWN 614 S. Greeley Highway Cheyenne, Wyoming 82007
(uranium)	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b>	
<b>Section 4: S<sup>2</sup>NW<sup>4</sup>, SW<sup>4</sup></b>	
<b>Section 6: SW<sup>4</sup>SE<sup>4</sup></b>	
<b>Section 7: SE<sup>4</sup>NW<sup>4</sup>, W<sup>2</sup>NE<sup>4</sup>, N<sup>2</sup>SE<sup>4</sup>, NE<sup>4</sup>SW<sup>4</sup></b>	
<b>Section 8: S<sup>2</sup>NW<sup>4</sup> N<sup>2</sup>SW<sup>4</sup> SE<sup>4</sup>SW<sup>4</sup></b>	
<b>Section 9: E<sup>2</sup></b>	
<b>Section 10: SW<sup>4</sup>SE<sup>4</sup></b>	
<b>Section 15: NW<sup>4</sup>NE<sup>4</sup></b>	
<b>Section 21: N<sup>2</sup></b>	
<b>Section 22: W<sup>2</sup>NW<sup>4</sup></b>	
<b>SURFACE OWNER:</b>	<b>SMITH LAND COMPANY</b> 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals	<b>The SMITH MINERAL TRUST</b> Frederick G. Smith, Trustee P.O. Drawer 689 Douglas, Wyoming 82633
<b>LEASE OWNER:</b>	<b>POWER RESOURCES, INC.</b> 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b>	
<b>Section 5: Lot 5, Part of MS 723 fka Lots 1, 2, S<sup>2</sup>NE<sup>4</sup></b>	
<b>SURFACE OWNER:</b>	<b>SMITH SHEEP COMPANY</b> 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	<b>THE UNITED STATES OF AMERICA</b> Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	<b>POWER RESOURCES, INC.</b> 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
<b>LEASE OWNER:</b> (oil & gas)	<b>HANSON &amp; STRAHN, INC.</b> P.O. Box 3020 Cheyenne, Wyoming 82003



Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 5: Lots 11, 12, Part of MS 723, fka SE<sup>4</sup>, S<sup>2</sup>SW<sup>4</sup>**

SURFACE OWNER:	SMITH SHEEP COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	RINCON EXPLORATION LLC 410 17 <sup>th</sup> Street, Suite 1320 Denver, Colorado 80202

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 5: Lots 6, 7, 8, 9, Part of MS 723, fka S<sup>2</sup>NW<sup>4</sup>, Lot 3, N<sup>2</sup>SW<sup>4</sup>**

SURFACE OWNER:	SMITH SHEEP COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	SWANSON, MORRIS & THOMPSON, LLC 410 17 <sup>TH</sup> Street, Suite 1180 Denver, Colorado 80202
	AMMONITE ENERGY TEXAS, INC. P.O. Box 50587 Midland, Texas 79710

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 6: Lots 14, 15, 16, 18, 19, 20, SE<sup>4</sup>SE<sup>4</sup>, Part of MS 723,  
fka S<sup>2</sup>NE<sup>4</sup>, N<sup>2</sup>SE<sup>4</sup>, SE<sup>4</sup>SE<sup>4</sup>, E<sup>2</sup>SW<sup>4</sup>, SW<sup>4</sup>SW<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**LEASE OWNER:**

(oil & gas)

AMERICAN GENERAL PARTNERSHIP  
717 17<sup>th</sup> Street, Suite 1435  
Denver, Colorado 80202

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 7: E<sup>2</sup>NE<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**LEASE OWNER:**

(oil & gas)

RINCON EXPLORATION LLC  
410 17<sup>th</sup> Street, Suite 1320  
Denver, Colorado 80202

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 7: Lots 5, 6, 7, 8, 9, 10, 11, 12, Part of MS 728, fka</b> <b>Lots 1, 2, 3, 4, NE<sup>4</sup>NW<sup>4</sup>, SE<sup>4</sup>SW<sup>4</sup> S<sup>2</sup>SE<sup>4</sup></b>	
<b>SURFACE OWNER:</b>	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
<b>LEASE OWNER:</b> (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102-5418

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 8: Lots 3, 4, Part of MS 723, fka N<sup>2</sup>NW<sup>4</sup></b>	
<b>SURFACE OWNER:</b>	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
<b>LEASE OWNER:</b> (oil & gas)	RINCON EXPLORATION LLC 410 17 <sup>th</sup> Street, Suite 1320 Denver, Colorado 80202

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 8: Lots 1, 2, 5, 6, 9, Part of MS 728, fka NE<sup>4</sup>, SW<sup>4</sup>SW<sup>4</sup>**

**Section 9: Lots 1, 2, 3, 4, fka NW<sup>4</sup>**

**Section 10: Lots 3, 4, 5, NW<sup>4</sup>NW<sup>4</sup>, S<sup>2</sup>SW<sup>4</sup>, NW<sup>4</sup>SE<sup>4</sup>  
fka W<sup>2</sup>, NW<sup>4</sup>SE<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**LEASE OWNER:**

(oil & gas)

W.A. MONCRIEF, JR.  
950 Commerce Street  
Ft. Worth, Texas 76102-5418

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**

**Section 8: Lots 7, 8, 10, 11, Part of MS 728, fka SE<sup>4</sup>**

**Section 9: Lots 5, 6, 7, 8, fka SW<sup>4</sup>**

**SURFACE OWNER:**

SMITH LAND COMPANY  
1744 Highway 93  
Douglas, Wyoming 82633

**MINERAL OWNER:**

All Minerals including Coal, Oil & Gas

THE UNITED STATES OF AMERICA  
Bureau of Land Management  
P.O. Box 1828  
Cheyenne, Wyoming 82003

All Locatable Minerals including Uranium

POWER RESOURCES, INC.  
400 East 1<sup>st</sup> Street, Suite 308  
Casper, Wyoming 82601

**LEASE OWNER:**

(oil & gas)

EGO RESOURCES, INC.  
P.O. Box 4362  
Houston, Texas 77210-4362

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 15: Lots 1, 2, 3, 4, 9, 10, 11, Part of MS 701, fka**  
**SW<sup>4</sup>NE<sup>4</sup>, NW<sup>4</sup>, N<sup>2</sup>SW<sup>4</sup>, SW<sup>4</sup>SW<sup>4</sup>**

SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 15: Lots 5, 12, fka SW<sup>4</sup>NE<sup>4</sup>, SE<sup>4</sup>SW<sup>4</sup>**

SURFACE OWNER:	SMITH SHEEP COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102-5418

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 15: Lot 8, fka NW<sup>4</sup>SE<sup>4</sup>**

<b>SURFACE OWNER:</b>	<b>SMITH SHEEP COMPANY</b> 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	<b>THE UNITED STATES OF AMERICA</b> Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	<b>POWER RESOURCES, INC.</b> 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 16: All**

<b>SURFACE OWNER:</b>	<b>THE STATE OF WYOMING</b> Office of State Lands & Investments 122 West 25 <sup>th</sup> Street Cheyenne, Wyoming 82002
<b>MINERAL OWNER:</b> All Minerals	<b>THE STATE OF WYOMING</b> Office of State Lands & Investments 122 West 25 <sup>th</sup> Street Cheyenne, Wyoming 82002
<b>LEASE OWNER:</b> (uranium)	<b>POWER RESOURCES, INC.</b> 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
(oil & gas)	<b>ROBERT B. FERGUSON</b> 23072 Lake Center Drive, Suite 205 Lake Forest, California 92630

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.  
Section 17: SE<sup>4</sup>NE<sup>4</sup>**

SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	HANSON & STRAHN, INC. P.O. Box 3020 Cheyenne, Wyoming 82003

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.  
Section 17: Lot 1, 2, Part of MS 687, fka  
NW<sup>4</sup>, W<sup>2</sup>NE<sup>4</sup>, NE<sup>4</sup>NE<sup>4</sup>, N<sup>2</sup>SE<sup>4</sup>**

SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102-5418

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 17: SW<sup>4</sup>**

SURFACE OWNER:	MAGEE REVOCABLE TRUST James Magee, Trustee P.O. Box 598 Glenrock, Wyoming 82637
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	HANSON & STRAHN, INC. P.O. Box 3020 Cheyenne, Wyoming 82003

**Township 35 North, Range 74 West, 6<sup>th</sup> P.M.**  
**Section 17: S<sup>2</sup>SE<sup>4</sup>**

SURFACE OWNER:	MAGEE REVOCABLE TRUST James Magee, Trustee P.O. Box 598 Glenrock, Wyoming 82637
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft Worth, Texas 76102-5418



Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 18: NE<sup>4</sup>NE<sup>4</sup></b>	
SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 18: Lots 5, 6, 7, NE<sup>4</sup>, S<sup>2</sup>NW<sup>4</sup>, NW<sup>4</sup>SW<sup>4</sup>, NW<sup>4</sup>SE<sup>4</sup>,</b> <b>Parts of MS 687 &amp; MS 728</b> <b>fka Lots 1, 2, 3, E<sup>2</sup>NW<sup>4</sup>, W<sup>2</sup>NE<sup>4</sup>, SE<sup>4</sup>NE<sup>4</sup>, NW<sup>4</sup>SE<sup>4</sup></b>	
SURFACE OWNER:	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
MINERAL OWNER:	
All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft Worth, Texas 76102-5418

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 18:</b> S <sup>2</sup> SW <sup>4</sup> , NE <sup>4</sup> SW <sup>4</sup> , S <sup>2</sup> SE <sup>4</sup> , NE <sup>4</sup> SE <sup>4</sup> , Parts of MS 687 & MS 728 fka Lot 4, E <sup>2</sup> SW <sup>4</sup> S <sup>2</sup> SE <sup>4</sup> , NE <sup>4</sup> SE <sup>4</sup> <b>Section 19:</b> Lots 5, 6, 7, 8, 9, 10, 11, 12, 13, 17, 18, Parts of MS 728 & MS 746 fka Lots 1, 2, E <sup>2</sup> NW <sup>4</sup> , NE <sup>4</sup> , NE <sup>4</sup> SW <sup>4</sup> , SE <sup>4</sup> <b>Section 20:</b> Lots 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, fka W <sup>2</sup> , SE <sup>4</sup> , S <sup>2</sup> NE <sup>4</sup>	
<b>SURFACE OWNER:</b>	MAGEE REVOCABLE TRUST James Magee, Trustee P.O. Box 598 Glenrock, Wyoming 82637
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
<b>LEASE OWNER:</b> (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft Worth, Texas 76102-5418

<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 20:</b> Lots 1, 2, fka N <sup>2</sup> NE <sup>4</sup> <b>Section 21:</b> Lots 1, 2, 3, 4, 6, 7, fka W <sup>2</sup> SE <sup>4</sup> , NE <sup>4</sup> SE <sup>4</sup> , N <sup>2</sup> SW <sup>4</sup> , SE <sup>4</sup> SW <sup>4</sup> <b>Section 22:</b> Lot 3, fka NE <sup>4</sup> NW <sup>4</sup>	
<b>SURFACE OWNER:</b>	SMITH LAND COMPANY 1744 Highway 93 Douglas, Wyoming 82633
<b>MINERAL OWNER:</b> All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

LEASE OWNER: (oil & gas)	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102-5418
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<b>Township 35 North, Range 74 West, 6<sup>th</sup> P.M.</b> <b>Section 21: Lot 5, fka SW<sup>4</sup>SW<sup>4</sup></b>	
SURFACE OWNER:	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER:	W.A. MONCRIEF, JR. 950 Commerce Street Ft. Worth, Texas 76102-5418

<b>Township 35 North, Range 75 West, 6<sup>th</sup> P.M.</b> <b>Section 12: Lots 1, 8, fka E<sup>2</sup>NE<sup>4</sup></b> <b>Section 24: Lot 1, fka NE<sup>4</sup>NE<sup>4</sup></b>	
SURFACE OWNER:	PACIFIC POWER & LIGHT COMPANY 1407 West North Temple, Suite 110 Salt Lake City, Utah 84116
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER: (oil & gas)	ROBERT L. BAYLESS PRODUCER LLC 621 17 <sup>th</sup> Street, Suite 1640 Denver, Colorado 80293

Surface & Mineral Ownership within  
Radius of Disposal Well  
Table 11

<b>Township 35 North, Range 75 West, 6<sup>th</sup> P.M.</b> <b>Section 13: Lots 9, 10, 16, Part of MS 728,</b> <b>    fka E<sup>2</sup>SE<sup>4</sup>, NW<sup>4</sup>SE<sup>4</sup></b>	
SURFACE OWNER:	PACIFIC POWER & LIGHT COMPANY 1407 West North Temple, Suite 110 Salt Lake City, Utah 84116
MINERAL OWNER: All Minerals including Coal, Oil & Gas	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals including Uranium	POWER RESOURCES, INC. 400 East 1 <sup>st</sup> Street, Suite 308 Casper, Wyoming 82601
LEASE OWNER:	RINCON EXPLORATION LLC 410 17 <sup>th</sup> Street, Suite 1320 Denver, Colorado 80202

<b>Township 35 North, Range 75 West, 6<sup>th</sup> P.M.</b> <b>Section 12: Lots 9, 15, 16, fka E<sup>2</sup>SE<sup>4</sup>, SW<sup>4</sup>SE<sup>4</sup></b> <b>Section 13: Lots 1, 2, 7, 8, fka NE<sup>4</sup></b>	
SURFACE OWNER:	PACIFIC POWER & LIGHT COMPANY 1407 West North Temple, Suite 110 Salt Lake City, Utah 84116
MINERAL OWNER: Coal	THE UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Other Minerals	NORWEST BANK, CASPER, TRUSTEE of the Herma Werner Irvine, et al Trust Leo A. Riley & Lee R. Irvine, Trustees of the Herma Werner Irvine Trust

WATER RIGHTS WITHIN AREA OF REVIEW  
TABLE 12

Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P26622W	35 N	74 W	20	NWSW			RIDGE ROAD UNIT WATER WELL #1	AMOCO PRODUCTION COMPANY
P26622W	35 N	74 W	20	NWSW			RIDGE ROAD UNIT WATER WELL #1	AMOCO PRODUCTION COMPANY
P51604W	35 N	74 W	19	NENE			COATES #1	APACHE OIL CORPORATION
P51604W	35 N	74 W	19	NENE			COATES #1	APACHE OIL CORPORATION
P21501P	35 N	74 W	20	NENW			BOWMAN #1	BURTON O. BARBER
P21501P	35 N	74 W	20	NENW			BOWMAN #1	BURTON O. BARBER
P62110W	35 N	75 W	12	NESW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	12	SESE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	12	SWSE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NENE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NESE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NWNE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NWSE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	NWSW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	SENE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	SENE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	SESE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	SESW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	13	SWNE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY

WATER RIGHTS WITHIN AREA OF REVIEW  
TABLE 12

Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P62110W	35 N	75 W	13	SWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	18	NWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	18	NWSW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	18	SWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	18	SWSW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	19	NWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	19	NWSW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	74 W	19	SWNW			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P62110W	35 N	75 W	24	NENE			ENL DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P58601W	35 N	74 W	17	SESW			DJ81 UB 14E	GLENROCK COAL COMPANY
P58601W	35 N	74 W	17	SESW			DJ81 UB 14E	GLENROCK COAL COMPANY
P58600W	35 N	74 W	17	SESW			DJ81 UB 14D	GLENROCK COAL COMPANY
P58600W	35 N	74 W	17	SESW			DJ81 UB 14D	GLENROCK COAL COMPANY
P58599W	35 N	74 W	17	SESW			DJ81 UB 14C	GLENROCK COAL COMPANY
P58599W	35 N	74 W	17	SESW			DJ81 UB 14C	GLENROCK COAL COMPANY
P58598W	35 N	74 W	17	NESW			DJ81-UB-14B	GLENROCK COAL COMPANY
P58598W	35 N	74 W	17	NESW			DJ81-UB-14B	GLENROCK COAL COMPANY
P58597W	35 N	74 W	17	NESW			DJ81-UB-14A	GLENROCK COAL COMPANY
P58597W	35 N	74 W	17	NESW			DJ81-UB-14A	GLENROCK COAL COMPANY
P56078W	35 N	75 W	12	NESW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY



WATER RIGHTS WITHIN AREA OF REVIEW  
TABLE 12

Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P56078W	35 N	75 W	12	SESE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	12	SWSE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NENE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NESE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NWNE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NWSE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	NWSW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SENE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SENE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SESE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SESW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SWNE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	13	SWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	18	NWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	18	NWSW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	18	SWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	18	SWSW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	19	NWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	74 W	19	NWSW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P56078W	35 N	74 W	19	SWNW			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P56078W	35 N	75 W	24	NENE			DJ WATER SUPPLY #3	GLENROCK COAL COMPANY
P110558W	35 N	75 W	13	SWNE			DJ98-SW-14	GLENROCK COAL COMPANY
P24679W	35 N	74 W	7	NENE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	NENE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	NENW			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	NWNE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	NWNW			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	SENE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	SENE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	SWNE			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P24679W	35 N	74 W	7	SWNW			KM #2 SMITH #2	KERR-MCGEE NUCLEAR CORP.
P47942W	35 N	75 W	13	NWNW			SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO.
P47942W	35 N	75 W	13	NWSW			SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO.
P47942W	35 N	75 W	13	SENE			SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO.
P47942W	35 N	75 W	13	SESW			SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO.
P47942W	35 N	75 W	13	SWNW			SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO.
P49151W	35 N	75 W	13	NWNW			ENL SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO. & GLENROCK COAL CO.
P49151W	35 N	75 W	13	NWSW			ENL SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO. & GLENROCK COAL CO.
P49151W	35 N	75 W	13	SENE			ENL SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO. & GLENROCK COAL CO.



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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P49151W	35 N	75 W	13	SESW			ENL SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO. & GLENROCK COAL CO.
P49151W	35 N	75 W	13	SWNW			ENL SOUTH MINE PIT WELL #1	PACIFIC POWER & LIGHT CO. & GLENROCK COAL CO.
P97465W	35 N	74 W	7	SWSE			DJ-4	PACIFICORP
P97464W	35 N	74 W	7	SWSE			DJ-3	PACIFICORP
P97463W	35 N	74 W	7	SWSE			DJ-2	PACIFICORP
P97462W	35 N	74 W	7	SWSE			DJ-1	PACIFICORP
P77031W	35 N	74 W	8	SWSW			K 140	POWER RESOURCES INC
P77030W	35 N	74 W	8	SWSW			KM 138	POWER RESOURCES INC
P77029W	35 N	74 W	8	SWSW			KM 137	POWER RESOURCES INC
P70186W	35 N	74 W	8	SWSW			KM 8 136	POWER RESOURCES INC
P70185W	35 N	74 W	17	NENW			KM 17 421	POWER RESOURCES INC
P70184W	35 N	74 W	17	SWNE			OM 17 422	POWER RESOURCES INC
P156865W	35 N	74 W	9	SENE			SE/NE 9-35-74 (2 WELLS)	POWER RESOURCES INC
P156864W	35 N	74 W	9	NESE			NE/SE 9-35-74 (1 WELL)	POWER RESOURCES INC
P156863W	35 N	74 W	10	SWNW			SW/NW 10-35-74 (10 WELLS)	POWER RESOURCES INC
P156862W	35 N	74 W	10	NWSW			NW/SW 10-35-74 (6 WELLS)	POWER RESOURCES INC
P156861W	35 N	74 W	10	SWSW			SW/SW 10-35-74 (3 WELLS)	POWER RESOURCES INC
P156860W	35 N	74 W	15	NWNW			NW/NW 15-35-74 (2 WELLS)	POWER RESOURCES INC
P156859W	35 N	74 W	10	SENE			SE/NW 10-35-74 (2 WELLS)	POWER RESOURCES INC
P156858W	35 N	74 W	10	NESW			NE/SW 10-35-74 (12 WELLS)	POWER RESOURCES INC

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P156857W	35 N	74 W	10	SESW			SE/SW 10-35-74 (10 WELLS)	POWER RESOURCES INC
P156856W	35 N	74 W	15	NENW			NE/NW 15-35-74 (3 WELLS)	POWER RESOURCES INC
P156854W	35 N	74 W	10	NWSE			NW/SE 10-35-74 (7 WELLS)	POWER RESOURCES INC
P156853W	35 N	74 W	10	SWSE			SW/SE 10-35-74 (9 WELLS)	POWER RESOURCES INC
P156852W	35 N	74 W	15	NWNE			NW/NE 15-35-74 (2 WELLS)	POWER RESOURCES INC
P153478W	35 N	74 W	10	SWSE			773CORE	POWER RESOURCES, INC
39/9/176W	35 N	74 W	16	NESW			SWMO-002	POWER RESOURCES, INC
39/8/176W	35 N	74 W	17	SENE			SWMP-003	POWER RESOURCES, INC
39/7/176W	35 N	74 W	17	SWNE			SWMP-002	POWER RESOURCES, INC
39/6/176W	35 N	74 W	18	NWSE			SWPW-001	POWER RESOURCES, INC
39/5/176W	35 N	74 W	18	NWSE			SWMU-001	POWER RESOURCES, INC
39/4/176W	35 N	74 W	18	NWSE			SWMO-001	POWER RESOURCES, INC
39/3/176W	35 N	74 W	18	NWSW			SWMP-001	POWER RESOURCES, INC
39/2/177W	35 N	74 W	21	SWNE			SWMP-004	POWER RESOURCES, INC
39/10/176W	35 N	74 W	16	NESW			SWMU-002	POWER RESOURCES, INC
39/1/177W	35 N	74 W	16	NESW			SWPW-002	POWER RESOURCES, INC
P172671W	35 N	74 W	10	SWNW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172671W	35 N	74 W	10	SWNW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172668W	35 N	74 W	10	NWSE			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172668W	35 N	74 W	10	NWSE			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P172667W	35 N	74 W	10	NESW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172667W	35 N	74 W	10	NESW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172666W	35 N	74 W	10	NWSW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172666W	35 N	74 W	10	NWSW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172664W	35 N	74 W	10	SWSE			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172664W	35 N	74 W	10	SWSE			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172663W	35 N	74 W	10	SESW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172663W	35 N	74 W	10	SESW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172662W	35 N	74 W	10	SWSW			SW/SW 10-35-74 (2 WELLS) MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172662W	35 N	74 W	10	SWSW			SW/SW 10-35-74 (2 WELLS) MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172661W	35 N	74 W	15	NENW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172661W	35 N	74 W	15	NENW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172660W	35 N	74 W	15	NWNW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P172660W	35 N	74 W	15	NWNW			WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P23655W	35 N	74 W	8	SENW			KM#2 SMITH #2	SEQUOYAH FUELS CORPORATION** SMITH SHEEP COMPANY
P23655W	35 N	74 W	8	SENW			KM#2 SMITH #2	SEQUOYAH FUELS CORPORATION** SMITH SHEEP COMPANY
P126426W	35 N	74 W	10	SWSE			WW-10-1	SMITH LAND CO.** RIO ALGOM MINING CORP.
P126426W	35 N	74 W	10	SWSE			WW-10-1	SMITH LAND CO.** RIO ALGOM MINING CORP.
P5001P	35 N	74 W	10	NWSW			SMITH #28	SMITH LAND COMPANY
P5001P	35 N	74 W	10	NWSW			SMITH #28	SMITH LAND COMPANY

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P5000P	35 N	74 W	8	SWSE			SMITH #27	SMITH LAND COMPANY
P5000P	35 N	74 W	8	SWSE			SMITH #27	SMITH LAND COMPANY
P4564W	35 N	74 W	21	SWNE			SMITH #36	SMITH LAND COMPANY
P4564W	35 N	74 W	21	SWNE			SMITH #36	SMITH LAND COMPANY
P3703P	35 N	74 W	21	SESW			SMITH #26	SMITH LAND COMPANY
P3703P	35 N	74 W	21	SESW			SMITH #26	SMITH LAND COMPANY
P165195W	35 N	74 W	10	SWSW			POTTS #2	SMITH SHEEP COMPANY
P165195W	35 N	74 W	10	SWSW			POTTS #2	SMITH SHEEP COMPANY
P108020W	35 N	74 W	3	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	4	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	74 W	5	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	5	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	74 W	8	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	8	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC



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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	74 W	9	SENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	9	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	10	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	75 W	13	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	75 W	13	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	75 W	13	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	16	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC



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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	74 W	17	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	17	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108020W	35 N	74 W	18	NWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	NWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SESE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SESW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SWSE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	18	SWSW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	19	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	19	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	NENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	NENW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	NWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	NWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	SENE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	SWNE			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P108020W	35 N	74 W	21	SWNW			WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	35 N	74 W	21	NESE			PN5 L314	WILLIAM J. SMITH

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P78113W	35 N	74 W	21	NESW			PN5 L314	WILLIAM J. SMITH
P78113W	35 N	74 W	21	NWSE			PN5 L314	WILLIAM J. SMITH
P78113W	35 N	74 W	21	NWSW			PN5 L314	WILLIAM J. SMITH
P78113W	35 N	74 W	21	SESW			PN5 L314	WILLIAM J. SMITH
P78113W	35 N	74 W	21	SWSW			PN5 L314	WILLIAM J. SMITH
P55552W	35 N	74 W	18	NWSW			DJ81-IB-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P55552W	35 N	74 W	18	SWSW			DJ81-IB-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P55551W	35 N	74 W	18	SWSW			DJ81-SC-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P55551W	35 N	74 W	18	SWSW			DJ81-SC-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P55550W	35 N	74 W	18	SWSW			DJ81-UB-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P55550W	35 N	74 W	18	SWSW			DJ81-UB-5	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P108648W	35 N	74 W	3	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	74 W	4	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	4	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	5	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.



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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	74 W	8	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	8	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	74 W	9	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	9	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	NWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	SENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	10	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.



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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	75 W	13	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	75 W	13	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	75 W	13	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	16	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.

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Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	74 W	17	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	NWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SWSE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	17	SWSW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	18	NENE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	18	NENW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	18	NESE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	18	NESW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P108648W	35 N	74 W	18	NWNE			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.



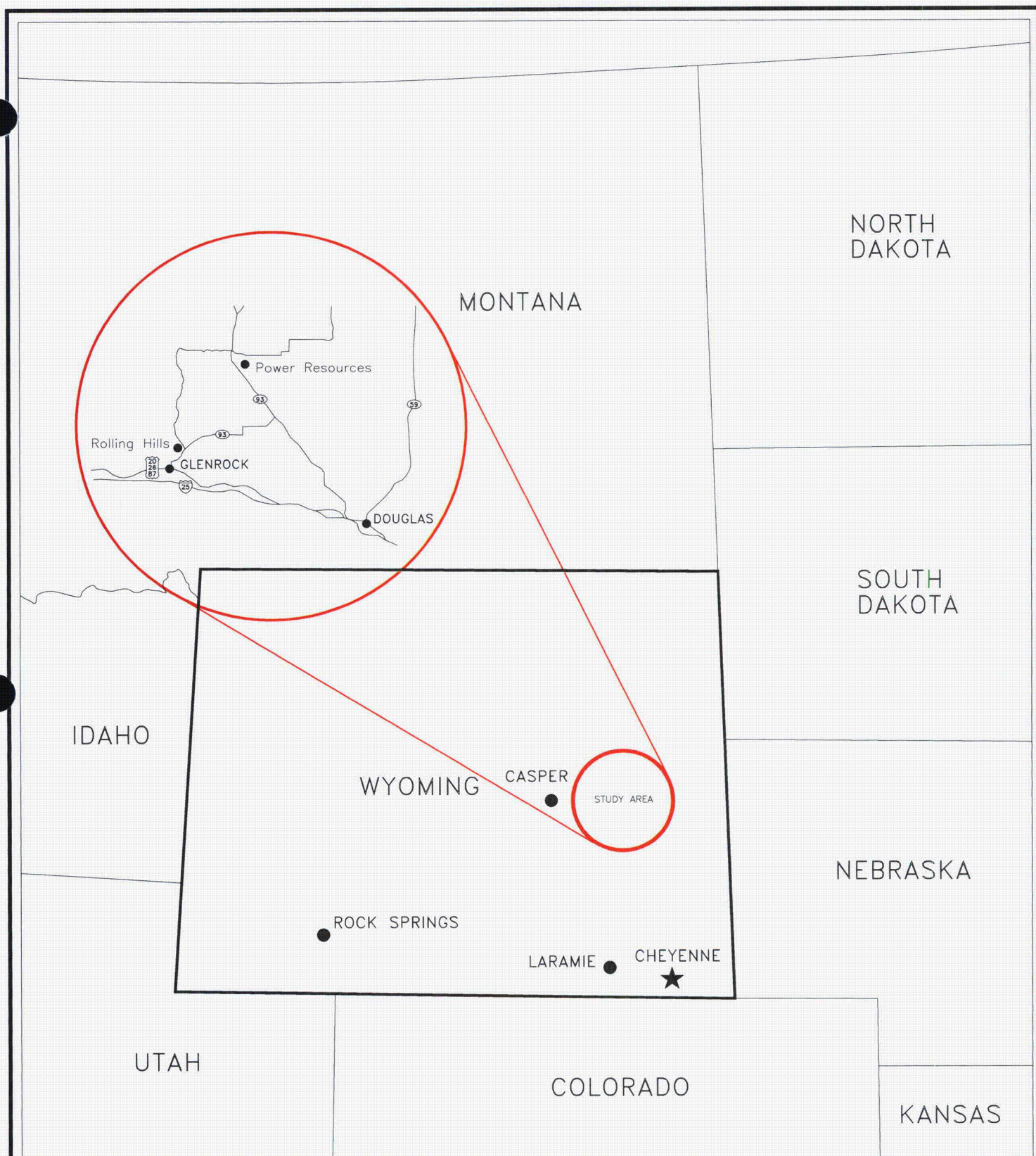
## TABLE 12

Page 21 of 22

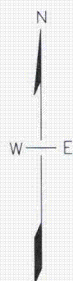
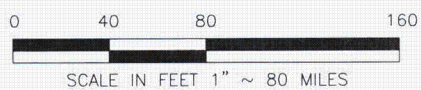
WATER RIGHTS WITHIN AREA OF REVIEW  
TABLE 12

Permit #	TWNSHP	Range	Section	Qtrqtr	SW Permit Name	SW Permit Applicant	GW Permit Facility Name	GW Permit Applicant
P108648W	35 N	74 W	21	SWNW			WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P8864R	35 N	75 W	13	SESE	UPS-24 Reservoir	GLENROCK COAL COMPANY		
P8864R	35 N	75 W	13	SESE	UPS-24 Reservoir	GLENROCK COAL COMPANY		
P8864R	35 N	74 W	18	SWSW	UPS-24 Reservoir	GLENROCK COAL COMPANY		
P8829R	35 N	75 W	13	NWSW	SP-36 Reservoir	GLENROCK COAL COMPANY		
P8829R	35 N	75 W	13	SWNW	SP-36 Reservoir	GLENROCK COAL COMPANY		
P8821R	35 N	75 W	13	SENE	UPS-1 Reservoir	GLENROCK COAL COMPANY		
P5407R	35 N	74 W	21	NENW	Sand Creek Reservoir	HERMAN WERNER		
P5407R	35 N	74 W	21	SENE	Sand Creek Reservoir	HERMAN WERNER		
P5407R	35 N	74 W	21	SWNW	Sand Creek Reservoir	HERMAN WERNER		
P5407R	35 N	74 W	21	SWNW	Sand Creek Reservoir	HERMAN WERNER		
P4656R	35 N	74 W	7	NESE	Smith Reservoir	WILLIAM J. SMITH		
P4656R	35 N	74 W	7	SESE	Smith Reservoir	WILLIAM J. SMITH		
P4656R	35 N	74 W	8	NWSW	Smith Reservoir	WILLIAM J. SMITH		





LEGEND



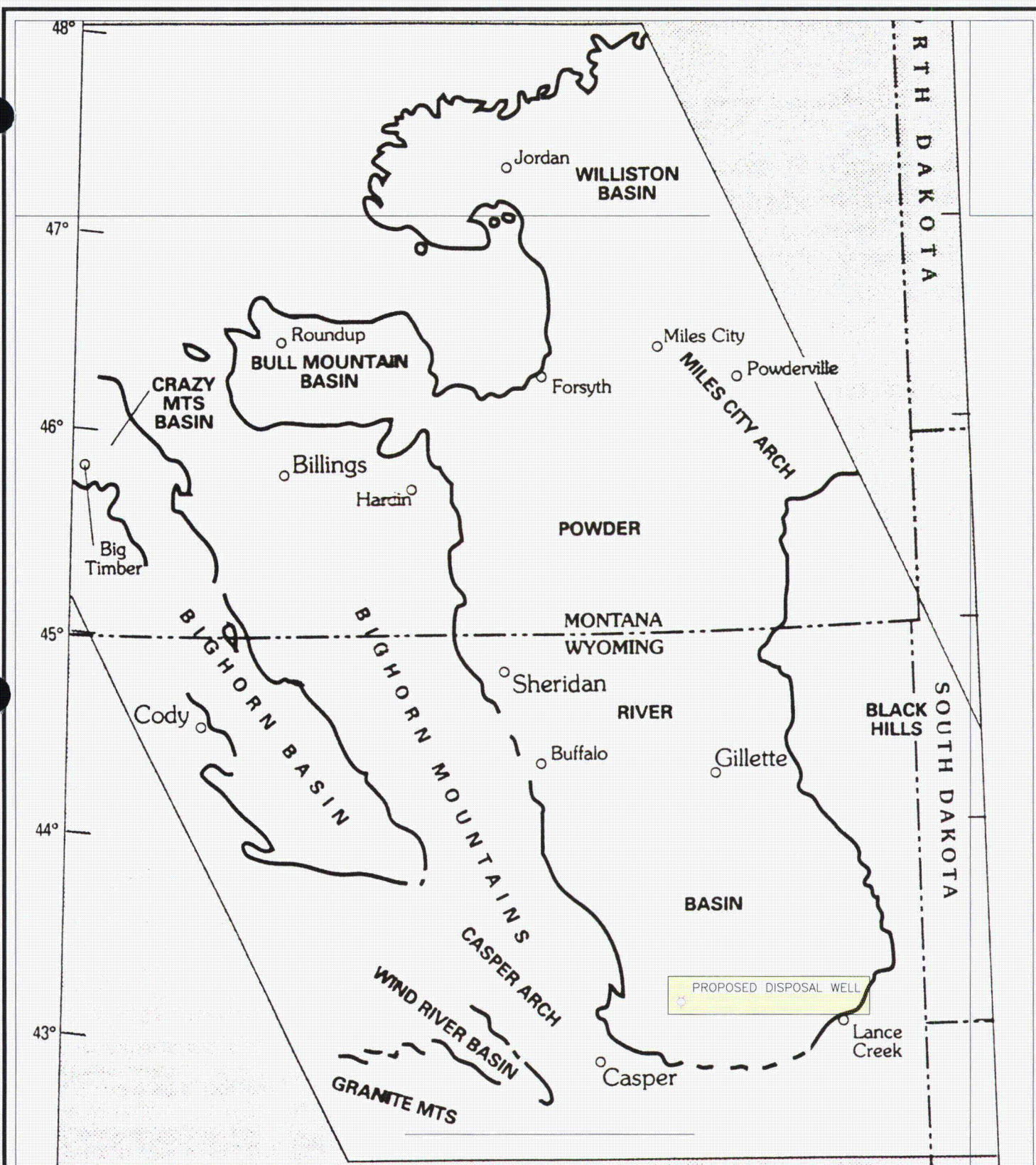
POWER RESOURCES, INC.

FIGURE 1  
GENERAL LOCATION MAP

PROJECT: 288-17	DATE: DECEMBER 2006
DWG: Figure1L.dwg	BY: KRS CHECKED: HPD

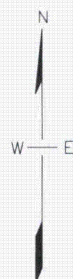
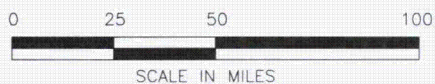
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# LEGEND

★ APPROXIMATE LOCATION OF PROPOSED DISPOSAL WELL



Map from: Connor, 1992

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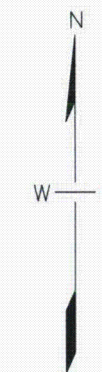
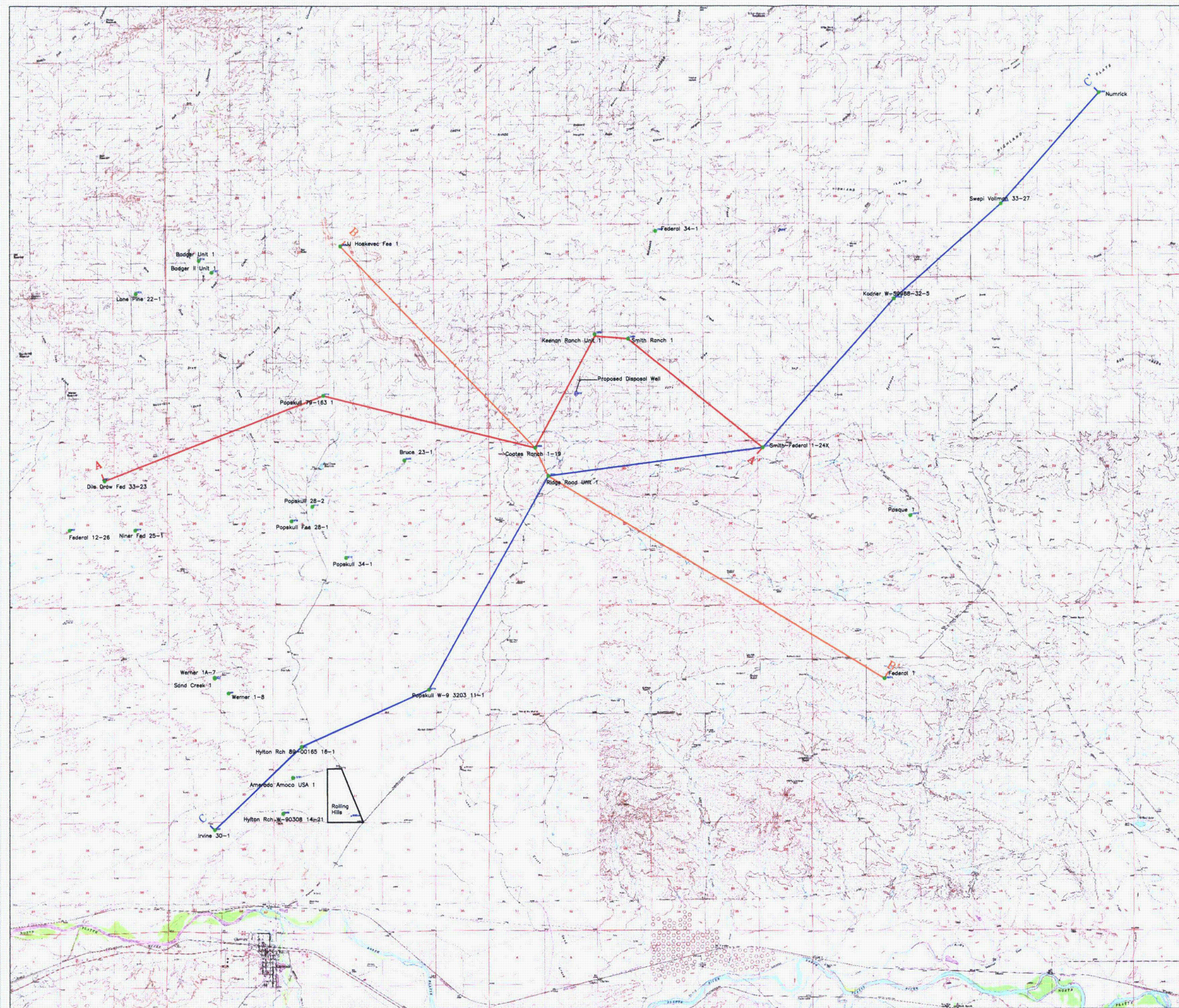
FIGURE 1A  
LOCATION OF PROPOSED PRI WELL  
POWDER RIVER BASIN

PROJECT: 288-17	DATE: DECEMBER 2006
DWG: Figure1AL.dwg	BY: KRS CHECKED: HPD



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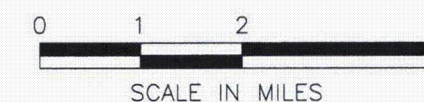
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## LEGEND

-  Proposed Disposal Well
-  Pasque 1 Oil Well Location



POWER RESOURCES, INC.

FIGURE 2  
STRUCTURAL AND STRATIGRAPHIC  
CROSS SECTION LOCATION MAP

PROJECT: 288-17	DATE: DECEMBER 2006
ISOPACHS EXHIBIT.dwg	BY: KRS CHECKED: HPD

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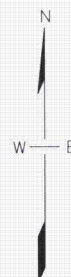


# LEGEND

- APPROXIMATE LOCATION OF PROPOSED DISPOSAL WELL
- ISOPACH CONTOUR INTERVAL = 100'

0 5 10 20 30

SCALE IN MILES



## POWER RESOURCES, INC.

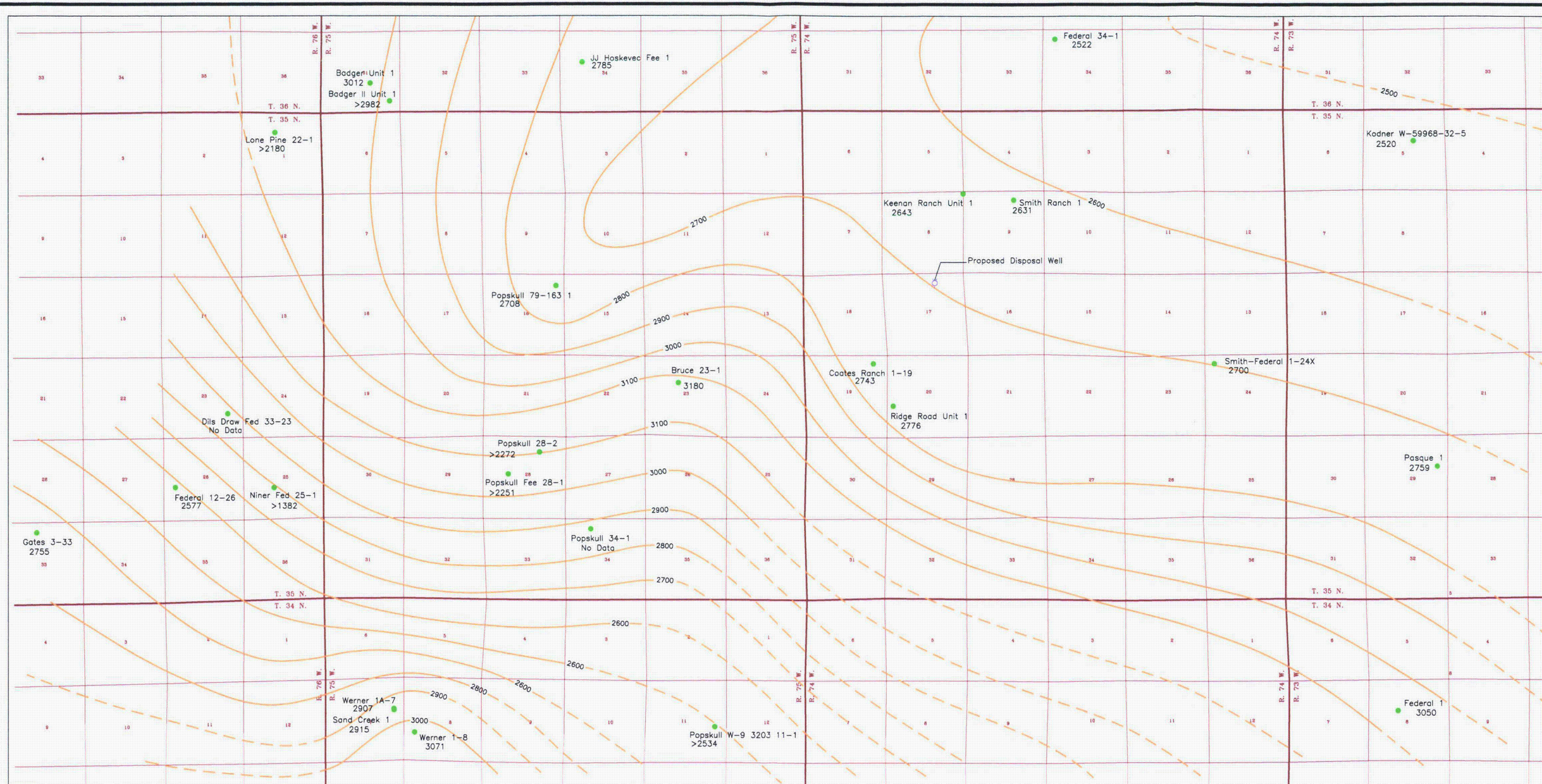
FIGURE 2A  
REGIONAL ISOPACH OF LANCE FORMATION

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DWG: Figure2AL.dwg	BY: KRS   CHECKED: HPD




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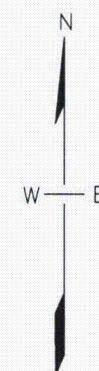




## LEGEND

-  Proposed Disposal Well
-  Pasque 1 2459
-  Isopach Contour Interval = 100 Feet, Dashed Where Inferred

0 6600 13,200  
SCALE: 1" = 6600'



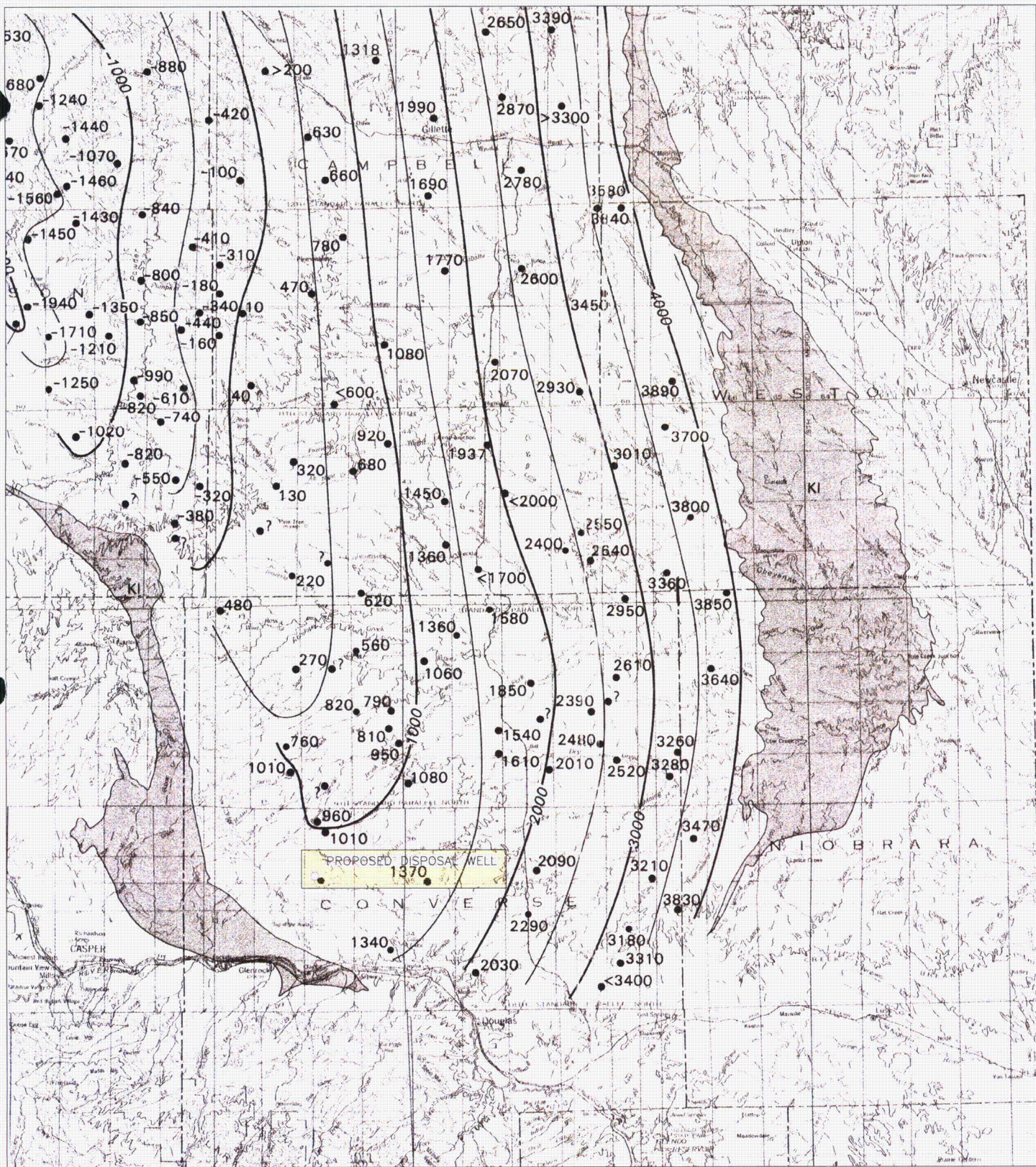
## POWER RESOURCES, INC.

FIGURE 3  
REGIONAL ISOPACH OF LANCE FORMATION  
IN THE PRI PROPOSED WELL LOCATION

PROJECT: 288-17 DATE: DECEMBER 2006  
ISOPACHS EXHIBIT.dwg BY: KRS CHECKED: HPD

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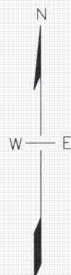
# LEGEND

- APPROXIMATE LOCATION OF PROPOSED DISPOSAL WELL
- CONTOUR INTERVAL = 500' IN ELEVATION ABOVE MEAN SEA LEVEL



Map from: Connor, 1992

SCALE IN MILES



## POWER RESOURCES, INC.

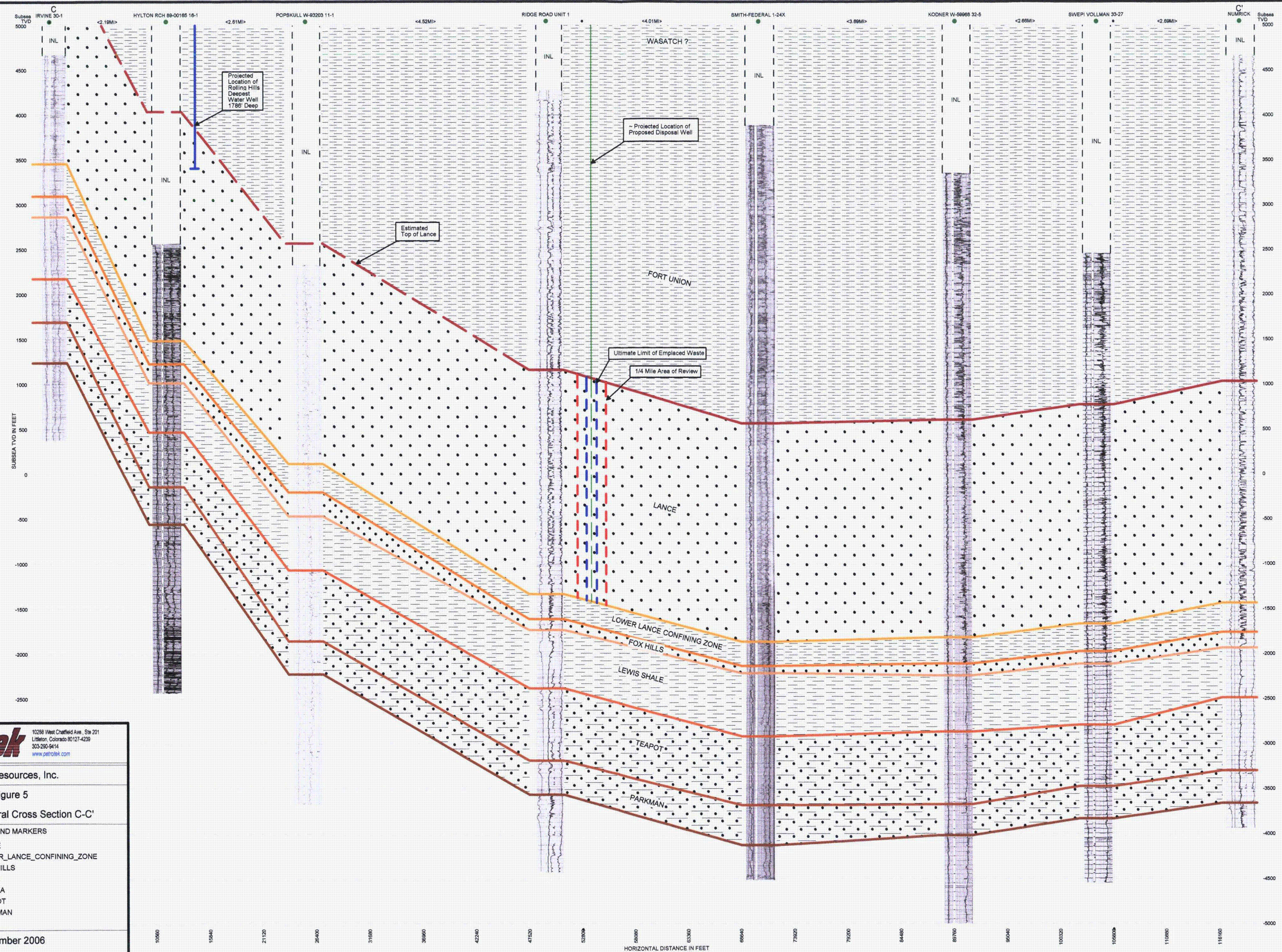
FIGURE 4  
REGIONAL STRUCTURE CONTOUR MAP  
TOP OF LANCE

PROJECT: 288-17	DATE: DECEMBER 2006
DWG: Figure4L.dwg	BY: KRS CHECKED: HPD

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Figure 5

Regional Structural Cross Section C-C'

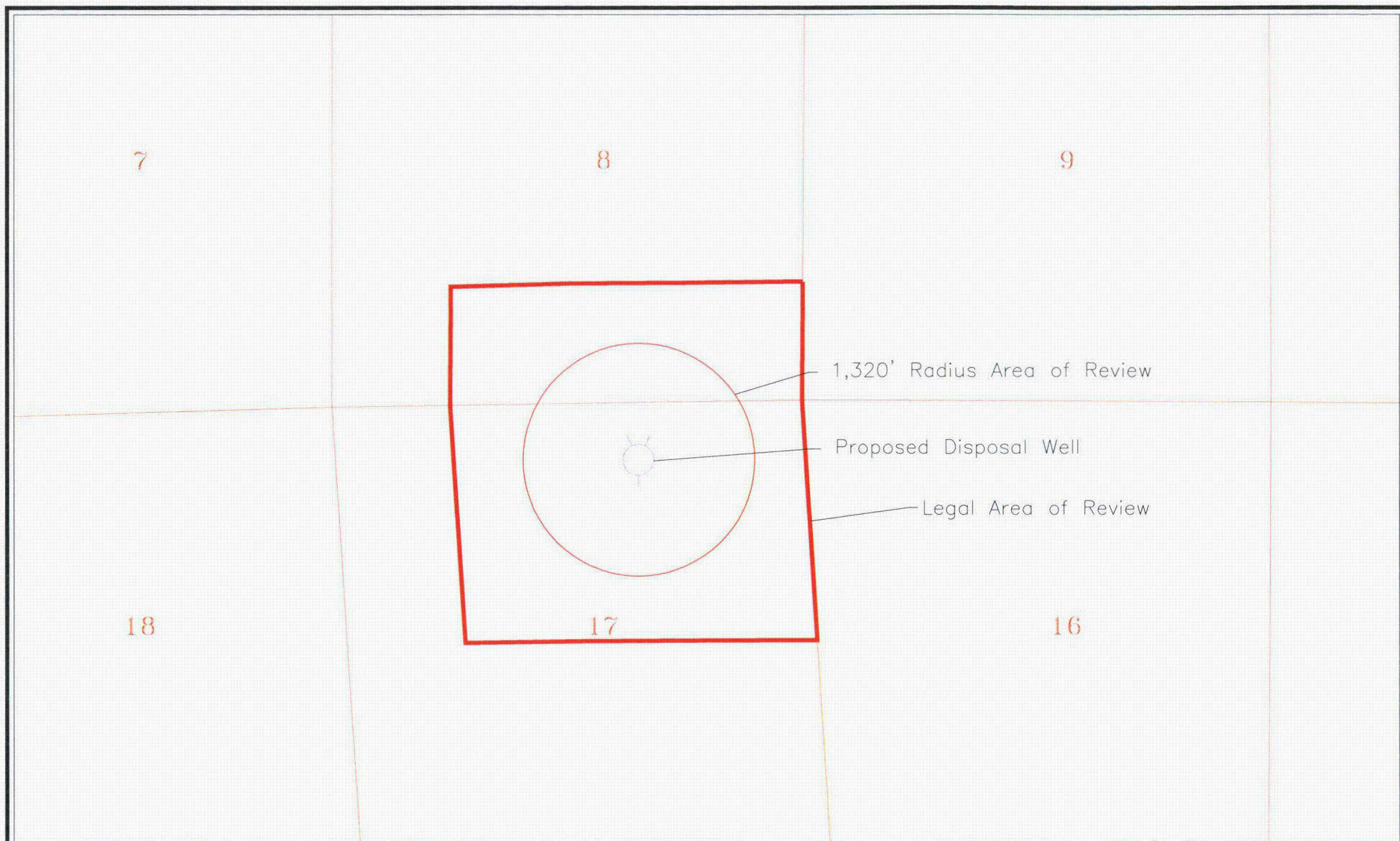
TOPS AND MARKERS

- LANCE
- LOWER\_LANCE\_CONFINING\_ZONE
- FOX\_HILLS
- LEWIS
- TECKLA
- TEAPOT
- PARKMAN

December 2006


By: KRS Checked: HPD

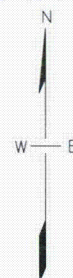
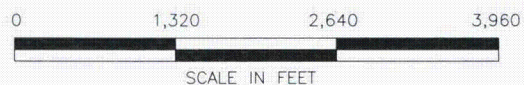




# LEGEND

 Proposed Disposal Well

 Legal Area of Review



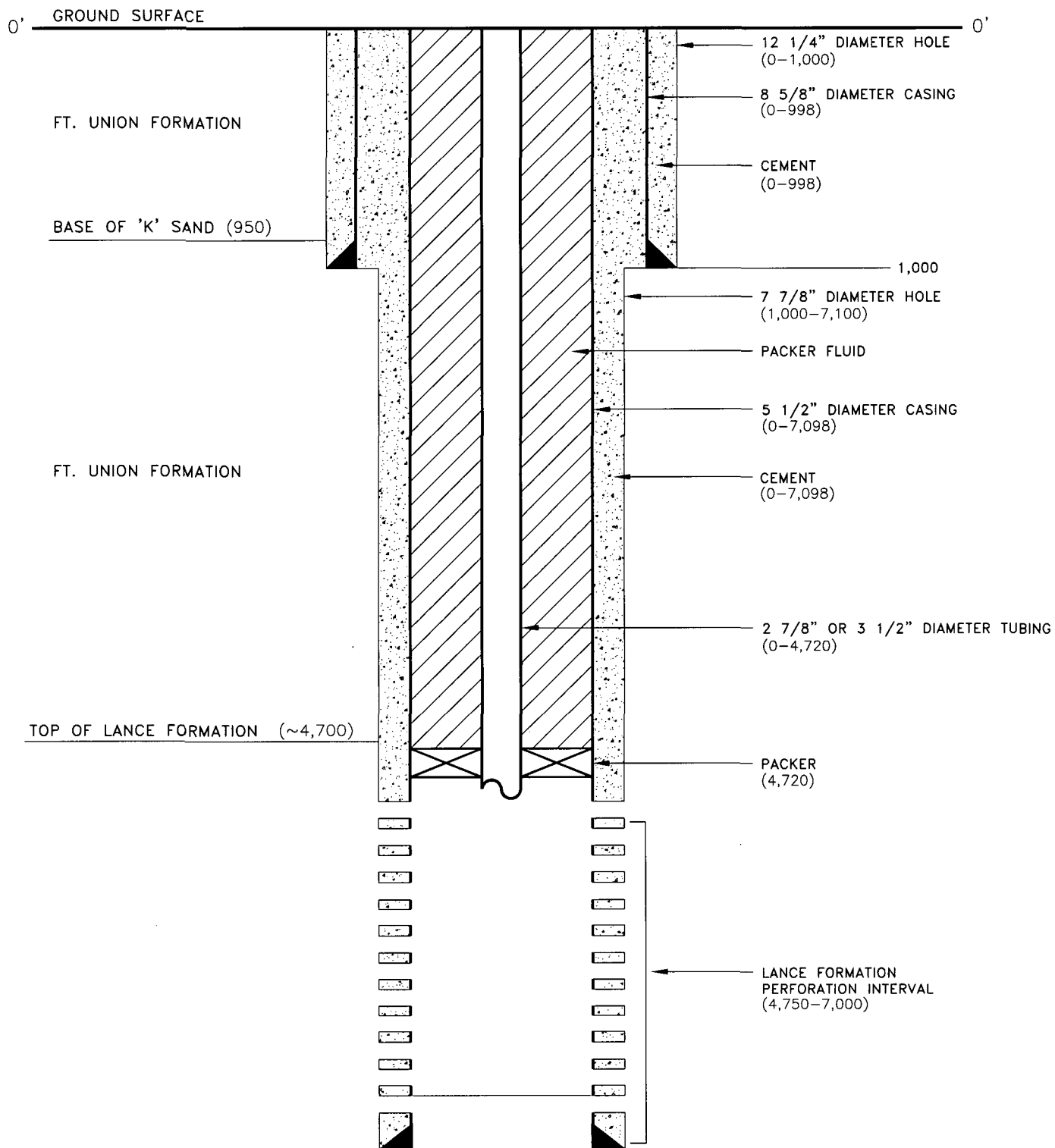
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FIGURE 6  
AREA OF REVIEW - LANCE  
FOR PROPOSED CLASS I WELL LOCATION

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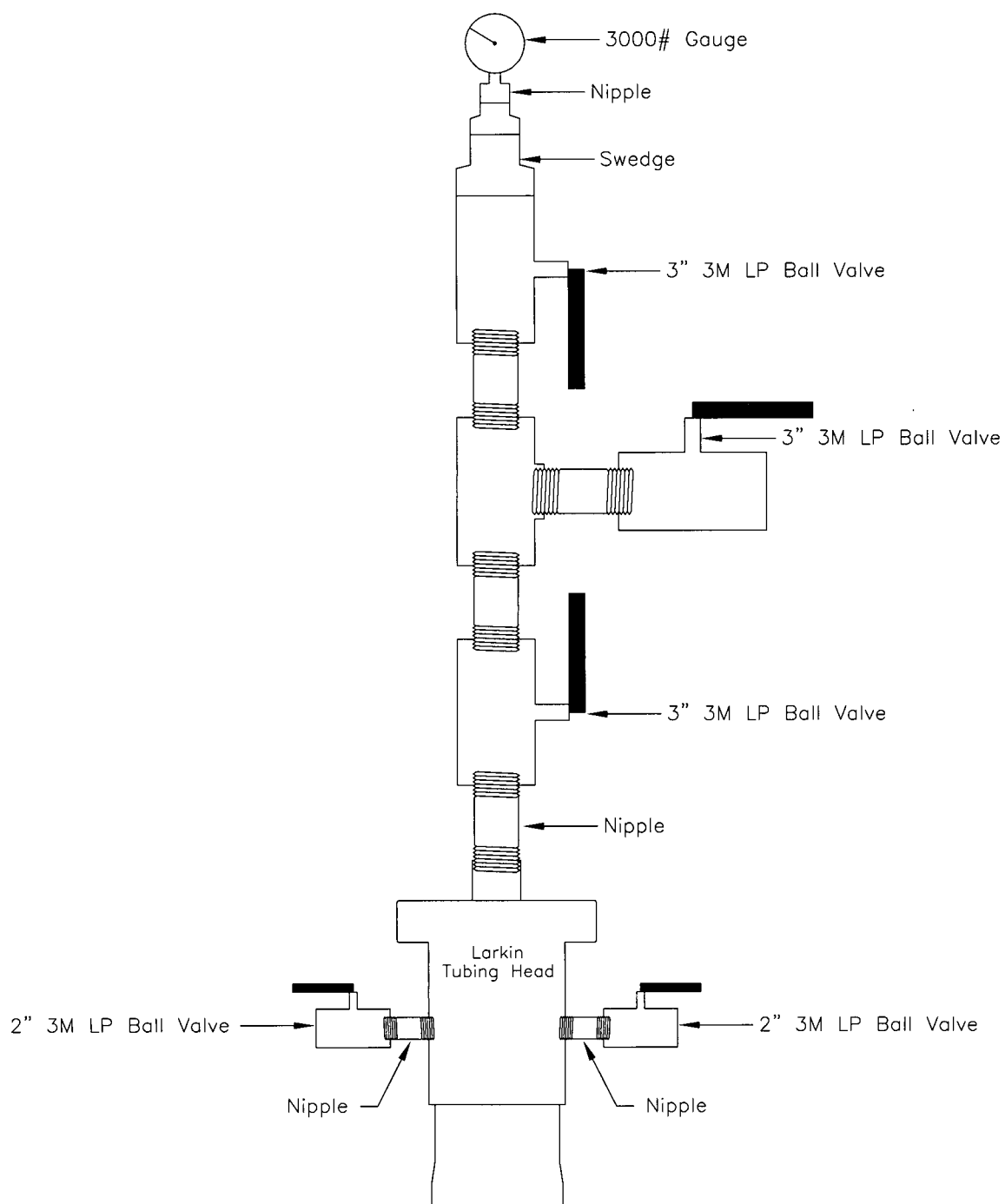
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FIGURE 7  
PRELIMINARY WELL COMPLETION SCHEMATIC  
POWER RESOURCES SWA CLASS I WELL

PROJECT: 288-17	DATE: DECEMBER 2006
DWG: Figure77aL.dwg	BY: KRS CHECKED: HPD

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NOT TO SCALE

POWER RESOURCES, INC.

FIGURE 7A  
PRELIMINARY WELLHEAD SCHEMATIC  
POWER RESOURCES SWA CLASS I WELL

PROJECT: 288-17	DATE: AUGUST 2006
DWG: Figure77aL.dwg	BY: KRS CHECKED: HPD

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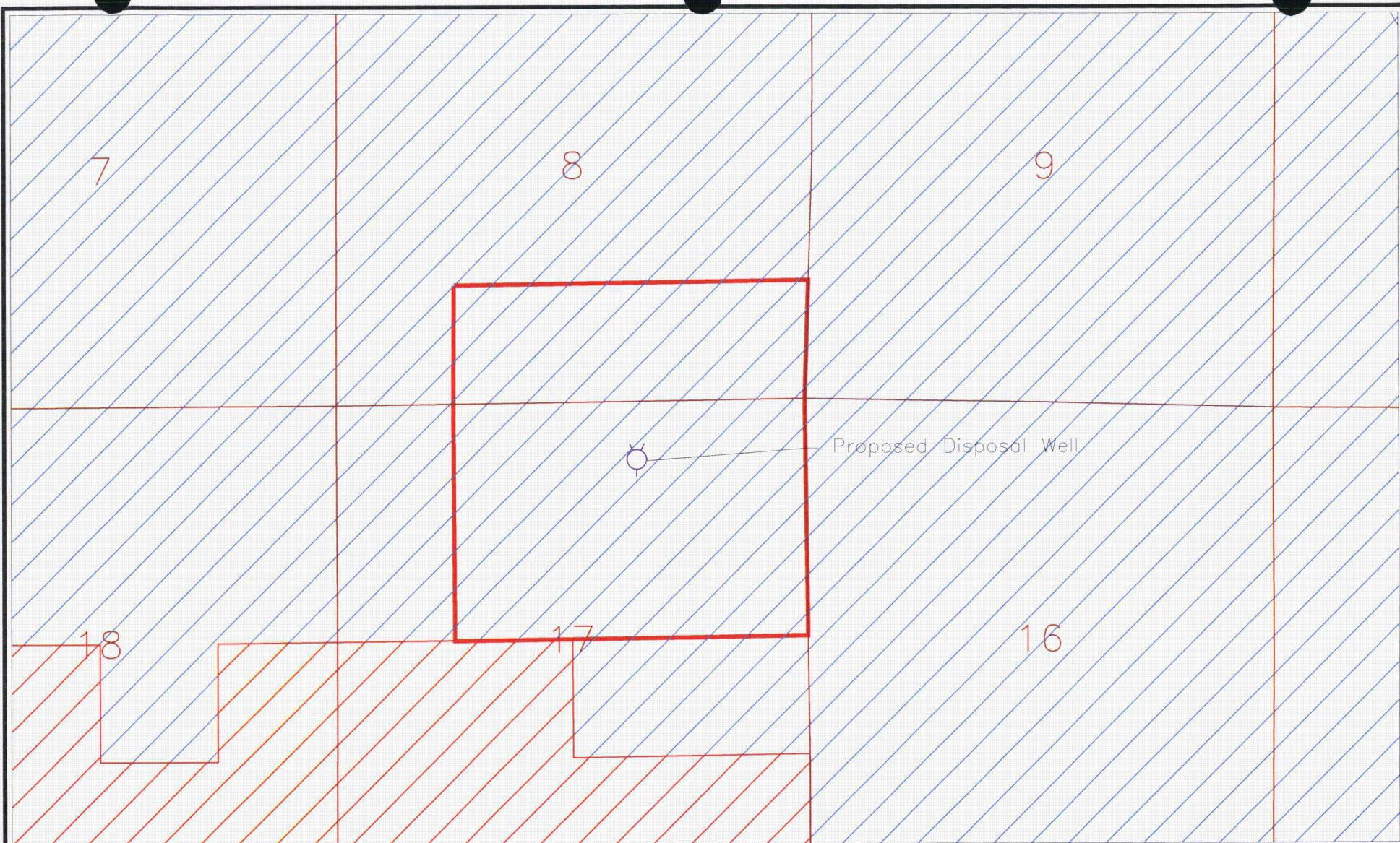
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**THIS PAGE IS AN  
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FIGURE,  
THAT CAN BE VIEWED AT THE  
RECORD TITLED:  
DRAWING NO.: FIGURE 8, “WASTE  
DISPOSAL WELL INJECTION SYSTEM  
P&ID”**

**WITHIN THIS PACKAGE... OR,  
BY SEARCHING USING THE  
DOCUMENT/REPORT  
DRAWING NO. FIGURE 8**

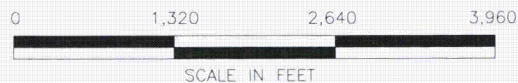
**D-01**





# LEGEND

- Proposed Disposal Well
- Legal Area of Review
- Smith Land Company
- Magee Revocable Trust



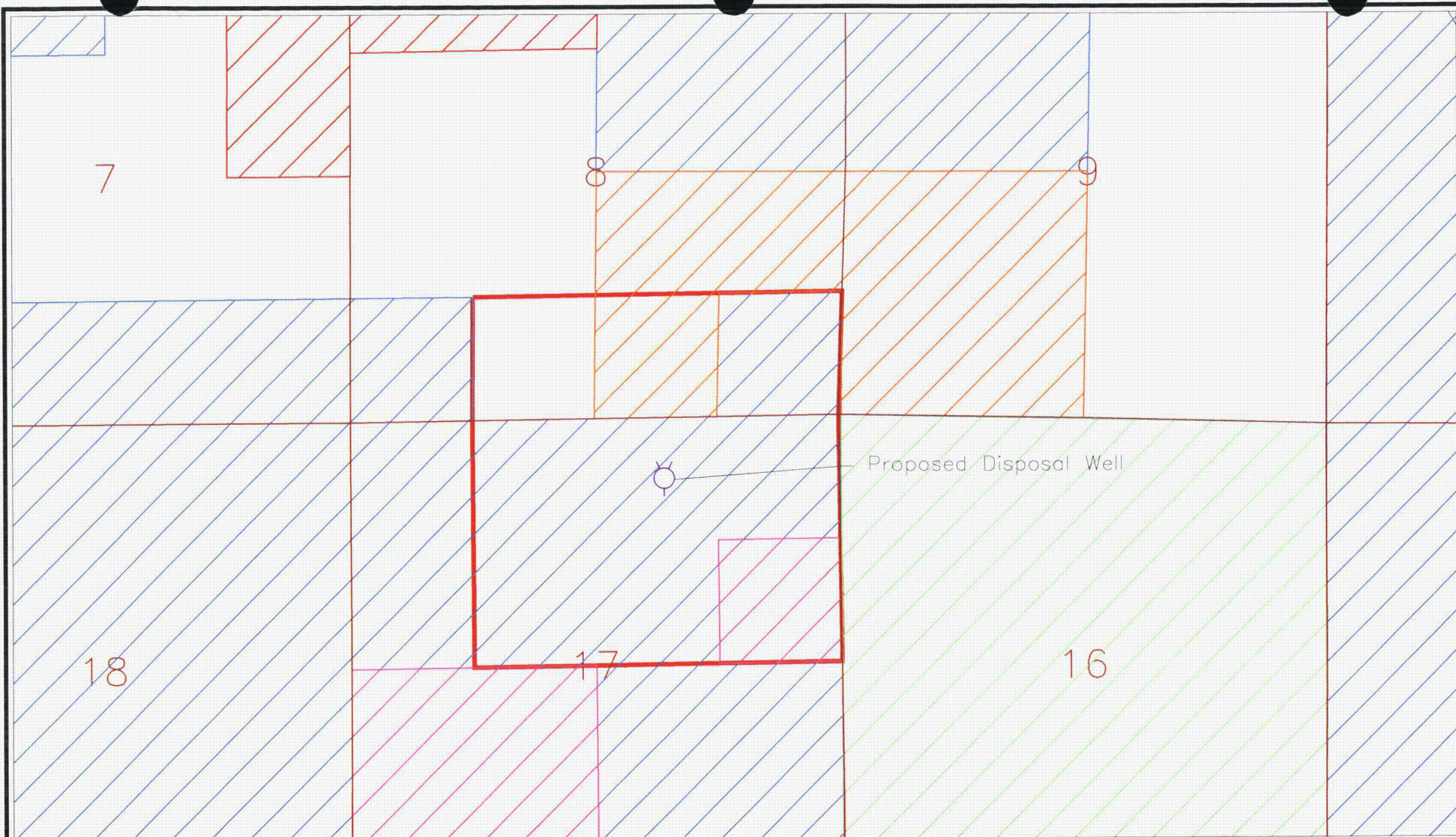
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FIGURE 9  
SURFACE OWNERSHIP  
WITHIN AREA OF REVIEW








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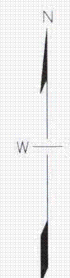
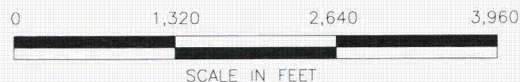
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# LEGEND

-  Proposed Disposal Well
-  Legal Area of Review
-  Robert B. Ferguson
-  Hanson & Strahn, Inc.
-  EGO Resources, Inc.
-  W.A. Moncrief, Jr.
-  Rincon Exploration LLC



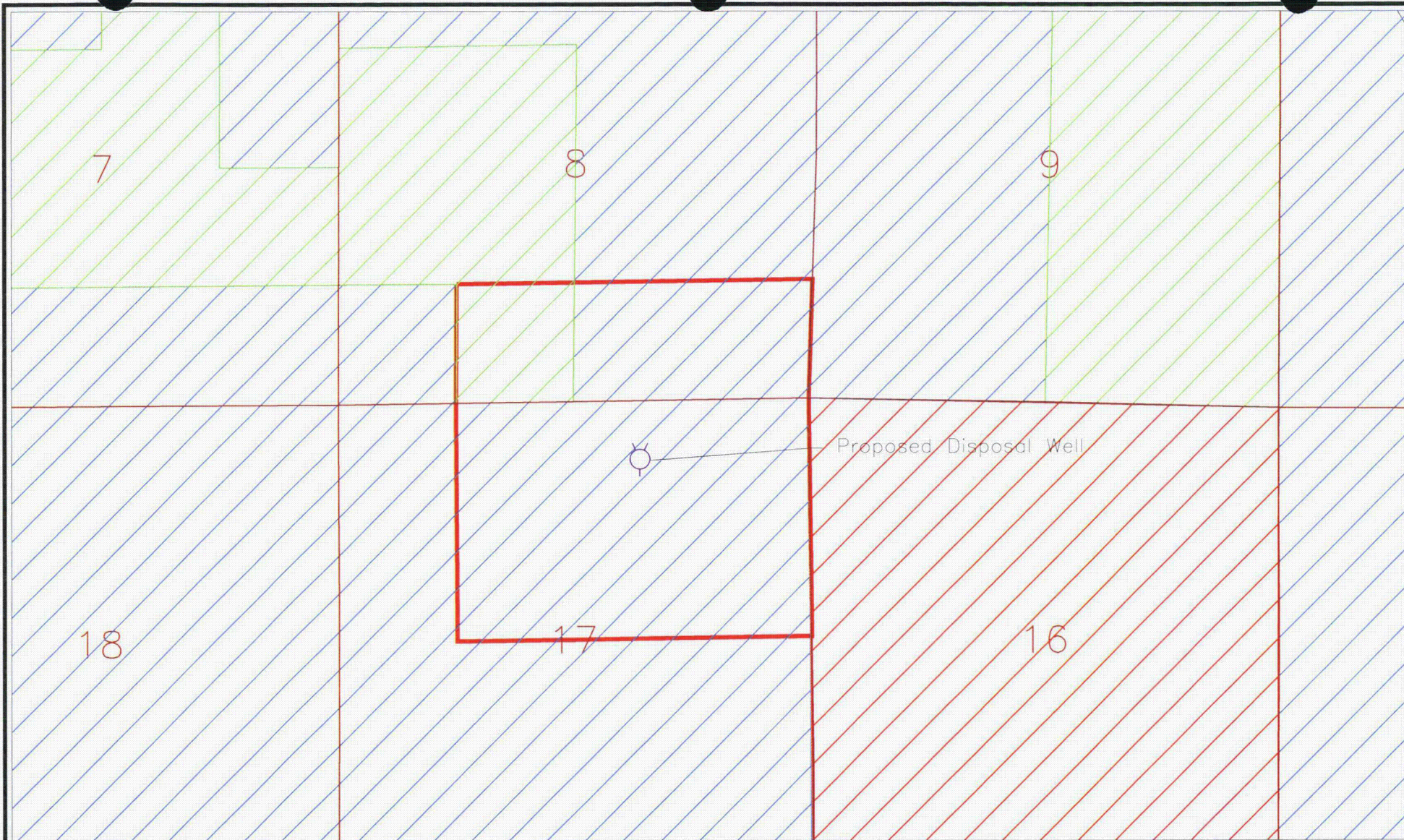
POWER RESOURCES, INC.

FIGURE 10  
OIL AND GAS OWNERSHIP  
WITHIN AREA OF REVIEW






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# LEGEND

-  Proposed Disposal Well
-  Legal Area of Review
-  The United States of America
-  State of Wyoming
-  Smith Mineral Trust

0 1,320 2,640 3,960

SCALE IN FEET



POWER RESOURCES, INC.

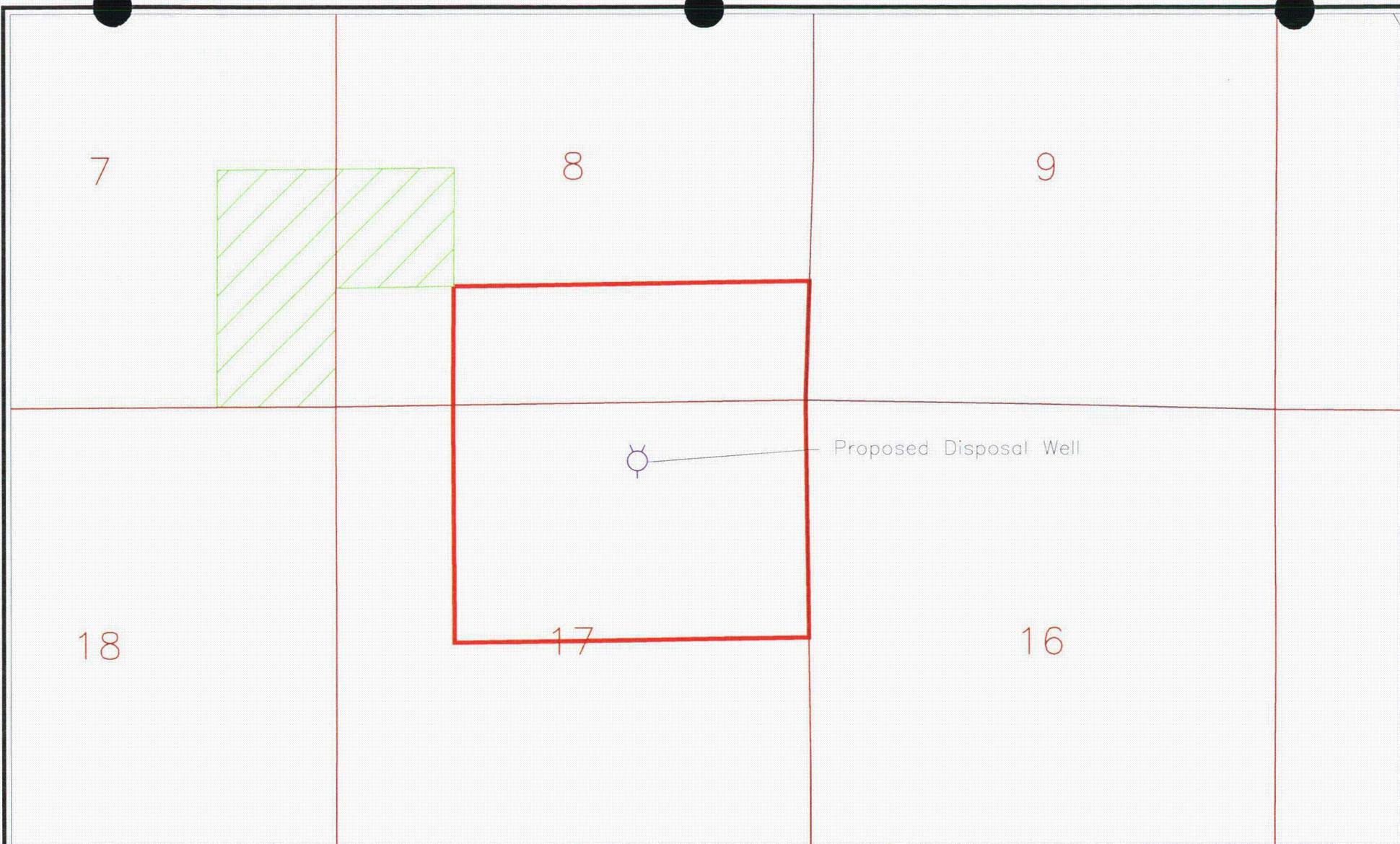
FIGURE 11  
MINERAL OWNERSHIP  
WITHIN AREA OF REVIEW

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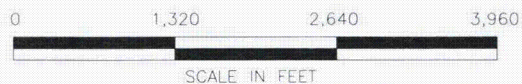
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# LEGEND

-  Proposed Disposal Well
-  Legal Area of Review
-  William J. Smith



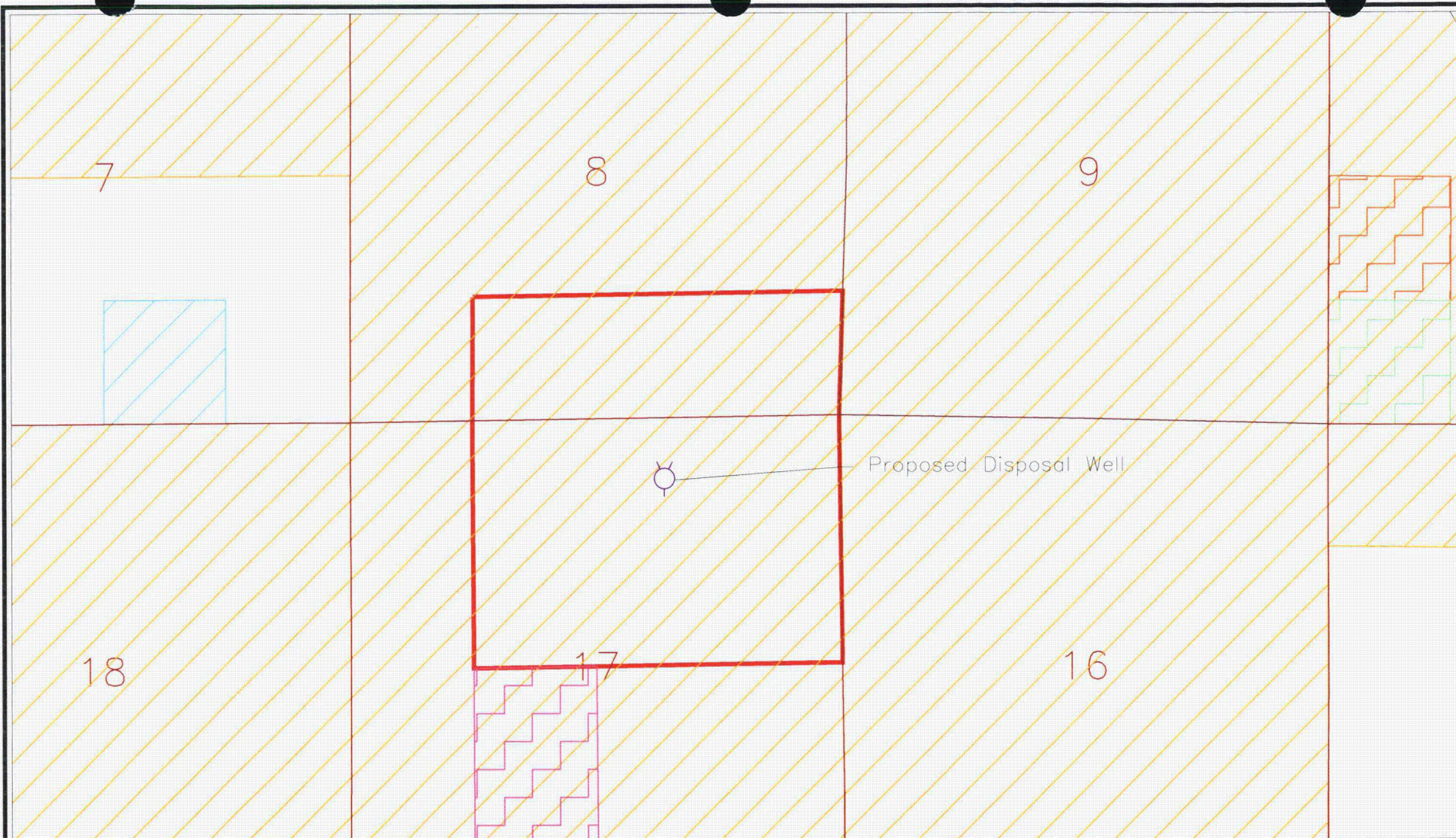
POWER RESOURCES, INC.

FIGURE 12  
SURFACE WATER RIGHTS  
WITHIN AREA OF REVIEW

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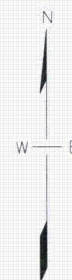




# LEGEND

-  Proposed Disposal Well
-  Legal Area of Review
-  Power Resources
-  Glenrock Coal Company
-  Smith Land Company
-  Smith Sheep Company
-  Pacificorp

0 1,320 2,640 3,960  
SCALE IN FEET



POWER RESOURCES, INC.

FIGURE 13  
GROUNDWATER WATER RIGHTS  
WITHIN AREA OF REVIEW

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